2023 Plastic Surgery The Meeting Abstracts

Aesthetic

Long-Term Maintenance of Nasal Tip Projection and Rotation with the Columellar Strut Graft

Abstract Presenter
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BACKGROUND: Maintenance of nasal tip projection and rotation are important factors to consider when evaluating the utility of specific rhinoplasty techniques with respect to desired long-term outcomes. Whereas septal extension grafts have been shown to be associated with preserved tip projection and rotation over time, the long-term efficacy of the columellar strut graft remains debatable. This study aims to evaluate the impact of the columellar strut graft on nasal tip projection and rotation.

METHODS: This is a retrospective study of patients who underwent primary rhinoplasty at a single private practice between 2003-2022 and had at least two follow-ups with standardized photography. Preoperative and postoperative standardized right profile images were compared. Nasal tip projection was evaluated using both the nasofacial angle and the Goode ratio. Nasal tip rotation was evaluated using the nasolabial angle. Statistically significant variation between postoperative measurements was assessed using paired t-tests. Bivariate analysis was used to determine the significance of time on long-term maintenance of tip rotation and projection.

RESULTS: A total of 51 patients underwent primary rhinoplasty with a columellar strut graft and had at least two follow-ups with standardized photography. The mean age was 29.98±14.61 years. From the operation date, the mean time to the first follow-up was 444.83±338.13 days, and the mean time to the second follow-up was 1047.88±497.60 days. The mean nasolabial was 99.09±11.74 preoperatively, 103.52±12.16 at the first postoperative follow-up, and 100.17±10.93 at the second postoperative follow-up. The second postoperative nasolabial angle differed significantly from the first postoperative nasolabial angle ($p=0.0007$). The mean Goode ratio was 0.65±0.051 preoperatively, compared to 0.62±0.047 and 0.57±0.048 at the first and second postoperative follow-ups, respectively. The second postoperative Goode ratio was significantly lower than the first postoperative Goode ratio ($p<0.0001$). The mean nasofacial angle was 142.30±7.27 preoperatively, 142.09±7.50 at the first postoperative follow-up, and 142.90±6.35 at the second postoperative follow-up. Postoperative nasofacial angles were not found to be significantly different from one another ($p=0.16$). The time between the first and

second postoperative follow-ups was not significantly associated with increased or decreased changes in nasolabial angle (p=0.93), Goode ratio (p=0.38), or nasofacial angle (p=0.24).

CONCLUSIONS: The columellar strut graft remains an effective technique for the long-term optimization of nasal tip projection, as the final postoperative Goode ratio was found to be closer to the ideal ratio of 0.55-0.60 compared to the preoperative Goode ratio. The nasofacial angle was maintained over time, indicating that the columellar strut graft may be effective for long-term maintenance of tip projection. Although both the nasolabial angle and Goode ratio were susceptible to change over time, the contributory role of postoperative swelling on these results remains unclear. Given that time between follow-ups was not associated with an increased magnitude of change for any metric, indicating that tip projection and rotation stabilize over time, surgeons may leverage estimated longitudinal changes in tip projection and rotation to achieve optimal long-term outcomes.

Costal Cartilage Grafts in Dorsal Augmentation Rhinoplasty: A Systematic Review and Meta-Analysis (Top Medical Student)

Abstract Presenter
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BACKGROUND: Oftenly, cartilage is added as a supporting structure in the nose in augmentation rhinoplasty. The two most commonly used options for rhinoplasty are irradiated homologous costal cartilage (IHCC) and, autologous costal cartilage, while Tutoplast is may also be used as an alternative. Currently, there is no definitive study comparing the complications rates between grafts of IHCC and autologous costal cartilage. This study aimed to compare the outcomes of patients who had septorhinoplasty with autologous costal cartilage, IHCC, or Tutoplast grafts based on the complications rates reported in the available publications.

METHODS: A meta-analysis and systematic review were conducted using various databases, including MEDLINE, Embase, Scopus, Cochrane Central Register of Controlled Trials, and ClinicalTrials.gov. The search covered articles published from the inception of the databases to December 2022. The following keywords were used: septorhinoplasty, rhinoplasty, autologous costal cartilage graft, cadaveric cartilage graft, and rib graft. Patients who went through an en bloc dorsal onlay graft were only included to ensure a homogenous study sample. A random-effects model was used to pool the data. The measured outcomes included complications such as graft warping rates, resorption, infection, contour irregularity, and revision surgery among patients who had autologous grafts vs IHCC vs Tutoplast cartilage grafts.

RESULTS: Out of 678 unique citations identified in the search, 37 studies were added in the meta-analysis. These studies included 2785 patients, of whom 2429 received autologous grafts, and 349 received IHCC grafts (regardless of type). When comparing autologous cartilage (n = 2429) vs IHCC (n = 209) vs Tutoplast cartilage (n = 140) grafts, no significant difference was found in warping (6.6%; 95%CI, 4.1%-9.8%), resorption (4.2%; 95%CI, 2.6%-6.2%), contour irregularity (2.9%; 95%CI, 1.8%-4.3%), infection (3.8%; 95%CI, 2.4%-5.4%), or revision surgery (6.8%; 95%CI, 4.3%-9.7%).

CONCLUSION: The study found no significant difference in outcomes or complications between autologous cartilage and IHCC grafts, indicating that either material may be used for dorsal augmentation rhinoplasty.

A Not-So-Glamorous Vacation: The Impact of Cosmetic Surgical Tourism on Patients and the Healthcare System

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BACKGROUND: Cosmetic tourism describes the practice of patients traveling, either domestically or internationally, to seek out cosmetic surgery at lower costs. Despite the seemingly lower initial price tag for the surgery, patients can face devastating consequences from limited preoperative evaluation and postoperative follow-up. Patients are often left alone to manage their wounds, drains and possible complications. The purpose of this study was to assess the most common complications experienced by this population and elucidate the additional burden placed on the healthcare system.

Methods: A total of 57 patients presented to the emergency department at our institution with cosmetic tourism-related complications from 2018 through 2022. Information regarding patient demographics, procedures performed, complications and hospital resource utilization was analyzed. Wilcoxon rank sum test was used to assess differences in continuous variables. Fisher test was used to assess differences in categorical variables.

RESULTS: A total of 57 patients were identified, with 47% of patients undergoing procedures abroad and 53% undergoing procedures domestically. Overall, 95% of patients were female with a mean age of 39 ± 9.2 years. There were no statistically significant differences in sex, race, ethnicity, educational level, or insurance type between patients who underwent surgery domestically versus abroad. All the domestic cosmetic tourism occurred in Florida while 70% of the abroad patients underwent their procedures in the Dominican Republic, with the remainder occurring in Brazil, Colombia, and Mexico. The most common procedure was abdominoplasty, with 70% of patients undergoing one alone or in combination with other procedures. This was followed by liposuction and gluteal fat grafting (51% and 25%, respectively). Wound dehiscence (33%) and seroma formation (32%) were the most common complications, followed by infection

(26%). Regarding healthcare utilization, 23 (40.4%) patients were admitted, 48 (84.2%) underwent at least one imaging study, 29 (50.9%) underwent a bedside or radiology-guided procedure, and 6 (10.5%) required a reoperation.

CONCLUSION: Complications following cosmetic tourism were found to cause significant impacts on both patients and the healthcare system necessitating utilization of radiologic imaging, bedside and operating room procedures, and inpatient management. Our analysis revealed that dehiscence, seroma formation and infection are particularly common complications experienced by this cohort. Greater awareness and patient education about the risks of cosmetic tourism should be implemented to limit the cost burden on patients and hospital systems.

Variation in Percentage of Residents Pursuing Aesthetic Fellowships between Plastic and Reconstructive Surgery and Other Specialties

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PURPOSE: The field of aesthetic surgery has grown significantly over the past few decades with multiple specialties offering pathways into the field through fellowship training- plastic and reconstructive surgery to aesthetic plastic surgery, otolaryngology to facial plastic surgery, ophthalmology to oculofacial plastic surgery, and dermatology to cosmetic dermatology, respectively. Although potentially lucrative, bias against aesthetic fields and procedures remains prominent in the literature, though it is unclear whether this stigma is present among residents in programs with opportunities to pursue aesthetic fellowship training1-3. To address this, the authors aimed to compare trends in aesthetic fellowship specialization among eligible graduating seniors and determine the variation between fields.

MATERIALS & METHODS: A retrospective review of data from The San Francisco Match, National Resident Matching Program, American Society for Dermatologic Surgery, and The Accreditation Council for Graduate Medical Education (ACGME) was performed. Collected data included the year, number of total and matched applicants for each aesthetic fellowship (aesthetic plastic surgery, facial plastic surgery, cosmetic dermatology, and oculoplastic surgery), and number graduating residents from each respective residency program. For each field, ratios between the number of graduating residents to the number of residents applying and matching into aesthetic fellowship were calculated. The percent of graduating residents pursuing aesthetic fellowship training across the four specialties was compared using ANOVA and t-tests compared differences in means between fields.

RESULTS: There was significant difference in the proportion of residents pursuing aesthetic fellowship training, both in participating and matched applicants, between the four specialties with otolaryngology having the highest percent, followed by plastic and reconstructive surgery, ophthalmology, and dermatology respectively (ANOVA $p<0.0001$). When comparing the two more surgical specialties, otolaryngology had a significantly higher percent of applicants to aesthetic fellowship compared to plastic and reconstructive surgery (t-test, $p=0.000866$). However, no associated difference was found in the percent of applicants to aesthetic fellowship between the largely non-surgical specialties, dermatology and ophthalmology (t-test, $p=0.060$).

CONCLUSIONS: The percent of residents applying into aesthetic fellowship differs significantly between the respective specialties with otolaryngology having the highest percent. While there was a significant difference in proportion of aesthetic fellowship applicants from surgical fields, no difference was seen between the nonsurgical fields. Since 2018, there has been a general trend of increased applicants to aesthetic fellowship training, possibly reflecting a growing interest in aesthetic specialization.

REFERENCES:
1. Jason Roostaeian, MD, James Rough, MD, Michael C. Edwards, MD, A Plastic Surgery Resident's View of Aesthetic Training and the Future, Aesthetic Surgery Journal, Volume 34, Issue 8, November 2014, Pages 1270–1273, https://doi.org/10.1177/1090820X14548889
2. Alotaibi, Ahmed S. MBBS. Demographic and Cultural Differences in the Acceptance and Pursuit of Cosmetic Surgery: A Systematic Literature Review. Plastic and Reconstructive Surgery - Global Open 9(3):p e3501, March 2021. | DOI: 10.1097/GOX.0000000000003501
3. Motakef, Saba M.D.; Motakef, Sahar M.A.; Chung, Michael T. M.D., et. al. The Cosmetic Surgery Stigma: An American Cultural Phenomenon?. Plastic and Reconstructive Surgery 134(5):p 854e-855e, November 2014. | DOI: 10.1097/PRS.0000000000000604

What is the Ideal Nose? Individual Perspectives and Virtual Simulation Results from Rhinoplasty Surgeons Around the World

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BACKGROUND:
Existing literature on rhinoplasty places little to no emphasis on variability and evolution of ideal nasal aesthetics. Our group sought to use virtual 3D computer simulation to identify potential differences in ideal nasal aesthetics between rhinoplasty surgeons with varied experience,

training, and geography.

METHODS: A cohort of surgeons were invited to participate in this simulation study. Participating surgeons then took part in a simulation session, in person or via Zoom, and were asked questions regarding their practice, including location, years experience, percent cosmetic and open rhinoplasty performed, number of rhinoplasties performed each year, and private vs academic. An identical set of 3D images (Vectra H1) for 3 patients (P1,2,3), with varying degrees of nasal deformities and facial proportions were used and surgeons were asked to create an ideal rhinoplasty result using the Canfield Vectra software system.

All simulated 3D images were then analyzed by placing standardized landmarks and measuring the distance (mm) of radix height (RH), dorsal height (DH), alar width (AW), nasal tip projection (NTP), and nasal tip rotation (NTR).

RESULTS: A total of 111 surgeons from 28 countries completed the study to date (response rate 6.4%). Rhinoplasty surgeon demographics were as follows: 92% male, 70% plastic surgeons (29% facial plastics, 1% OMFS), 75% private practice, and 64% fellowship trained. The surgical practices included in the study demonstrated the following averages: 17+/-11 years experience, 123+/-101 rhinoplasties performed per year, with 75% and 77% of rhinoplasty procedures being cosmetic and via an open approach, respectively.

RADIX&DORSUM: Interestingly, increasing number of years of experience was associated with an increase in both RH and DH(RH, P1,2,3;p=<0.05,<0.01,<0.01)(DH, P2,3; p=<0.01,<0.01). Similar findings of an increased RH were noted in surgeons that identified as private practice(P3;p=<0.05). Conversely, the ideal RH was noted to be lower for surgeons using an open technique(P2;p=<0.05). The ideal DH was noted to be lower for surgeons who were fellowship trained(P2;p=<0.05) and performed primarily cosmetic rhinoplasty(P2;p=<0.05).

NASAL TIP COMPLEX: Ideal noses demonstrated a significant increase in NTR for surgeons who had increased years of experience(P1;p=<0.05) and those who primarily performed open rhinoplasty(P3;p=<0.05). NTP was significantly increased in ideal noses by surgeons who had increased years of experience (P2,3;p=<0.05,<0.05) and performed an increased number of cosmetic rhinoplasties(P2;p=<0.05). On the other hand, ideal noses demonstrated a significant decrease in NTP in fellowship trained rhinoplasty surgeons(P2,3;p=<0.05,<0.05), facial plastic surgeons(P2;p=<0.05), and female surgeons(P2;p=<0.05). When stratifying surgeons by location, distinct visual differences were noted in simulated ideals. For instance, Eastern European countries, such as Turkey, increased NTP, NTR and decreased DH when compared to the Northeast US, such as New York. However, these comparisons did not reach statistical significance.

CONCLUSION: Our data suggests surgeons increased years of experience produce a more conservative nasal profile characterized by radix augmentation and less aggressive DH reduction. Analysis of geographic location showed no significance, however, visual representation of geographical ideals proves to highlight differences in the ideal nose. While aesthetic standards in rhinoplasty exist, 3D technology quantifies differences in perceived ideal aesthetics

Is it Time to Reevaluate Our Body Mass Index Cutoff in Body Contouring Surgery? An Assessment of the Preferred Cutoff Values to Minimize Venous Thromboembolism and Wound Complications (Top Medical Student)

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INTRODUCTION: Obesity has been linked extensively to adverse outcomes, such as wound complications and venous thromboembolisms (VTEs), for patients undergoing plastic surgery, especially regarding body procedures.1 However, most surgeons utilize variable and arbitrary body mass index (BMI) cutoffs. The purpose of this study was to reevaluate an optimal BMI cutoff to avoid complications in elective body contouring procedures.

METHODS: The 2010-2020 National Surgical Quality Improvement Program (NSQIP) database was queried for patients undergoing an infraumbilical panniculectomy including a lipectomy (CPT = 15830). A binary logistic multivariable regression was run to determine any significant preoperative variables associated with either wound complications or VTEs. Patients were excluded if they possessed any preoperative variables that were statistically significant in our regression for each of those complications. For both the VTE and wound complication cohorts, a receiving operating characteristics (ROC) curve was generated with a 95% confidence and a Youden's Index (J) calculated with the highest J determining the optimal BMI cut-off values.

RESULTS: A total of 10,241 patients were included for analysis in the wound complication cohort. Within this cohort, 520 (5.1%) patients experienced wound complications. For the VTE complication cohort, 16,123 patients were included for analysis with an overall VTE complication rate of 0.8% (n = 130). The area under the curve (AUC) for the wound complication and VTE cohort was 0.643 and 0.613 respectively. The optimal BMI cutoff based on the J statistic for the wound complication cohort was 30.5 while for the VTE cohort it was 28.2.

CONCLUSIONS: Our research determined that the optimal BMI cutoffs to avoid VTEs and wound complications in patients undergoing abdominal contouring procedures are 28.2 and 30.5 respectively. These values can be utilized to guide shared decision making in patients undergoing elective body contouring surgery.

1. Joslyn NA, Esmonde NO, Martindale RG, Hansen J, Khansa I, Janis JE. Evidence-Based Strategies for the Prehabilitation of the Abdominal Wall Reconstruction Patient. Plastic and Reconstructive Surgery. 2018;142(3S):21S. doi:10.1097/PRS.0000000000004835

Facial Hypertrophy as a Complication of Weight Gain in Autologous Fat Graft Patients: Considerations and Recommendations

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OBJECTIVES: This study aims to systematically assess the literature to investigate the effects of postoperative weight gain on facial hypertrophy in patients after facial fat grafting.

METHODS: A search through PubMed/Medline was conducted on October 4, 2022 to identify relevant articles using appropriate search terms: "fat graft," "lipofill," "autologous fat graft," "facelift," "fat injection," "secondary facelift," "stem cell facelift," "fat transfer," "fat augmentation," "lipograft," "lipotransfer," "weight gain," "obesity," "growth," "grow," "enlarge," "excess," and "fattening." No lower date limit was used and all eligible non-animal clinical articles in English were included for review. Reports were summarized and presented as descriptive statistics.

RESULTS: The search generated 714 articles, 202 of which were automatically excluded by the "English" and "human" PubMed criteria. After abstract and full text review of the initial set of articles, a total of 6 were included in our analysis. All articles described poor cosmetic outcomes resulting from non-anatomic hypertrophy of the grafted fat, and none of the articles reported a thorough methodology that incorporated patient-specific weight fluctuation analysis when selecting the donor site.

CONCLUSION: Grafted facial fat is susceptible to exaggerated hypertrophy with changes in patient weight. Given the relatively small volumes required for the face, the most abundant fat compartment in the body may not be ideal for harvesting lipoaspirate for facial fat injection.

Are Scar Assessment Tools Validated with Skin-Color Diverse Populations?

Abstract Presenter

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BACKGROUND: Across scar studies, there is a lack of dark-skinned individuals, who have a predisposition for keloid formation, altered pigmentation, and poorer quality-of-life. There is a need for patients-of-color to be included in scar scale development and validation. In this study, we evaluate the racial diversity of patients included in the validation of scar assessment scales.

METHODS: A systematic review was conducted for articles reporting on the validation of a scar assessment tool. Racial, ethnic, and Fitzpatrick skin type(FST) data was extracted.

RESULTS: Fifteen scar scale validation studies were included. Nine of the studies did not mention FST, race, or ethnicity of the patients. Two of the studies that reported FST or race information only included White patients or included no FST V/VI patients: MAPS and UNC4P. Only four studies included non-white patients or dark-skinned patients in the validation of their scar scale: the modified Vancouver Scar Scale, Modified POSAS, Acne QOL, and SCAR-Q scales. The patients included in the modified VSS validation were 7 and 13% FST V/VI, 14% African in the modified POSAS, and 4.5% FST V/VI in the SCAR-Q.

CONCLUSION: We highlight the severe lack of diversity in scar scale validation, with only 4 out of 15 studies including dark-skinned patients. Given the susceptibility of darker-skinned individuals to have poorer scarring outcomes, it is critical to include patients-of-color in the very assessment tools that determine their scar prognosis. Inclusion of patients-of-color in scar scale development will improve scar assessment and clinical decision-making.

Survey on Adjuncts Used to Enhance Autologous Fat Grafting Outcomes (Top Medical Student)

Abstract Presenter
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BACKGROUND: Autologous fat grafting (AFG) is a surgical procedure in which a patient's fat tissue is harvested from one part of the body and injected into another area to add volume, contour, or rejuvenation. Due to its natural-looking results and long-term durability, this technique has gained popularity in various cosmetic and reconstructive surgeries, such as facial rejuvenation, breast augmentation, buttocks enhancement, and soft tissue reconstruction. This survey presents a contemporary assessment of prevalent practices concerning adjunct implementation in autologous fat grafting procedures.

METHODS: A 52-question survey was emailed to 3,106 active American Society for Aesthetic Plastic Surgery members. 187 responses were recorded to date representing a 6% response rate.

RESULTS: A total of 186 surveyors report performing autologous fat grafting (AFG). 25% of the surgeons reported a practice length of 9 years or less, 37% reported 10-25 years of experience, and 38% had over 25 years of experience. The majority of respondents (97%) are in private practice. Only 55% of respondents reported performing 100% cosmetic procedures in their practice. The primary procedures involving autologous fat grafting are Gluteal (36%), Facial augmentation (35%), and Breast (27%). Contour deformities/corrections anywhere was noted at 1.6%. Preoperative systemic antibiotic prophylaxis was reported by 154 (82%) of surgeons. 91% indicating the usage of Cefazolin. Prolonged (>72hrs) preoperative use of antibiotics was reported by 57% of surgeons, the majority utilizing Cephalexin (35%) or Cefazolin (32%). Lipoaspirate and antibiotic mixture was reported in 37 out of 187 respondents (20%). The most commonly used antibiotics mixed in the lipoaspirate were Clindamycin (57%), followed by Cefazolin (38%). Six of the 37 surgeons (16%) use a combination of Cefazolin in conjunction with other antibiotics. As additional adjunct therapies 78 surgeons (42%) reported using Tranexamic Acid (TXA). Ten surgeons (5%) reported using Plasma Rich Platelets (PRP) for their autologous procedures. Additionally, 36 of the 186 surgeons (19%) reported using ultrasound as an additional adjunct in autologous fat grafting.

CONCLUSION: This survey reports on the diverse practice methods and adjunct therapies utilized in autologous fat grafting among aesthetic surgeons to date. It reveals that there is an increasing trend towards adopting new adjunct treatments as they are published in the literature. In order to ensure optimal clinical outcomes and patient safety, standardization and further research is needed to establish evidence-based guidelines.

Using Artificial Intelligence to Quantify Sexual Dimorphism in Aesthetic Faces: Analysis of 100 Facial Landmarks in 42 Caucasian Celebrities

Abstract Presenter
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PURPOSE: Facial aesthetics play an important role in a variety of social outcomes ranging from social interactions, mating preferences to job hiring decisions. The standards of an aesthetically attractive face are different for males and females, as sexual dimorphism (i.e. masculinity or femininity) plays a role in facial attractiveness. Sexual dimorphism has been studied in faces of average populations and worldwide celebrities of various ethnicities. However, a focused analysis of attractive Caucasian faces has not been conducted. Our study is the first of its kind to harness the power of artificial intelligence (AI) in facial recognition technology to efficiently analyze sexual dimorphism in contemporary attractive Caucasian male and female celebrity faces.

METHODS: 21 male and 21 female Caucasian celebrities were selected based on contemporary listings acquired from popular editorial rankings, modeling agencies, and casting directors from 2017-2022. Frontal photos of celebrities aged 23-42 without facial animation were selected. 100 facial landmarks were identified using custom, semi-automatic facial analysis program consisting of modified Apple Vision machine learning algorithms and additional custom points in MATLAB. Measurements were converted to absolute distances by fixing subjects' white-to-white corneal diameters to the validated average in Caucasians.

RESULTS: Attractive males had significantly greater facial height, bigonial and bizygomatic widths, medial and total brow lengths, and alar width than females. Attractive females had significantly greater upper and middle facial proportions, uniformly divided facial thirds, and greater canthal tilt compared to males. The ratio of facial height to bigonial width in females (1.613) and males (1.566) were close to the golden ratio (1.618). No faces exhibited scleral show.
Conclusion: This is the first study to quantify key differences in facial features between aesthetic, Caucasian biological genders. Furthermore, our study harnesses the power of AI for efficient facial analysis that can be applied to other ethnicities as well. Identifying these contemporary patterns between genders will provide valuable insight into planning facial rejuvenation and gender affirmation surgeries.

Fat-tening the Odds: Evaluating the Impact of Lipoaspirate Processing Techniques on Longitudinal Volume Retention in Fat Grafting Surgery

Abstract Presenter

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INTRODUCTION: Autologous fat grafting has been well-established as a successful means of improving aesthetic outcomes following both breast reconstruction and aesthetic surgery through volume enhancement and tissue contouring.1,2 Long-lasting effects are dependent on post-operative volume retention. Several factors, including the harvesting, processing, and injection techniques, may all affect the rate of resorption and the success of deformity filling.3 Volume maintenance is linked to greater patient satisfaction and more optimal augmentation results. Our objective is to evaluate the effect of lipoaspirate processing modality on longitudinal volume retention after surgery.

METHODS: A prospective, single institution randomized control trial placed consented post-mastectomy fat grafting patients into one of three treatment arms (active filtration, low-pressure decantation, and standard decantation) in a 1:1:1 ratio. A pre-operative three-dimensional scan of the upper torso is taken as baseline. At the 3-month post-operative visit, another 3D scan is taken. Audodesk Meshmixer is used to evaluate the volume change. The quantity of injected fat during the procedure is obtained using retrospective chart review.

RESULTS: The volume of fat injected during the initial procedure did not differ significantly between the treatment arms ($p > 0.05$). Both active filtration and low-pressure decantation resulted in higher percent volume retention than traditional decantation ($p < 0.05$). Active filtration and low-pressure decantation exhibited comparable degrees of fat maintenance at three-months ($p > 0.05$).

CONCLUSION: Compared to using traditional decantation as the lipoaspirate purification technique, active filtration and low-pressure decantation may have led to higher levels of cell viability by way of reduced cellular debris and other inflammatory components that may contribute to tissue resorption and necrosis. Further immunohistochemistry studies are needed to examine whether active filtration and low-pressure decantation lead to lipoaspirates with more concentrated viable adipocytes, progenitor cells and factors for angiogenesis.3

REFERENCES

1. Chiu WK, Fracol M, Feld LN, Qiu CS, Kim JYS. A Comparison of Fat Graft Processing Techniques: Outcomes in 1,158 Procedures in Prosthetic Breast Reconstructions. Plast Reconstr Surg Glob Open. 2019;7(11):e2276. Published 2019 Nov 12. doi:10.1097/GOX.0000000000002276.
2. Delay E, Garson S, Tousson G, Sinna R. Fat injection to the breast: technique, results, and indications based on 880 procedures over 10 years. Aesthet Surg J. 2009;29(5):360-376. doi:10.1016/j.asj.2009.08.010.
3. Liu, M., Shang, Y., Liu, N. et al. Strategies to Improve AFT Volume Retention After Fat Grafting. Aesth Plast Surg (2022). https://doi.org/10.1007/s00266-022-03088-y

Complications from Gluteal Augmentation with Fat Grafting Occurring in Ambulatory Surgery Centers: An Analysis of the American Association for Accreditation of Ambulatory Surgical Facilities (AAAASF) Patient Safety Data

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BACKGROUND: Gluteal augmentation with autologous fat grafting, more commonly referred to as the Brazilian butt lift (BBL), is an increasingly common procedure. This study aims to analyze the prevalence of complications that accompany these surgeries and subsequently identify factors that may increase the risk of adverse outcomes.

METHODS: Adults that experienced BBL-related complications from 2019-2021 were identified in surgery accreditation authority AAAASF's database. Patients were analyzed based on demographics, procedure and complications. Descriptive statistics were performed to evaluate complications and provide risk-adjusted measures.

RESULTS: Overall, 436 fat grafting procedures with complications were reported to AAAASF, of which 153 were confirmed to be related to gluteal augmentation procedures. The number of BBL complications decreased from the year 2019 (48) to 2020 (36), then nearly doubled from 2020 to 2021 (69). The majority of patients were female (96.7%) with a mean age of 42.0 years and a mean BMI of 28.3 kg/m2. Patients spent an average of 4.2 hours in surgery at the time of their procedure. The Southeast had the most complications (45.8%) followed by Southwest (18.3%), West (15.7%), Midwest (11.8%), and Northeast (8.5%). Wound infection was the most commonly documented complication (15.0%). Meanwhile, 24.2% of patients presented to a hospital for their complications and 8.5% had at least one unplanned reoperation. There were four deaths in total resulting from venous thromboembolism (2), bowel perforation (1) and hemorrhagic shock (1).

CONCLUSION: BBL procedures have been shown to be associated with significant morbidity through a variety of both medical and surgical complications, with the most common being infection. Given the increase in popularity of this procedure, increased surveillance to prevent and identify complications is recommended.

Revaluating The Caprini Score as a Predictor for VTE in Abdominoplasty: A Single Surgeon's Experience

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BACKGROUND: Venous thromboembolism (VTE) is responsible for over 200,000 deaths annually and is a rare yet devastating complication following outpatient surgery (1). In a large study analyzing over 1 million outpatient procedures, 23 patients died from a VTE, predominantly in those undergoing abdominoplasty (2). Abdominoplasty is common with 97,988 preformed in the United States in 2020 (3). The reported rate of a VTE after abdominoplasty ranges from 0.2-3.4% in the literature (1, 4, 5). Many studies support the validated 2005 Caprini risk assessment model to estimate patient's risk profile (5). The current risk assessment profile strongly relies on the Caprini score. Our study looked at retrospective data utilizing Caprini score metrics and belt-and-suspenders prophylaxis, which provided strong protection across all patients and parenthetically protected a low risk Caprini patient from a severe pulmonary embolism.

METHODS: A belt-and-suspenders, VTE prophylaxis protocol was utilized by a single surgeon for all patients undergoing cosmetic abdominoplasty between January 1st 2019 and April 1st 2022. All patients had a Caprini score calculated pre-operatively and underwent the same pre and post-operative protocol which included 5000 units preoperative heparin, intraoperative serial compression devices, post-operative battery operated serial compression devices which were worn by patients for two weeks following surgery, and postoperative Enoxaparin (40mg daily) for 7 days. A retrospective chart review was preformed to analyze outcome data for this cohort.

RESULTS: Ninety-five patients were included in this review. The study cohort had an average age of 47 ± 10, with an average BMI of 27 ± 5. Patients had an average Caprini score of 4.2 (range 2-7). There was only one incident of VTE (1.0%), in a patient with a Caprini score of 2. A hypercoagulability workup was conducted postoperatively for this patient and was unremarkable. The patient had a large pulmonary embolism diagnosed and treated endovascularly on postoperative day 5 without sequela.

CONCLUSIONS: VTE is a rare but significant complication following abdominoplasty. The Caprini score currently represents our best risk stratification model. Utilization of this historically has provided a framework of risk assessment. Belt-and-suspenders VTE prophylaxis in our study provided protection even in patients with the lowest possible Caprini score who developed at pulmonary embolism. More research is needed in this field to better identify those at higher risk for VTE.

1. Pannucci CJ, MacDonald JK, Ariyan S, et al. Benefits and risks of prophylaxis for deep venous thrombosis and pulmonary embolus in plastic surgery: A systematic review and meta-analysis of controlled trials and consensus conference. Plast Reconstr Surg. 2016;137:709–730.
2. Keyes GR, Singer R, Iverson RE, et al. Mortality in outpatient surgery. Plast Reconstr Surg.

2008;122(1):245-250.
3. American Society of Plastic Surgeons (2020) Plastic Surgery Statistics Report. Online, 2020-2022.
4. Murphy RX Jr, Alderman A, Gutowski K, et al. Evidence based practices for thromboembolism prevention: Summary of the ASPS Venous Thromboembolism Task Force Report. Plast Reconstr Surg. 2012;130:168e–175e. 10.
5. Pannucci CJ. Evidence-based recipes for venous thromboembolism prophylaxis: a practical safety guide. Plastic and Reconstructive Surgery. 2017;139(2):520e-532e.

Understanding Pre-operative Patient Body Image: Perception Is Not Reality

Abstract Presenter
Makenna Ash

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INTRODUCTION: Patients seek plastic surgery consultation for medical and/or aesthetic reasons, most of which involve altering the external appearance. One of the challenging roles of a plastic surgeon is managing patient expectations. Patients may have an unrealistic view of the possible surgical outcome, which may start with a pre-existing distorted self-perception. Understanding patient self-perception may aid plastic surgeons in providing improved pre-operative counseling and expectation-setting.

PATIENTS AND METHODS: We performed a retrospective review of patients who presented to two plastic surgeons during calendar years 2020 to 2022. Our cohort consisted of patients that completed a pre-visit questionnaire - of which included patient-reported (PR) height and weight. PR height and weight were then compared to measured (MS) values (cm and kg) taken from the same visit. Our primary clinical outcome was to evaluate if PR and MS values differed.

RESULTS: 355 patients were identified from the query, of which 184 patients completed the pre-visit questionnaire. The mean difference in PR weight and measured weight was 2.1 kg (range -4.8 to 46.9). There was a statistically significant difference between PR weight and MS weight in all visit types (medically necessary, cosmetic, blended). 83.2% of patients underestimated their weight. Patients with a measured BMI greater than 30 underestimated their weight more profoundly than patients with a measured BMI less than 30 ($p=0.02$). There was no significant difference between PR and MS height.

CONCLUSIONS: Patients seeking plastic surgery consultations may under-report their weight, whereas patients typically report their height accurately. It is possible this phenomenon may indicate a distorted body image. Plastic surgeons should be aware of this potential discrepancy between patient-reported and measured weight, to determine appropriateness for surgery. Plastic surgeons must ensure that accurate measurements are taken in their offices, rather than using patient-reported values. More research is needed to understand why specific cohorts of patients may under-report their weight.

Good Looks vs. Competence: Effects of Facial Plastic Surgery Procedures on Perceptions of Competence

Abstract Presenter
Trudy Kim

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INTRODUCTION: While many say that true beauty is on the inside, there is no denying that our physical appearance greatly determines how others perceive our character. Considering how one's physical attractiveness impacts perception, we aim to explore the potential effects of physical appearance via transformations through facial cosmetic surgery on one's perceived competence.

METHODS: An anonymous 25 item survey adapted from a validated competence scale with 11 patient photos was distributed online via Amazon Mechanical Turk to participants with a Bachelor's Degree, Master's Degree, or Ph.D. Participant demographic data was collected, and participants were asked to rank their perceptions of social, technical, and cognitive competence based on pre-operative or postoperative photos of patients who have undergone facial plastic surgery procedures on a 1-5 Likert scale (1=Strongly Disagree, 5= Strongly Agree).

RESULTS: A total of 252 responses were gathered. Participants were 21-69 years old, 60.2% were Male, 82.1% identified as Caucasian, and 82.1% had received plastic surgery. Participants gave a statistically significant higher score to the postoperative image when asked about perceptions on the individual's humor, maturity, and morality. Differences were seen when dichotomized by type of facial cosmetic surgery procedure.

CONCLUSION: Facial plastic surgery procedures improve perceptions of social, technical, and cognitive competence. Specifically, perceptions on one's social and cognitive abilities showed

the most difference when comparing preoperative and post-operative images. The impacts on perceptions of competence differs based on the type of facial cosmetic surgery procedure and patient demographics.

All in one surgery for complex periocular rejuvenation. Energy based devices, lipofilling and blepharoplasty

Abstract Presenter
Elena Martin MD

GOALS/PURPOSE: Periocular area is early prone to ageing and one of the major concerns for the patients seeking facial rejuvenation. Combing surgical and minimal invasive procedures long lasting results may be obtain with better aesthetics. Surgery alone cannot improve skin quality and energy-based devices such as radiofrequency microneedling and laser resurfacing may improve the overall appearance. Blepharoplasty addresses the puffiness and skin excess. Lipofilling offers support for the periorbital area with volume restoration and regenerative benefits depending on technique. results and high grade of satisfaction among patients. Combining energy-based devices, lipofilling and blepharoplasty better aesthetics may be achieved in order to address all the causes of this sensitive area.

METHODS/TECHNIQUE
A cohort of 51 consecutives patients with a median age of 39 years were operated by a single surgeon in a private practice accredited facility by a single surgeon. All cases were documented for associated medical issues and photos were taken preoperatively with patients consent. Single dose of antibiotic was administrated at the time of the incision. Preoperative bleeding control included tranexamic acid. All the surgeries were done through a transconjunctival approach for the lower eyelids. Upper blepharoplasty was performed without fat excision. Radiofrequency microneedling and CO2 laser were performed on lower eyelids and in selected cases also in the upper ones. Lipofilling was performed with micro and nanofat around the orbits and in selected case in the temporal area and midface.

RESULTS/COMPLICATIONS: All the patients reported the surgery as completely painless and as a good experience they would repeat it if needed. The overall complication rate was 3%(n=3). Three patients had prolonged edema for 3 months after the surgery and 2 patients reported hypoesthesia 3 months after the surgery. There were no case of long lasting chemosis. Two patients developed postinflammatory hyperpigmentation completely subsided under local and laser treatment.

CONCLUSION: Blepharoplasty can be safely combined with energy based devices and lipofilling for complex periocular rejuvenation in one surgery high grade of satisfaction among

patients and low risk of complications. With technical refinements and tissue preservation a natural look is created with minimal scarring.

Minimal invasive facial rejuvenation with helium plasma radiofrequency technology (Renuvion)

Abstract Presenter
Han Hoang MD

PURPOSE: To describe the technique and outcome of full face and neck sub-dermal treatment with helium plasma radiofrequency technology (Renuvion).

METHODS: All patients treated with helium plasma technology were reviewed between April 2021- to December 2022. Only patients who had full face and neck sub-dermal treatment with helium plasma radiofrequency technology were included. Total energy and power setting were reviewed. Post-op outcome including complications, post-op residual concerns, and overall patient's satisfactions were analyzed. Pre-op and post-op photos were assessed by two volunteers who are not medical professionals.

RESULTS: A total of 15 patients were identified. Average procedure time were 2 hours and 3 minutes. Average total energy used was 3.5 Kilo Joules. Follow up ranges from 1-25 months. 2/15 had additional periorbital and perioral resurfacing using the same technology. All patients returned to normal activity within 1 week of the procedure. There were no associated perioperative complications. All patients noticed improvement in skin firmness by 4 months post-op. All patients were satisfied with their results. Photo assessment showed reduction in forehead and glabellar wrinkles and improvement in jawline and cervical mental angle definition in all patients.

CONCLUSIONS: Full face and neck subdermal treatment with helium plasma radiofrequency technology is a safe and effective method in facial rejuvenation.

Breast Implants Protect The Chest Wall In Low Speed, Unrestrained Motor Vehicle Crash

Abstract Presenter
Christopher Pannucci MD

INTRODUCTION: Breast implants improve quality of life in patients seeking improved breast aesthetic, and are known to minimize human injury in the less common scenario of penetrating

trauma. People commonly sustain rib and sternum fractures and thoracic injury in motor vehicle crashes (MVC), a form of blunt traumatic injury. Whether breast implants minimize injury during MVC is unknown. This study examines the potential protective effect of breast implants in low speed, unrestrained MVC.

METHODS: Control (10% gelatin) and implant (10% gelatin with embedded breast implant) blocks were subjected to load approximating a low speed, 10mph MVC (n=12 blocks per group). Colormetric pressure film measured pressure at the neo-chest wall position in response to load, across the gel block base. Maximum pressure and average pressure across the gel block base were compared, by group.

RESULTS: Presence of an implant significantly decreased, by 22.8%, maximum pressure experienced by the neo-chest wall (333.0±58.7 psi vs 431.6±37.3 psi, p=0.0006). Average pressure experienced by the neo-chest wall across the gel block base was also significantly decreased, by 28.1%, in the implant group (53.4±5.6 psi vs 74.3±15.7 psi, p=0.0017). Subjective analysis of all implant and control blocks supported an overall reduction in pressure for the implant group.

CONCLUSIONS: Presence of a breast implant decreased maximum pressure at the chest wall by 23%, and average pressure by 28%. Patients with breast implants involved in low speed, unrestrained MVC may be less likely to sustain rib and sternum fractures and thoracic injury, when compared to patients without implants.

DISCLOSURE: Direct research support was provided by Mentor (Irvine, CA), through Investigator-Initiated Grant M-016, titled "An examination of blunt injuries involving breast implants" and Investigator-Initiated Grant M-021, titled "Breast Implants and Blunt Trauma: Do Implants Absorb Force and Decrease Chest Wall Injury?". The grants provided direct research support plus breast implants only; no salary support or fringe benefits were received. The funding agency did not participate in the experimental design, data acquisition, data analysis, decision to present, creation or review of presentation slides, manuscript writing, or decision to submit for publication.

Asian Dorsal Preservation Rhinoplasty using Medical Image based Silicone Implant with 3D Technology

Abstract Presenter
Taek kyun Kim MD, Phd

PURPOSE: Recent development of 3D printing technology have a great effect on entire medicine including plastic surgery. It also affects the manufacture of medical devices, especially silicone implant that is mostly essential in Asian rhinoplasty. Although silicone implants were

used with carving from the silicone block in the past, it is available to choose silicone implants among prototypes with various shape and thickness nowadays. Furthermore, the new era that is possible to order individually customized silicone implants with 3D printing technique has come in Korea based on the wide propagation of CBCT (cone beam computerized tomography).

METHOD: Although 3D printing technology has been developed, it is impossible to embody perfect silicone implant in Asian rhinoplasty since the resolution on upper part of nasal framework (bone) is excellent, but resolution on lower part of nasal framework (cartilage) is not enough. Therefore, cartilage is reconstructed on nasal airway image of CT scan during the manufacture of 3D printed silicone implant (Medical Image based Silicone Implant with 3D Technology), which makes inevitable technical error. In addition, it is another burden for surgeons to predict and plan the amount of change in shape and position of lower lateral cartilage during the tip plasty because it accounts for a large portion of Asian rhinoplasty.

RESULT: Fourty-seven patients (28 male, 19 female, 18-53 years, mean 29.4 years old) from April 2022 to January 2023. The application of 3D printed silicone implant has advantages including fitting on bony framework, shorter operation time without silicone carving and less invasive on nasal framework followed by shorter downtime. However, it is sometimes not perfectly fit on cartilage framework due to unpredictable change of lower lateral cartilage during structural tip plasty, longer preoperative preparation time to design, more cost to order and longer wait for manufacturing.

CONCLUSION: According to presenter's own experience, proper indication for using 3D printed silicone implant (SOFIT, Bistool, Korea) as a tool for Asian dorsal preservation rhinoplasty (dorsal preservation with tip structural rhinoplasty) differing from recently spotlighted preservation rhinoplasty includes patients with minor nasal deviation or hump and who want less recovery time since the original nasal structure can be remained untouched without osteotomy or humpectomy as much as possible if 3D printed silicone implant is applied for camouflage.

Gluteoplasty Augmentation with Lumbar Gluteal Flap associated with liposuction and Fat Grafting: A technique standardization in Post Bariatric patients

Abstract Presenter
Helio Alves MD

Abstract Co-Author
Gregory Nicolas MD

PURPOSE: The popularization of bariatric surgeries has led to an increase in the number of patients with multiple changes in body contour. Weight loss leads to excess flaccidity and loss of

gluteal volume and often to tissue descent in this region. Many techniques have been used for gluteal augmentation, such as the use of silicone implants, fat grafting, local flaps, hyaluronic acid injection, and local tissue relocation. Despite some series of gluteal flaps for gluteal augmentation in post-bariatric patients, even some using fat grafting in volumization, there is no step by step standardization in the literature on the association of the three surgical techniques: autologous flap/liposuction and fat grafting.

METHODS: This is a prospective and formal case series of individuals with flaccidity and gluteal ptosis due to weight loss after undergoing post-bariatric surgery. We included 16 individuals submitted to bariatric surgery for at least 1 year, who have weight stability for at least 6 months and who have flaccidity and gluteal ptosis, and excluded any patient with a history of torsoplasty, and an inability to remain in the prone position postoperatively. A validated questionnaire was used for post-operative patients satisfaction evaluation.

RESULTS: After the surgery, the flap, pocket size, and surgical time were reported. Complications were also observed postoperatively. The decorticated flaps of the lumbar region were found to be advantageous in the treatment of tissue sagging in the gluteal region. They provided a good gluteal projection, in an autologous and safe way. Moreover, the association with liposuction and fat grafting techniques was essential to achieve aesthetic refinement, which increased patient satisfaction in the gluteal contour.

CONCLUSION: This study allows a standardization of the 3 techniques to achieve rounded and projected gluteus for post bariatric patients without the use of alloplastic devices

REFERENCES:

1. Oranges CM, Haug M, Schaefer DJ. Body Contouring. Plastic and reconstructive surgery (1963). 2016;138:944e-945e
2 Colwell AS, Borud LJ. Autologous gluteal augmentation after massive weight loss: Aesthetic analysis and role of the superior gluteal artery perforator flap. Plast Reconstr Surg. 2007;119(1):345-356.
3. Sozer SO, Agullo FJ, Palladino H. Bilateral lumbar hip dermal fat rotation flaps: a novel technique for autologous augmentation gluteoplasty. Plastic and reconstructive surgery (1963). 2007;119:1126-1127.
4. Cárdenas-Camarena L, Lacouture AM, Tobar-Losada A, Mexico J. Combined gluteoplasty: Liposuction and lipoinjection. Plast Reconstr Surg. 1999;104(5):1524-1531.
5. Lockwood TE. Transverse flank-thigh-buttock lift with superficial fascial suspension. Plastic and reconstructive surgery (1963). 1991;87:1019.

Complications Following Body Contouring Post-Bariatric Surgery: The Influence of BMI and Operative Time

Abstract Presenter
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INTRODUCTION: Bariatric surgery (BS) for massive weight loss often results in excess skin. Body contouring surgery (BCS) provides a solution but comes with a high risk for postoperative complications, especially after BS. The risk of complication has been previously linked to body mass index (BMI), diabetes, hypertension, smoking history, and the amount of skin resected. The goal of this study was to analyze the factors leading to postoperative complications in patients who underwent BS and BCS at the same tertiary care center.

METHODS: We retrospectively reviewed all patients who underwent BS followed by BCS at the same institution between March 1, 2012 and January 1, 2022. Patient demographics and comorbidities, perioperative BS data, and perioperative BCS data were recorded. The predictors of postoperative complications were investigated using a binary multivariable logistic regression.

RESULTS: There were 2,292 patients who underwent BS of which 47 (2.1%) subsequently underwent BCS at the same institution. Twenty-three (48.9%) patients developed 31 different postoperative complications. Eleven patients developed dehiscence, eight developed seroma, eight developed infection, two had hypergranulation treated with silver nitrate, one had nipple necrosis, and one developed hematoma. Two (4.3%) patients, one with hematoma and one with an abscess, had to return to the operating room. Patients with a greater BMI were significantly more likely to develop a postoperative complication, controlling for operative time (OR 1.179, 95% CI 1.004-1.384, p=0.044).

CONCLUSIONS: Minor complications are common after BCS. A higher BMI and a longer operative time increase the risk for postoperative complications.

Short Flap Deep Plane Office Based Facelift with Local and Oral Sedation

Abstract Presenter

Edward Daniele MD

Abstract Co-Author
Jeremy Warner MD

GOALS/PURPOSE: There is no "standard" way to perform a facelift in today's era, given the myriad of published variations and techniques. The changes in technique were all born from improvements in aesthetic outcomes while simultaneously reducing, or even removing, complications. The differences in facelift techniques range from skin only, subcutaneous face lifts to deep plane dissections and SMAS manipulation. We present a specialized technique, utilizing aspects of a deep plane face lift, while using the novel Arista absorbable hemostat (BD, Franklin Lakes, NJ) without drain placement under oral sedation with local anesthetic. In our experience, we have managed to reduce fluid collections (both hematoma and seroma formation) while maintaining a superior aesthetic outcome.

METHODS/TECHNIQUE: This novel technique is performed with oral sedation and under local anesthetic in an office based setting. Oral sedation medications are taken on arrival to the office. In the upright position, the patient is marked, with pre-auricular temporal incision inside the hair bearing scalp. This incision is curved in a "S" shape, in order to increase length. The incision continues in an inter-tragal fashion, and an acute angle at the lobule to respect the tragal unit. After wrapping around the lobule into the posterior auricle, a zigzag incision is placed into the hair bearing area. After skin flap creation, sub-SMAS dissection is completed bluntly without any sharp transection to remain completely safe. After SMAS tightening is performed, but prior to closure, Arista is placed under the skin flap.
Utilizing this novel office-based technique, 101 consecutive patients were evaluated in the postoperative period between January 2020 and September 2022. Patients were immediately seen after surgery on post operative days 1, 5, and 7. All complications were recorded with the most significant being a fluid collection followed by a hypertrophic scar.

RESULTS/COMPLICATIONS: All patients were evaluated for fluid collections and this was meticulously checked multiple times in the first post operative week by both surgeon, fellow, and staff. Of these patients, none required a "return to operating room", or operative management of complications. There was a total of 6 fluid collections, 5 of which were seromas. These were all aspirated in clinic within the first week of surgery without further complication or sequela to the post operative course. All patients were very satisfied with their aesthetic outcome, with the exception of 3 patients, who returned for further face and/or neck tightening which were all completed under local anesthetic.

CONCLUSION: With the evolution of facelift techniques, we present a safe, long lasting option utilizing Arista under local anesthesia. This option as described minimizes complications comparatively to the literature, and provides a safe alternative to putting patients under general anesthesia. Given the lack of general anesthesia or IV sedation, there is no necessity to

aggressively monitor blood pressures as well, also enhancing patient comfort. With this novel technique, patients are able to obtain a superior aesthetic results while minimizing complications.

The Rise of AI in Skincare: A Study Comparing AI-Generated Recommendations and Human-Generated Instructions

Abstract Presenter
Kylie Mcmath

Abstract Co-Author
Subhas Gupta MD, PhD, FRCSC, FACS

The use of artificial intelligence (AI) has been on a steep rise in various industries.1 In plastic surgery, AI is being utilized to diagnose skin conditions, design treatment plans, and even outline procedures.2 3 One area where AI has yet to be assessed is in generating personalized care recommendations based on individual skin types and concerns.4 5 The purpose of this study is to compare the effectiveness of AI-generated skin care recommendations versus those generated by humans. Through the analysis of various standardized skin care routines, this project aimed to provide insights into whether AI is a viable alternative to human-generated instructions for achieving optimal skin health. To investigate the effectiveness of AI-generated skin care recommendations, a survey was sent out to a total of 15 Plastic Surgeons / Residents / Aestheticians of whom seven submitted a complete response. The survey was distributed using Survey Monkey. The survey included questions that asked the respondents to rate the AI-generated skin care recommendations on a Likert scale. The survey also gave respondents an area to add additional comments. Based on the survey results, the AI-generated skin care recommendations showed overall positive feedback with a majority of respondents agreeing or strongly agreeing with the recommendations provided. Specifically, the AI-generated recommendations for dry, dehydrated, and aging skin treatment showed the highest percentage of agreement with 85.71% of respondents rating it as strongly agree. Additionally, the AI-generated recommendations for balanced skin with fine lines treatment and product use both had a 71.43% agreement rating. However, the AI-generated recommendations for combination skin with an oily T-zone and dry cheeks/jaw-line treatment and product use showed lower levels of agreement, with only 28.57% and 42.86% of respondents strongly agreeing, respectively. The limitations of the study include the small sample size and the fact that the survey relied on self-reported data. Nonetheless, this study provides a preliminary investigation into the effectiveness of AI-generated skin care recommendations compared to those generated by humans. Overall, the survey results suggest that AI-generated skin care recommendations are generally effective, but there are areas where improvements can be made.

REFERENCES:

1. Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and

analytics. International Journal of Information Management, 35(2), 137-144. doi: 10.1016/j.ijinfomgt.2014.10.007
2. Esteva, A., Kuprel, B., Novoa, R. A., Ko, J., Swetter, S. M., Blau, H. M., & Thrun, S. (2017). Dermatologist-level classification of skin cancer with deep neural networks. Nature, 542(7639), 115-118. doi: 10.1038/nature21056
3. Hamidi, M., & Azimi, P. (2019). Artificial intelligence in plastic surgery: A systematic review. Plastic and Reconstructive Surgery, 143(6), 1600-1609. doi: 10.1097/PRS.0000000000005651
4. Li, J., Cheng, W., Li, R., Wang, X., Zhang, G., & Guo, X. (2019). An AI system for recommending personalized skincare routines. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops (pp. 0-0). doi: 10.1109/CVPRW.2019.00108
5. Lee, C. H., & Yoo, S. J. (2019). Artificial intelligence in dermatology: Past, present, and future. Journal of Dermatological Science, 94(2), 196-198. doi: 10.1016/j.jdermsci.2019.02.009

Rectus Abdominis Myofascial release Technique vs External Oblique Plication Technique For Safe Waist Enhancement in Abdominoplasty

Abstract Presenter
Mahmoud Hassouba MD

Abstract Co-Author
karim El Lamie

OBJECTIVE: This study aims to evaluate and compare the results of the rectus abdominis myofascial release technique,1 versus the external oblique plication technique,2 regarding their role in enhancement of the waist line and their effect on intra-abdominal pressure after abdominoplasty procedure.

METHODS: In this clinical, interventional, prospective, self-controlled, single- centered Study, 30 patients seeking abdominoplasty procedure for abdominal laxity and increased waist/hip ratio were randomly selected. All patients were females. Their age ranged between 25 and 55 years old and with a BMI (body mass index) less than 34 kg/cm2. Standard abdominoplasty was performed in all patients. Regarding the musculoaponeurotic laxity management, patients were divided randomly into two groups: Group A (15 patients): Rectus abdominis myofascial release technique was conducted. Group B (15 patients): External oblique plication technique was conducted. All patients had Foley catheter inserted for preoperative and immediate postoperative measurement of the vesical pressure which directly reflects the intraabdominal pressure.3 Patients were followed up post operatively and the following measurements were recorded: Intraabdominal pressure changes, waist-hip ratio one month after the operation, intensity of postoperative pain on 2nd, 7th, and 15th day after surgery (evaluated by Numeric Rating Scale),

duration of postoperative pain in days and complications.

RESULTS: The mean intra-abdominal pressure postoperatively in Group A was 9.45 + 0.22 (8.06 CM H2O-11.2 CM H2O) and the mean intra-abdominal pressure postoperatively in Group B was 10.3 + 1.14 (8.65 CMH2O-11.9 CMH2O). Patients in group (B) who underwent external oblique plication technique showed a statistically significant higher increase in intra-abdominal pressure than patients in group (A) who underwent rectus abdominis myofascial release technique. The mean Waist/ Hip ratio postoperatively in Group A was 0.75 + 0.04 (0.70-0.83) and the mean Waist/ Hip ratio postoperatively in Group B was 0.78 + 0.04 (0.71-0.89). Patients in (Group A) showed a statistically significant better improvement of the waist/ hip ratio than patients in (Group B).

CONCLUSION: Rectus abdominis myofascial release technique has a better effect on the waist enhancement and considered safer on the intra-abdominal pressure than the external oblique plication technique. However, the Rectus abdominis myofascial release technique is more invasive operation compared to other plication techniques due to the incision of the anterior rectus sheath that puts the patient under risk of incisional hernia if no care was taken in the postoperative period to avoid strain.

REFERENCES:

1- Ramirez OM. Abdominoplasty and abdominal wall rehabilitation: A comprehensive approach. Plast Reconstr Surg 2000; 105: 425.
2- Nahas FX. Advancement of the external oblique muscle flap to improve the waistline: a study in cadavers. Plast Reconstr Surg 2001; 108: 550–555.
3- Malbrain ML, De Laet IE. Intra-abdominal hypertension: evolving concepts. Crit Care Nurs Clin North Am. 2012 Jun; 24(2):275-309.

Ideal site for dimple plasty - A software-based analysis

Abstract Presenter
Madhubari Vathulya M.S, Mch

INTRODUCTION: Dimpleplasty is one of the most common cosmetic procedures opted for by patients nowadays. Though literature quotes a number of landmarks for surgically creating a dimple, there is no consensus regarding the ideal site.

MATERIALS AND METHODS: About sixty female employees of the hospital without natural dimples were included in the study. Facial scanning using the software was done and sculpting tools were used to create dimples according to three described landmarks including the intersection point between a line drawn vertically down from the external canthus and a

transverse line from the highest point of the cupids bow(Point A), Khoo Boo Chai (KBC) point B and a site which is a point of intersection between the vertical line at the level of the external canthus and a vector in the axis of the smile(point C). A panel of members including the patient, a nonmedical person, a Plastic surgeon (other than the author), and a dermatologist was included to assess the photographs of the patients without a dimple and with the dimple created on the above-mentioned sites through software and grade them using the five grade Global AestheticImprovement scale(GAIS). anthropometric measurements including the height of the face, the width of the face, etc were also measured.

RESULTS: The Patient and Plastic Surgeon were in consensus mostly. As the width of the face increased, the preference for point B got decreased as graded by the plastic surgeon. Conclusion: For a round face with TR Men/width ratio is less than 1.735, the Plastic surgeon prefers point A for dimple plasty, and for a longer face with TR Men/width ratio of> 1.735 the preference is towards point B.

REFERENCES:

1. Batwa W. The influence of the smile on the perceived facial type esthetics. Biomed Research international. 2018;2018
2. Pothanikat jj, Balakrishna R, Mahendra P, Neeta J. Two-dimensional morphometric analysis of young Asian females to determine attractiveness. Annals of Maxillofacial surgery.2015; 5(2): 208
3. BAo S, Zhou C, Li S, Zhao M. A new simple technique for making facial dimples. Aesthetic Plastic surgery. 2007; 31(4): 380-3

OZONE AND BODY CONTOUR FROM BASIC TO CLINICAL RESEARCH, HOW TO DIVIDE THE DOSE INTO THE DIFFERENT ROUTES OF ADMINISTRATION, ACHIEVING A PROPOSED TREATMENT ALGORITHM.

Abstract Presenter
Rogelio Martinez Wagner MD

We started with two experimental, comparative, prospective, cross-sectional studies. Wounds on the back, and another flap on the back of the rats. 6 groups of 4 rats each study, euthanasia at 2 and 10 days. The following were evaluated: wound contraction area, inflammatory infiltrate, fibroblast proliferation, angiogenesis, NfKB by immunohistochemistry and HIF-1 and VEGF by Western Blot. Significant Mann-Whitney U test p=<0.05, thus progressing to body contouring surgery applying it rectally, hemotransfusion, ozonophoresis, transcutaneous, ointments, oral, dividing the total doses into pre, trans and postoperative therapy.

Ozone therapy group area contraction wound greater compared to control day 2 (p=0.008), 5 (p=0.005), 7 (p=0.005) and 10 (p=0.005). Greater number of fibroblasts in ozone therapy, sacrificed on day 2 (p=0.008). Greater blood vessels in ozone therapy, sacrificed on day 2

(p=0.003) and day 10. (p=0.032). Densitometry increase in VEGF control group day 2 (p=0.005) and day 10 (p=0.003) and increase in HIF-1 experimental group day 2 (p=0.004) and decrease in expression in the same group day 10 (p=0.001) in the groups of ozone Vs control in body contouring surgery, faster and better healing quality was observed, promoting angiogenesis, shortening post-surgery recovery times.

CONCLUSION: Ozone therapy modulates wound healing by decreasing the inflammatory infiltrate, fibroblast proliferation, increases blood vessel formation, HIF-1 and VEGF expression. Ozone therapy better and faster healing, being the two best routes of rectal administration and autotransfusion, it can be complemented in all routes of administration by dividing the pre, trans and postoperative dose.

1.-Curtiellas, V., & Gómez, M., & Ledea, O., & Fernández, I., & Sánchez, E. (2005). Actividad antimicrobiana del OLEOZON® sobre Staphylococcus aureus y Pseudomonas aeruginosa. Revista CENIC. Ciencias Biológicas, 36

2.-Curtiellas. V, Ledea. O, Rodríguez, (16 noviembre de 2007). El OLEOZON® sobre la viabilidad, la permeabilidad celular y la ultraestructura de Staphylococcus aureus. Revista CENIC Ciencias Biológicas, 39, 128-131.

3.-Zanardi . I, Burgassi. S ,Paccagnini. E (12 de abril de 2013). What Is the Best Strategy for Enhancing the Effects of Topically Applied Ozonated Oils in Cutaneous Infections?. BioMed Research International, Volume 2013, Article ID 702949, 1-6.

4.-Costanzo. M, Cisterna. B, Vella. A,. (4 de Abril de 2015). Low ozone concentrations stimulate cytoskeletal organization, mitochondrial activity and nuclear transcription. European Journal of Histochemistry, 59:2515, 129-136.

5.-Travagli.V ,Zanardi.I ,Valacchi.G ,. (23 de Marzo de 2010). Ozone and Ozonated Oils in Skin Diseases: A Review. Hindawi Publishing Corporation Mediators of Inflammation, 2010, ID 610418, 1-9.

"Metabolically activated" macrophages or MMe, can they be a prognostic marker in the results of Body Contour?

Abstract Presenter
Rogelio Martinez Wagner MD

Dyslipidemia, a public health problem; it is associated with the progression of chronic diseases of clinical importance. It is accompanied by systemic inflammation and subsequent infiltration of monocytes into adipose tissue, to differentiate into macrophages. In this regard, a new population of macrophages called "metabolically activated" or MMe has been described, which are characterized by expressing markers associated with lipid processing; We can use this as one of the prognostic factors in body contour. MMe produce proinflammatory cytokines in adipose

tissue of obese mice, however, the mechanisms involved in the activation of this macrophage population and its functional consequences in humans are still unknown. Thirty-two body contouring surgery patients were included, collecting their serum biochemical parameters. Adipose tissue samples were obtained that were processed to isolate mononuclear cells and stain them with different monoclonal antibodies coupled to fluorochromes; De novo adipogenesis was determined by PPARγ expression and lipid droplet staining with oily red dye. Co-cultures were performed with the human preadipocyte cell line PCS-210-010. We show that the MMe population is increased in patients with dyslipidemia (2.74% vs 1.43%), which favors the differentiation of preadipocytes to white adipocytes. These results show the presence of MMe in humans and its possible pathogenic role in the mechanisms underlying the metabolic syndrome; as well as a greater risk of a poor result in body contour, maintenance of long-term results, since they would be more susceptible to overweight and obesity.

1. Williams JW, Giannarelli C, Rahman A, Randolph GJ, et al. Macrophage biology, classification, and phenotype in cardiovascular disease. Journal of the American College of Cardiology. 2018;72(18):2166-80.
2. Ginhoux F, Guilliams M. Tissue-resident macrophage ontogeny and homeostasis. Immunity. 2016;44(3):439-49.
3. Okabe Y, Medzhitov R. Tissue biology perspective on macrophages. Nature Immunology. 2015;17(1):9-17.
4. Saeed S, Quintin J, Kerstens HH, Rao NA, et al. Epigenetic programming of monocyte- to-macrophage differentiation and trained innate immunity. Science. 2014;345(6204):1251086.
5. Netea MG, Domínguez-Andrés J, Barreiro LB, Chavakis T, et al. Defining trained immunity and its role in health and disease. Nature Reviews Immunology. 2020;20(6):375- 88.

eLift, Helium plasma radiofrequency (Renuvion) subdermal treatment and minimal access face and neck lift, is an effective facial rejuvenation technique with minimal downtime.

Abstract Presenter
Han Hoang MD

PURPOSE: To describe the technique and outcome of combining helium plasma radiofrequency (Renuvion) sub-dermal treatment and minimal access face and neck lift.

METHODS: All patients treated with helium plasma radiofrequency technology and minimal access face and neck lift were reviewed between April 2022- to November 2022. Total energy and power setting were reviewed. Post-op outcome including complications, post-op residual concerns, and overall patient's satisfactions were analyzed.

RESULTS: A total of 7 patients were identified. Average procedure time were 4 hours and 57 minutes under local anesthesia. Average total energy used was 4.3 Kilo Joules. Follow up ranges from 3-9 months. 1/7 had resurfacing using the same technology (not at the same setting). All patients returned to normal activity within 1-2 week (median 10 days). There were no associated perioperative complications. All patients were satisfied with their results.

Conclusions: Combining full face and neck subdermal treatment with helium plasma radiofrequency technology and minimal access face and neck lift is a safe and effective method in facial rejuvenation with minimal downtime.

Do Absorbable Sutures Work For Rectus Diastasis Repair In Abdominoplasty Patients?

Abstract Presenter
Brandon Jackson MD

Abstract Co-Author(s)
Simon Moradian MD
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John Y.S. Kim MD

PURPOSE: Rectus sheath plication during abdominoplasty is the standard treatment for diastasis of the rectus muscles to improve abdominal contour. Essential to this repair is a lasting correction of this diastasis using sutures to reapproximate the rectus muscles along the midline. There is currently a debate as to whether absorbable versus non-absorbable rectus plication accomplishes the lowest rate of recurrence. This study reviews a single surgeon's experience with absorbable suture rectus plication.

METHODS AND MATERIALS: This is a retrospective study from the senior author's own cohort of female patients that underwent abdominoplasty from 2018 to 2022. Only patients that followed up longer than 6 months were included in this analysis to assess long term correction of diastasis. Plication of the rectus muscles was performed with a combination of interrupted, buried, figure of eight #0 PDS (Ethicon, Somerville, New Jersey) and running #0 Maxon (Covidien, Mansfield, Massachusetts). Outcomes were assessed by physical examination at post-operative visits.
Via chart review, an analysis was also performed on patient factors such as number of pregnancies and the types of deliveries, history of prior abdominal surgeries before abdominoplasty, and whether a concurrent hernia repair was performed.

RESULTS: From 2018 to 2022, 71 patients had follow up data >6 months. Average values are as follows: Age, 43 ; BMI, 27 kg/m2. The average number of follow up visits in the first 6 months

post-operatively was
5. 43 patients (61%) had previous abdominal surgery. The most common previous abdominal surgery was a
caesarean section (41%, n=29), with the average number of previous pregnancies being 2. 1 patient had a prior
abdominoplasty performed and presented for revision. 20 patients (28%) had a hernia repair at the time of
abdominoplasty. 50 patients had follow up data >9 months. Average values are as follows: Age, 44 ; BMI, 27
kg/m2. The average follow up time post-operatively was 18 months. 31 patients (62%) had previous abdominal
surgery. The most common previous abdominal surgery was a caesarean section (46%, n=23), with the average
number of previous pregnancies being 2. 12 patients (24%) had a hernia repair at the time of abdominoplasty.
Correction of rectus diastasis was performed in all patients in both groups with a recurrence rate of 0 percent

CONCLUSION: Abdominal wall plication using a double-layered, absorbable suture closure is a safe, reliable, and
long-lasting method to address rectus diastasis during abdominoplasty. Our technique achieved a 0 percent
recurrence rate with no major complications and was unaffected by patient factors including prior pregnancies,
abdominal surgeries, or concurrent umbilical hernia repairs.

Facial Pre-Juvenation: A Stepwise Approach to Skin Rejuvenation Prior to Facelifting to Maximize Your Aesthetic Results

Abstract Presenter
Zachary Gala MD

Abstract Co-Author(s)
Fernando Arias MD
Gregory Greco DO, FACS

BACKGROUND: Facial skin rejuvenation, prior to facelifting is a key component to achieving a balanced and harmonious facial appearance. Modern surgical correction of facial aging typically addresses both the structural and volumetric deficiencies, but often overlooks rejuvenating the face and neck skin prior to facelifting. Normal physiologic skin aging as well as photoaging, is a complex process that is determined by many variables, including, but not limited to genetics, long term sun exposure, smoking, dermatologic as well as systemic disease processes. We present a single surgeon's stepwise approach to skin rejuvenation prior to performing a facelift.

METHODS: 60 patients from 2018 to 2022 were evaluated for facelift. Patients were all prescribed topical Tretinoin at the time of their initial aesthetic consultation, if not already using it. All patients underwent at least one session of full-face hybrid broadband light/Erb:YAG fractional laser therapy no less than 6 weeks prior to their surgical procedure.

RESULTS: From 2018 to 2022, 60 patients were treated with our facial pre-juvenation protocol at least 6 weeks prior to facelift. The same aesthetician, registered nurses, and surgeon were involved in the preoperative and postoperative management of our patients. Follow up ranged from 6 months to 3 years. There were no major long-term complications associated with the facial pre-juvenation process prior to facelifting, identifiable skin issues or vascular compromise noted post-operatively. Patients were noted to have a more even skin tone with improved quality of overlying skin (decreased rhytids, vascular defects, texture) after facial pre-juvenation combined with subsequent facelift.

CONCLUSIONS: Neck and facial skin analyses should be an integral part of the initial face lift consultation, and the treatment plan should be offered and instituted prior to surgical intervention. This can eliminate the concerns of unacceptably prolonged facial edema, hyperemia and skin flap viability with simultaneous laser therapy with facelifting.1,2 The use of topical skin care agents along with laser and light-based therapies prior to facelifting can be a valuable adjunct. These modalities have been proven to improve the effectiveness of surgical results by greatly reducing facial rhytids, pigment changes and vascular defects, as well as improving the overall texture and tone of the skin.

REFERENCES

1. III JFS, Costa CR, Dauwe PB, Ramanadham SR, Rohrich RJ. Laser Resurfacing at the Time of Rhytidectomy. Plastic and Reconstructive Surgery. 2015;136(1):27-38.
2. Jackson IT, Yavuzer R, Beal B. Simultaneous Facelift and Carbon Dioxide Laser Resurfacing: A Safe Technique? Aesthetic Plastic Surgery. 2000;24:1-10.

Clinical Applications of Tranexamic Acid (TXA) in Plastic and Reconstructive Surgery: Two Decades of Experience

Abstract Presenter
Stav Brown MD

Abstract Co-Author
Rod Rohrich MD, FACS

PURPOSE: Tranexamic Acid (TXA), an antifibrinolytic agent, has gained increasing recognition as a valuable pharmacologic agent within plastic and reconstructive surgery. This study reviews the scientific evidence regarding the use of TXA in the full range of plastic and

reconstructive surgery within the past two decades to provide clinical recommendations regarding for its safe and effective use in various plastic surgical procedures.

METHODS: A systematic review and meta-analysis were conducted following the PRISMA guidelines. Study design, Procedure types, dosing regimen, time and mode of administration, outcomes and complications for each study were recorded. Outcome data collected in the meta-analysis included blood loss, transfusion requirements and hematoma rates.

RESULTS: Forty-two studies (2003-2023) describing the use of TXA in plastic surgery were included. TXA administration was significantly associated with reduced blood-loss in craniofacial surgery with a mean difference of -13.71 (95% CI -19.43 to -8.00) mL/kg in total blood loss. A reduction in transfusion was also demonstrated with TXA administration with an MD of -10.27 (95% CI -16.34, -4.19 mL/kg). TXA administration was significantly associated with a reduction in blood-loss and hematoma rates in cosmetic surgery, demonstrating a mean difference of -26.10 (95% CI -39.48, -12.73 mL/kg) and an odds ratio (OR) of 0.31 (95% CI 0.1, 0.64), respectively.

CONCLUSIONS: This is the largest study to date on the use of TXA in the full range of plastic surgery, summarizing two decades of experience. The literature highlights TXA's favorable safety profile and promising role in the fields of craniofacial surgery, face-lift surgery, rhinoplasty, and breast-related surgery and relatively limited use in microsurgery and burn care within the past two decades.

Improving Quality of Life in Postpartum Females by Non-invasive Pelvic Floor and Abdominal HIFEM and Synchronized Radiofrequency Treatments for Strengthening Core Muscles

Abstract Presenter
Julene Samuels MD

BACKGROUND: Women's bodies undergo many changes and challenges after pregnancy and during the postpartum period. After childbirth, regaining the strength of core muscles is important in preventing incontinence, pelvic floor disorders, and back pain issues.

OBJECTIVE: This study investigated the effect of abdominal HIFEM and synchronized RF with consecutive pelvic (standalone HIFEM) treatments for core muscle strengthening and improving quality of life.

MATERIALS AND METHODS: Thirty-six female subjects (27-44 years, BMI 19.4 – 34.5 kg/m2) were enrolled in this multicentre, single-arm, open-label, interventional study. The treatment schedule consisted of seven visits, four HIFEM+RF abdominal procedures spaced 5-10 days apart, and six standalone HIFEM pelvic floor procedures spaced 2-4 days apart. Both procedures were used consecutively at the first, third, and fifth treatment visits, the HIFEM+RF was applied prior to HIFEM-only treatment. The follow-up visits were scheduled 1 month and 3

months after the treatments. The primary evaluation included measuring the core strength by with a pressure biofeedback device and waist circumference. 5-point Likert scale questionnaires documenting patients' satisfaction and comfort were used, including a 10-point visual analog pain scale (VAS).

RESULTS: N=32 patients completed the 3-months follow-up evaluation. The core muscle strength showed a 22.8% (+24.07±22.14 mmHg, $p<0.05$) increase at 1-month follow-up, with a 25.2% (+26.58±28.45 mmHg, $p<0.05$) increase at 3-month follow-up. The waist circumference was reduced by 3.12±2.99 cm and 4.61±3.48 cm (both p-value<0.001) at 1-month and 3-months follow-up, respectively. Patients found the combined treatment comfortable and painless (VAS=2.6). According to 5-point Likert-scale satisfaction questionnaires evaluated 3 months post-treatment, 97.1.% of patients reported stronger core muscles (average score 4.3±0.6), 94.1% of subjects felt a stronger pelvic floor (average score 4.20.6), and 88.2% of subjects had improved physical performance during exercise (average score 4.1±0.6). Furthermore, 91.2% of patients reported being more comfortable in their clothes (average score 3.7±0.5), while all patients stated they were able to perform daily routine/activities without issue and spend quality time with their children (average score 4.5±0.5). No adverse events or side effects were observed.

CONCLUSION: 3-month data analysis outcomes indicated that the treatment regimen of consecutive HIFEM+RF and HIFEM-only effectively improves core and pelvic floor strength, and function, through stimulation of abdominal and pelvic floor muscles. This resulted in improved patients' quality of life along with high satisfaction.

The Safety of Extended Deep Plane Versus SMAS Plicature

Abstract Presenter
Murilo Secanho MD

INTRODUCTION: Extended deep plane face lift leads to the repositioning of tissues in an appropriate and natural feature, providing volume to the mid face and jawline, and a natural redraping of the flap through the mobilization of the medial mobile SMAS, and the release of the retention ligaments. Despite the benefits, the dissection below the SMAS exposes the surgeon to a high risk of injury to noble structures and a steep and longer learning curve.
This study aims to analyze the impact caused by the new technique adopted on the variables and surgical outcomes of the facelift.

METHODS: A retrospective analysis of the medical records of patients submitted to rhytidectomy performed between July 2019 and 2022, at the Dr Jerônimo Clinic in Ibitinga, São Paulo, Brazil.
We divided the patients into two groups. In group A, patients were from July 2019 to February 2021, who were submitted to the SMAS plication technique, which will be used as a control group. In Group B, the period analyzed was between March 2021 and May 2022, where the

technique performed for facelift was extended deep plane.
The variables and outcomes analyzed were age, gender, comorbidities, body mass index (BMI), surgery time, length of hospital stay and complications.
Statistical analyses were performed using the T-Student and Chi-square variables, with values lower than $p<0.05$ considered with statistical significance.

RESULTS: A total of 160 medical records were analyzed, 80 of which were submitted to SMAS plication and 80 the Deep Plane technique. 150 (93.7%) were female, with not statistically different between groups (p 0.11). The mean age was 54.8 years, without significance .
The mean BMI was 24.5; 78 patients had comorbidity, the most frequent being arterial hypertension in 43 individuals, and hypothyroidism in 27. There was no statistical difference when we compared these variables in both groups (p0.06; p 0.52). There were 5 active smokers patients.
Regarding the surgical time, in the plication group it was 326.8 minutes and in the Deep Plane group the mean was 348.3 minutes (p 0.07). The length of hospital stay was 2.2 days in group A, and 2.3 days in B (p 0.57).
Complications occurred in 2 (2.5%) patients in the control group and in 9 (11.2%) in the group submitted to Deep Plane (p 0.02). In group A, complications were 2 seromas and 1 neuropraxia, while in B there were 6 neuropraxia, 2 seromas, 1 infection, 1 sialoma and 1 late hematoma. There was no statistical difference when comparing each complication. Reapproach was necessary in one case, in group B, to treat the late hematoma.
Among the neuropraxias, group A had 1 neuropraxia at Zygomatic branch, and in the extended deep plane group 3 affected the buccal branch, 3 the zygomatic branch and 1 the temporal branch (p0.43). All the neuropraxias had a spontaneous resolution in 3 to 4 months.

CONCLUSION:
Despite the significant increase in complications, most were treated conservatively. The technique did not impact in the LOS and in the surgical time.

Progressive tension suturing (PTS) versus drainage in patients undergoing abdominoplasty: a systematic review and meta-analysis of clinical and patient-reported outcomes

Abstract Presenter
Ankur Khajuria MD

Abstract Co-Author
Gautham Rao

INTRODUCTION: The optimal surgical protocol for abdominoplasties remains a nebulous and contested domain. Classically, closed suction drains have been employed putatively to reduce seroma formation rates, which are estimated to be around 10%, in the absence of strong supporting evidence. This can potentially increase the risk of infection and worsen patient discomfort. Outcomes from progressive tension suturing (PTS) versus drainage (D) in

abdominoplasty, have previously been reported in meta-analyses that have been hindered by poor methodology and limited sample sizes. We aimed to conduct the first methodologically robust systematic review to evaluate the outcomes for PTS versus D in abdominoplasty.

METHODS: This study was registered a priori on PROSPERO: CRD42022346106. MEDLINE, EMBASE, CENTRAL, Google Scholar and Web of Science were searched between September 2022 and February 2023. Data were pooled by a random-effects Mantel-Haenszel model. Risk of bias was assessed using Cochrane's Risk of Bias Tool and Cochrane ROBINS-I tool, for randomized controlled trials and observational studies respectively. GRADE was used to assess the methodological quality of the studies.

RESULTS: Progressive tension suturing, compared to drains alone, was superior with respect to post-operative seroma and haematoma rates, with no synergistic benefit to combining PTS and D. The studies were of moderate-low quality.

DISCUSSION: Abdominoplasty using PTS without drain was effective in reducing seroma rates. However, there is a need for larger, level I studies to evaluate the safety and effectiveness of the drainless abdominoplasty technique using PTS versus drainage. Additionally, further delineation of larger seroma volumes (>80 mL) that may be indicative of negative patient prognoses would facilitate a more systematic classification of complications.

TOTAL GRAFT: Adipose Tissue Transfer in Dynamic Definition Liposculpture

Abstract Presenter
Mauricio Perez MD

Abstract Co-Author
Alfredo Hoyos Ariza MD

BACKGROUND: The aesthetics standards for the male and female body fluctuate among different populations, hence Aesthetic Body Sculpting has to adjust accordingly to suit the patient preferences and expectations . One of the pillars in which Dynamic Definition Liposculpture (HD2) stands on is Fat Grafting, which nowadays include the concepts of power muscles and definition muscles. The latter are subject to demarcation and careful carving during surgery, while the former benefit as well from Fat Grafting in order to improve their volume and projection, and as a consequence, the anatomic, athletic, and youthful contour. We carried out a retrospective cohort including patients who underwent fat grafting of different muscles during HD2 including: The trapezius, the latissimus dorsi, the erector spinae, the pectorals, the breasts, the rectus abdominis muscle, the gluteus medius, above the gluteus major (SQ), the deltoids, the biceps, the triceps, the vastus medialis/lateralis, the biceps femoris, and/or the calves.

METHODS: We performed cadaveric dissections for each anatomical region in order find the main pedicle for each muscle and as a result design a safe and reproducible fat grafting

technique. Furthermore, we looked into our records for patients who underwent fat grafting in addition to HD2 from January 2017 to February 2022. Criteria for inclusion were any patient undergoing fat grafting of any/multiple muscles as part of HD2 procedures.

RESULTS: A total of 1192 patients consecutive patients met the inclusion criteria. About 1020 (85%) were women and 172 (15%) were men. Anatomic regions subject to fat grafting included the posterior torso (5%), the upper limbs (14%), the anterior torso (37%), the gluteal region (94%) and the lower limbs (10%). Adipose graft volumes ranged from 40 to 650 cc (Avg = 250 cc). Only three cases of cellulitis were reported (0.3%), they were treated with oral antibiotics and physical means. Hematoma was reported in 5 cases (0.4%), which solved with conservative measures. No other complications were reported related to fat grafting. Almost all patients were satisfied with the procedure (95%). Follow up period ranged from 2 to 48 months.

CONCLUSION: Liposuction might not be enough to achieve either the ideal muscularization of the male's body or the voluptuous/slim figure of the female anatomy. In such cases, fat grafting has become the cornerstone to achieve the desired body contour. The proper recognition of the main neurovascular pedicle from each muscle subject to fat grafting, the accurate preoperative markings and a meticulous surgical technique ensure both the safety and the reproducibility of our techniques . The high satisfaction index and the low rate of complications support our findings and encourage future studies to broaden the targeted population with a multicenter approach.

LEVEL OF EVIDENCE: IV. Type of Study: Therapeutic – Retrospective Cohort.

KEYWORDS: Anatomic dissection; liposculpture; high definition; body contouring surgery; fat grafting; intramuscular lipoinjection; subcutaneous lipoinjection; multilayer lipoinjection.

REFERENCES

1. Hoyos AE, Perez ME, Domínguez-Millán R. Variable Sculpting in Dynamic Definition Body Contouring: Procedure Selection and Management Algorithm. Aesthet Surg J. 2021;41(3):318-332. doi:10.1093/asj/sjaa133
2. Hoyos AE, Prendergast PM. The Human Form as Art: Contours, Proportions, and Aesthetic Ideals. In: High-Definition Body Sculpting. Springer Berlin Heidelberg; 2014:3-18.
3. Vyas KS, Vasconez HC, Morrison S, et al. Fat Graft Enrichment Strategies: A Systematic Review. Plast Reconstr Surg. 2020;145(3):827-841. doi:10.1097/PRS.0000000000006557.
4. Shim YH, Zhang RH. Literature Review to Optimize the Autologous Fat Transplantation Procedure and Recent Technologies to Improve Graft Viability and Overall Outcome: A Systematic and Retrospective Analytic Approach. Aesthetic Plast Surg. 2017;41(4):815-831. doi:10.1007/s00266-017-0793-3

Upper Lip Malposition in Primary Rhinoplasty and its Role in Selection of Tip Augmentation Technique

Abstract Presenter
Marco Swanson MD

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BACKGROUND:
There is no published guidance on how the pre-operative position of the upper lip should influence decision making, specifically if tip augmentation is indicated. This is a retrospective cohort analysis of the incidence of upper lip malposition in primary rhinoplasty patients followed by the senior author's 40+ years of experience regarding the choice of tip augmentation technique based on upper lip position.

METHODS: A total of 150 consecutive patients who presented seeking primary rhinoplasty were identified and reviewed. The upper lip position was measured during smile in reference to incisor and/or gum show. The nasal length, tip projection and columella position were documented. Multivariate logistic nalysis was performed to assess for correlation between nasal parameters and upper lip positions. The most commonly encountered primary rhinoplasty scenarios are then described followed by the senior author's recommended tip augmentation technique.

RESULTS: Standardized photos of 139 primary rhinoplasty patients who met the inclusion criteria were analyzed. 117 (84%) patients were female. 49 (35%) patients had an "ideal" upper lip position, 83 (60%) patients had insufficient incisor show, and 7 (5%) patients had excessive gum show. None of the nasal parameters were found to be predictive of upper lip position. Tip over-projection (OR 3.03, $p=0.02$) and hanging columella (OR 2.97, $p=0.001$) were predictive of a long nasal length. Tip under-projection was predictive of short length (OR 35, $p<0.0001$). Based on the senior author's experience, the most commonly encountered tip deficient scenarios in primary rhinoplasty are: 1) isolated insufficient lobule volume, 2) hanging columella, 3) short columella, excessive gingival show, 4) short columella, inadequate incisor show, adequate nasal length, 5) short columella, inadequate incisor show, short nose. To achieve tip augmentation and favorably influence the upper lip position, the author recommends: 1) tip graft, 2) Fred technique, 3) columellar strut, 4) tip suspension suture, 5) extended spreader grafts with columellar strut, for each of the scenarios, respectively.

CONCLUSION: The majority of primary rhinoplasty patients present with an upper lip malposition, which highlights the importance of its inclusion when deciding between rhinoplasty techniques, specifically for tip augmentation. Tip augmentation maneuvers in rhinoplasty can have a significant effect on upper lip position, which oftentimes can be detrimental. The pre-operative position of the upper lip during smile should play an integral role in the selection of tip augmentation technique. If the surgeon fails to notice it pre-operatively, excessive gingival show or insufficient incisor show can inadvertently worsen. Even though, tip augmentation maneuvers may not fully optimize upper lip positioning, careful technique selection is vital to improve and not exacerbate the position of the upper lip.

Deep Plane Facelifts under Tumescent Anesthesia. Review of last 100 cases in the past 2 years

Abstract Presenter
R. Brannon Claytor MD

OBJECTIVES: Historically facelift procedures are performed in hospital settings owing to the nature of invasiveness and complexity of the surgery. However, with the normalization of outpatient surgery and surgery center procedures, many patients are looking for a surgery experience away from the hospital. This growth trend is most popular among the liposuction procedures, but more recently has grown to include the facelift population. Our experience in AAAASF surgical facilities performing deep plane facelifts with tumescent anesthesia over the past 2 years and over 100 patients demonstrates that such complex procedures can be performed safely with excellent outcomes and may be the model for the future

METHODS: Procedures were performed in AAAASF Class A facility under local anesthesia with oral valium and oxycodone for anxiolytic and narcotic control with supplementation by tumescent local solution which includes epinephrine and lidocaine. All patients were screened by the medical team for acceptable level of care within the AAAASF facility by blood pressure assessment and ASA class. Patients were instructed to stop aspirin at least 2 weeks prior to surgery and were administered intravenous antibiotics on the day of the procedure. All patients were allowed to eat and drink their normal meals, including right up to the time of the procedure. All patients were discharged 30 minutes after the end of the procedure.

RESULTS: 100 patients, 91 women and 9 men with the average age of 62 years old underwent deep plane facelift surgery between January 1 2021 and December 31 2022. Complications included 1 hematoma and 5 soft tissue wound infections all of which were managed with wound care and antibiotics. 3 patients had soft tissue ischemia at wound edges which were treated with local wound care and resolved spontaneously. 3 patients had transitory nerve palsy of the depressor angularis oris which resolved with conservative care.

CONCLUSIONS: Deep plane facelift surgery remains the pinnacle of facial rejuvenation based on complexity and technical challenge of surgical intervention.1 Currently only 5% of plastic surgeons who perform facelift do so with the deep plane technique. The major concern appropriately is avoiding facial nerve injury.2 However, our experience demonstrates that the awake patient can provide important and valuable feedback during surgery as facial motor nerves have sensory afferent fibers which enable the patient to share real time information about pain sensation despite adequate local anesthetic. This allows for increased tactile response during surgical release of retaining ligaments.3 Deep plane facelift surgery under tumescent anesthesia may not only be more desirable for the patients but may also allow for augmented feedback for nerve injury avoidance.

1. Jacono AA, Bryant LM, Alemi AS. Optimal Facelift Vector and its Relation to Zygomaticus Major Orientation. Aesthet Surg J. Mar 23 2020;40(4):351-356. doi:10.1093/asj/sjz114
2. Hamra ST. The role of the septal reset in creating a youthful eyelid-cheek complex in facial rejuvenation. Plast Reconstr Surg. Jun 2004;113(7):2124-41; discussion 2142-4.

doi:10.1097/01.prs.0000122410.19952.e7
3. Cakmak O, Emre I. Modified Composite Plane Facelift with Extended Neck Dissection. Facial Plast Surg. Dec 2022;38(6):584-592. doi:10.1055/a-1862-9024

Hip expansion with fat grafting combined with abdominoplasty: An evolution of body contouring technique

Abstract Presenter
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Abstract Co-Author(s)
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BACKGROUND: Aesthetic goals in abdominoplasty are changing as patients desire not only a thin waist but also an hourglass figure with round hips. Standard body contouring techniques do not necessarily address the hip as an aesthetic unit, and rarely work to expand the hip. The authors present their experienced using fat transfer for hip expansion, which can be useful in various aesthetic procedures, including abdominoplasty. This technique allows for the hip to be contoured into an aesthetically pleasing hourglass figure. The authors also describe the hip aesthetic unit and its boundaries and specific contours, which should be addressed to achieve a youthful body profile when fat grafting for hip expansion.

METHODS: A retrospective review was performed by the senior author (W. C.). Medical records of patients who underwent hip expansion with abdominoplasty between March 1st, 2014 and May 31st, 2022 were analyzed. Every patient had a minimum follow-up time of one year. A total of 1125 consecutive cases were found. Photographic records were taken before and during follow-ups at 1 month, 3 months and 12 months.

RESULTS: Hip expansion with fat grafting with abdominoplasty was successfully achieved in 1125 cases. Average age was 38 years old (standard deviation: 8 years, maximum: 68 years, minimum: 20 years). Average body mass index (BMI) was 29 kg/m2 (standard deviation: 4 kg/m2, maximum: 42 kg/m2, minimum: 18 kg/m2). Average amount of aspirated fat was 1896 ccs (standard deviation: 760 ccs, maximum: 3000 ccs, minimum 400 ccs). Average amount of fat injected into the bilateral hips was 493 ccs (standard deviation: 220 ccs, maximum: 1700 ccs, minimum: 50 ccs). Complications were as follows: Bleeding requiring transfusion (N = 6, 0.5%), infection (N = 19, 1.7%), seroma (N = 6, 0.5%), fat necrosis (N = 10, 0.9%), incisional dehiscence (N = 25, 2.2%), spitting sutures (N = 4, 0.4%), hematoma (N = 3, 0.3%), pulmonary embolism (N = 3, 0.3%), deep vein thrombosis (N = 4, 0.4%) with one case resulting in mortality, and medical complications including hypertension, urinary retention, and urinary tract infection (N = 26, 2.3%).

CONCLUSION: Adding a hip expansion to popular cosmetic procedures such as abdominoplasty offers a safe and reliable technique that improves patient surgical results. This

technique should be part of a plastic surgeon armamentarium, particularly for patients who request an improved waist-to-hip ratio. The authors recommend adding the hip anatomical area as a new aesthetic unit that needs to be taken into consideration.

Painless, Drainless Lipoabdominoplasty: A Retrospective Study of Pain Following Lipoabdominoplasty Utilizing Liposomal Bupivacaine and a Modified ERAS Protocol

Abstract Presenter
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PURPOSE: There are many functional and aesthetic benefits to lipoabdominoplasty, including increase in core strength, reduction in urinary incontinence, and improvement in lower back pain. However, patients are still hesitant to undergo surgery due to the perceived fears of post-surgical drains, and post-operative pain. This study proposes a standardized multimodal pain protocol for patients undergoing lipoabdominoplasty procedures that aims to improve post-operative pain control.

METHODS/MATERIALS: A total of 80 patients operated on between July 2020 to December 2021 were evaluated in this study. Patients all underwent lipoabdominoplasty and were administered a standardized pre-, intra-, and post-operative pain regimen. Pain scores were measured across all patients in the immediate post-operative period, and post-operative days 1, 7, 28, 90.

RESULTS: Mean pain scores in the PACU were 0.46/10 (+/- 0.18). Subsequent reassessment in the post-op recovery suite yielded mean pain scores of 0.34 (+/- 0.15). Mean pain scores on POD1 were 1.23 (+/- 0.15), and consistent through to POD7 at 1.24 (+/- 0.11) with patients taking an average of 6.65 total percocet 5mg during the week. After POD7, 95% (76/80) of patients were only taking NSAID medications. A total of 75/80 patients (93.75%) reported zero pain at 4-6 weeks after surgery (mean pain score 0.10 +/- 0.08).

CONCLUSIONS: The multimodal analgesia protocol consisting of preoperative or immediate induction IV tylenol, precut local analgesia with marcaine and lidocaine, and intraoperative use of liposomal bupivacaine, can improve perioperative pain control in patients undergoing lipoabdominoplasty.

Novel Application of the Piezoelectric Device with an Intraoral Approach to Lateral Osteotomies in Rhinoplasty, An Anatomical Study

Abstract Presenter
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INTRODUCTION: Lateral osteotomies (LO) are the mainstay modality to address prominent dorsal humps or widened nasal bones in patients undergoing rhinoplasty. Despite their accepted role in rhinoplasty, there is variation in how surgeons osteotomize the nasal bones, with classic reports describing an intranasal or percutaneous approach. Description of intraoral LOs are scant, likely due to the difficulty in surgeon experience and comfort. The Piezoelctric Device has garnered attention in craniofacial surgery, as it enables surgeons to perform accurate osteotomies, while reducing thermal injury and soft tissue damage. Here, we present the first report of using the piezoelectric device to perform LOs through an intraoral approach in a series of cadavers.

MATERIALS AND METHODS: All dissections were performed on cadavers without history of previous rhinoplasty, septoplasty or other nasal surgery. Traditional open rhinoplasty was performed followed by a 2cm intraoral dissection of the bilateral medial maxillary buttresses intraorally exposing the nasofacial junction. Piezoelectric surgery (MT8-20 L long osteotomy saw (Piezosurgery, Columbus, OH) was utilized to perform low to low lateral osteotomies in all cadavers. The duration of exposure, dissection and osteotomy was recorded along with dimensions of dissection. Dissected planes were individually stained with two different color dyes. Video nasal endoscopy was subsequently performed to evaluate for intranasal mucosal injury. Control group included intranasal lateral osteotomy with guarded osteotomes with video nasal endoscopy confirmation.

RESULTS: All experimental cadavers were Caucasian (5 females and 2 males), with a median age of 77.8 years old (IQR 5.5). The median time to open the nose was 13.77 (IQR 5.05 minutes). The median intraoral incision, dissection, and exposure was 1.59 minutes (IQR 0.26 minutes) and 1.22 minutes (IQR 0.30 minutes) for the right and left side, respectively. The median piezo osteotomy time took 1.70 (IQR 0.53 minutes) and 1.73 (IQR 1.06 minutes) for the right and left side, respectively. Visibility was maintained with good control and direct visualization in all cadavers from the piriform aperture to medial canthus. Out of the 7 cadavers, with 14 total dissections and osteotomies, all sides demonstrated no mucosal lacerations, confirmed via intranasal video endoscopy. The external branch of anterior ethmoidal nerve and infraorbital nerve were always preserved. Mucosal perforations were encountered in each control group (n=6) traditional lateral lacerations as well as irregular greenstick fractures of the nasal bones.

CONCLUSION: Direct visualization of the dissection and osteotomy allows for a more consistent and precise approach at narrowing the nasal bones. Traditional osteotome technique is blinded, inconsistent and has demonstrated to have a higher likelihood of multiple nasal mucosal lacerations. This study demonstrates that piezoelectric intraoral lateral osteotomies through an intraoral approach are a safe, expeditious and reproducible means to narrow the bony vault without the need for extensive nasal dissection.

Delineating the Effectiveness of Perioperative Tranexamic Acid in Reducing Bleeding Events after Panniculectomy

Abstract Presenter
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INTRODUCTION: Panniculectomy is a commonly performed procedure that restores abdominal cosmesis, improves hygiene, and enhances health-related quality of life for patients who experience massive surgical or medical weight loss. However, obesity-related dysmorphic changes in the pannus, comorbidities, and subclinical nutritional deficiencies may contribute to an elevated complication profile in these patients. Risk mitigation strategies include preservation of lymphatics, mattress and progressive tension sutures, hemostatic agents, tissue adhesives, and negative pressure wound therapy. Tranexamic acid, which blocks the conversion of plasminogen to plasmin, is gaining recognition as a pharmacologic adjunct to reduce hematoma, bruising, blood product transfusion, and post operative edema. By harnessing its antifibrinolytic and anti-inflammatory properties, we hope to discern the effectiveness of parenteral tranexamic acid to reduce bleeding complications following panniculectomy.

METHODS: A retrospective chart review was performed on consecutive patients who underwent panniculectomy by a single surgeon from 2017-2023. Patient charts were queried for demographics, operative factors, primary outcomes including hematoma or transfusion, and secondary outcomes including post operative change in hemoglobin concentration or hematocrit. Tranexamic acid was given as a loading dose followed by an infusion delivered prior to incision. The treatment group for tranexamic acid was compared to a historic cohort of panniculectomy patients that did not receive it.

RESULTS: 139 patients were identified with an average of 7 months of clinical follow up. The average age was 44±17 years. Average BMI was 32.2. 91% were female gender. 87% were

nonsmokers, 10% were former smokers, and 3% were current smokers. 79% had it least one surgical weight loss procedure. 47% underwent an infraumbilical skin excision while the other 53% underwent a fleur-de-lis pattern skin excision. A total of 19 patients received tranexamic acid treatment. Overall, the hematoma rate was low in both groups, 1 (5%) and 2 (2%) in the treatment group and control, respectively, and not significantly different.

CONCLUSIONS: The use of tranexamic acid in plastic surgery continues to expand. Though its safety in surgery is widely demonstrated, it may not be effective in preventing complications and reducing surgical morbidity after panniculectomy. Randomized clinical trial data may be needed to determine the utility of this adjunct to reducing clinically meaningful bleeding.

A Retrospective Single-Surgeon Chart-Review of Fresh Frozen Costal Cartilage in Revision Rhinoplasty

Abstract Presenter
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PURPOSE: Revision rhinoplasty and trauma-related rhinoplasty is often made more challenging by the lack of available autologous septal tissue. While other autologous and homologous graft options exist, they are fraught with their own challenges.1 Fresh frozen costal cartilage (FFCC) is an increasingly popular alternative that yields the benefits of homologous tissue while having a lower theoretical risk profile.2 Given the novel nature of this method, this study aims to analyze the long-term complication rates of MTF (Musculoskeletal Transplant Foundation) FFCC.

METHODS: A retrospective chart review of the use of FFCC in rhinoplasty in the senior author's practice was conducted. 282 cases were reviewed and analyzed for rates of infection, warping, and resorption. The inclusion criteria were cases with a minimum of 12 months of follow-up.

RESULTS: The mean age was 35.8 years old, with 27 males and 255 females. 40 cases were primary rhinoplasties while the remaining 242 were revisions. Mean follow-up period was 20.3 months. Six patients (2.1%) required antibiotics for post-operative redness, zero patients had clinical signs of warping, resorption, or displacement, and six patients (2.1%) required operative revision.

CONCLUSIONS: To date, this is the largest known study with the longest follow-up analyzing the complication profile of MTF FFCC in rhinoplasty. Acute infection, warping, and resorption rates were found to be no greater than rhinoplasty complication rates when autologous or homologous tissue are used. FFCC is a safe, convenient, and patient-centered option for graft tissue in rhinoplasty.

REFERENCES:
1. Chen K, Schultz B, Mattos D, Reish R. Optimizing the Use of Autografts, Allografts, and Alloplastic Materials in Rhinoplasty. Plastic and Reconstructive Surgery. 2022;150(3):675e-683e.
2. Rohrich RJ, Abraham J, Alleyne B, Bellamy J, Mohan R. Fresh frozen rib cartilage grafts in revision rhinoplasty: A 9-Year experience. Plastic and Reconstructive Surgery. 2022;150(1):58–62.

Facial Distortion with Common Social Media Applications: The Implications for Patient and Surgeon Perspectives

Abstract Presenter
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PURPOSE: The use of various image and video based social media applications has become exceedingly common. Obtaining self-taken images on such applications has had an effect on perception of body features, resulting in increased demand for aesthetic procedures. This study aims to explore social media application incurred software distortions in facial features using common applications compared to baseline images obtained on built-in smartphone cameras.

METHODS: A model's face was imaged at average human armlength (75 cm) with the camera at level (0°) with nose or, to simulate selfie angles, 30° above or below. The front and back cameras of an iPhone 14 Pro Max were utilized to obtain standard images. The front/back cameras were then used with three common social media applications including Snapchat, Instagram and TikTok. Cephalometric measurements using predefined anatomical landmarks were obtained from photographs. Average ratio values of cephalometric measurements were calculated and compared using t-tests holding built-in iPhone camera standard.

RESULTS: Based on comparison of various cephalometric ratios obtained within the social media applications to the standard photographs obtained using the built-in smartphone camera, extensive distortion patterns were noted when using all tested social media applications. Distortions were present with both front and rear phone cameras. In general, vertically oriented anatomical features were more distorted than horizontal features across most platforms. General trends also demonstrated decreases in size of central facial features and these distortions were accentuated when selfies were taken at angles above and below level with the face. Extensive quantitative details of specific anatomical distortions are explored in depth in the complete results.

CONCLUSIONS: Social media applications imposed distortions when taking selfies at level

and above or below face. This suggests that the aforementioned social media applications have inherent software-based alterations. We propose that these alterations may be secondary to the applications over correcting smartphone induced hardware or software distortions. Awareness of these distortions are important to consider when patient requests are based around smartphone photographs obtained using common social media applications.

Changes in the skin and subcutaneous tissue after bariatric surgery: a systematic review

Abstract Presenter
Edgard Da Silva Neto MD

INTRODUCTION: Obesity has currently taken on epidemic proportions, being considered a huge public health problem. Bariatric surgery is the most effective method in the treatment of morbid obesity (BMI> 40kg/m2), guaranteeing the patient a quick recovery and surgical success, representing a loss of up to 50% or more of weight after the procedure. Skin excess and flaccid, with inferior quality compared to other patients. Therefore, it is understood that surgeons should be aware of the skin alterations and seek to understand their etiology in order to create strategies that guarantee an increasingly superior functional aesthetic result.
The review aims to determine existing skin changes after bariatric surgery.

MATERIAL AND METHODS:
A search was carried out in electronic databases (MEDLINE, Pubmed, LiLacs, Scholar google) using the keywords: "skin laxity", "post bariatric" (after bariatric surgery), "massive weight loss".). The articles identified by the initial search strategy were evaluated according to the following inclusion criteria: (1) population (patients undergoing bariatric surgery), (2) intervention (skin analysis), (3) outcome (related skin changes).
Studies that met the inclusion criteria were assessed for methodological quality using the PEDro scale, based on the Delphi list, described by Verhagen et al. Studies with low methodological quality (PEDro score less than 3) were excluded. Articles that presented repeated information or information available in other articles were also excluded.

RESULTS: Were found 312 articles, but just 5 met the inclusion criteria and had methodological quality accessed by PEDro Score.

DISCUSSION: Macroscopically, there was a disarrangement of the subcutaneous layers with loss of continuity of the superficial fascia, with a structural disarrangement, and the lack of support provided by the subcutaneous tissue could be the cause of the skin flaccidity.
Already microscopically, it was observed a decrease in the amount, density and diameter of collagen fibers in patients after bariatric surgery, as well as depletion of elastic fibers, which would cause reduced tensile strength in the skin, causing sagging despite the resection of excess skin.
The current literature, however, needs to establish a consensus on the etiology of these changes, with an assumption that they occur due to skin stretching caused by obesity associated with nutritional factors that bariatric surgery as a complicating factor causes.

CONCLUSION: The literature demonstrates skin alterations caused by the great weight loss after bariatric surgery, more specifically changes in collagen fibers; however, there is a need for more specific studies to determine the etiology of these alterations, allowing intervention planning to minimize or circumvent them.

REFERENCES

Choo S; Marti G; Nastai M; Mallalieu J; Shermak MA. Biomechanical properties of skin in massive weight loss patients. Obes Surg. 2010; 20(10):1422-8
Orpheu SC1, Coulter PS, Scopel GP, Gomez DS, Rodrigues CJ, Modolin ML, Faintuch J, Gemperli R, Ferreira MC. Collagen and elastic content of abdominal skin after surgical weight loss.Obes Surg. 2010 Apr;20(4):480-6.
Silva SL. Anatomical variations of the subcutaneous tissue after weight loss. Rev. Bras. Cir. Plastic (Impr.), São Paulo , v. 25, no. 4, p. 675-678, Dec. 2010 .

Deep Chemical Peels and How to Incorporate Them Into Your Practice

Abstract Presenter
Richard Bensimon MD

The author will rely on his 22 year experience with modern croton oil peels to propose them as the premiere method for facial resurfacing and as an alternative to lasers. The argument that skin resurfacing is an indispensable part of facial rejuvenation will be made with multiple examples. Tactics for incorporating these peels into your practice safely will be discussed including how to perform them as an office procedure with mild oral sedation.

Facial resurfacing is a fundamental part of rejuvenation but it is often ignored because of the perceived difficulty. Lasers are an option,
but they have proved inadequate for difficult rhytids (i.e., perioral) both in quality and longevity. Croton oil peels can give excellent results with remarkable permanence. The misconception of danger and difficulty will be dispelled and the reality that these peels are within the grasp of any practitioner will be made evident and that they can be safely and comfortably performed in an office setting.

An Evaluation of the Reporting of Complications and Technical Usability of Rhinoplasty Online Patient Education Materials (OPEMs)

Abstract Presenter
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PURPOSE: While 95% of cosmetic surgery patients use online resources for medical information, the quality and completeness of these resources regarding rhinoplasty remain uncertain.1 Previous studies of OPEMs have found inadequate coverage of unsatisfactory results, need for revision, and risks of bleeding and infection.2,3 However, there has been no recent in-depth analysis of complication reporting. The objectives of this study were to evaluate whether rhinoplasty OPEMs comprehensively inform patients of complications and their prevalence in non-technical language, list strategies to prevent/manage complications, and are of high technical quality.

METHODS: The first 100 Google search results for "rhinoplasty patient information" were collected and narrowed down to 65 OPEMs that met inclusion criteria (i.e directed to patients, not post-operative instructions). Websites were categorized based on type (academic/hospital, private practice, health reference site), and WebsiteGrader was used for technical analysis. Assessment for the extent of complications mentioned was performed, and websites were evaluated based on several factors, including the percentage of complications listed in medical terms, discussion of complication prevention and management strategies, mention of complication prevalence, and inclusion of medical disclaimers.

RESULTS: 23 OPEMs were categorized as academic/hospital, 38 as board-certified private practice, and 4 as online health resources. Hospital/academic sites had a 14% higher technical quality score compared to private practice sites ($p=.003$). Online health resources reported the highest number of complications on average. 94% of sources listed less than 25% of complications in medical terminology. There was no significant difference in listing of strategies for prevention/management of complications, complication prevalence, or technical quality between hospital/academic and private practice sites. 27% of OPEMs listed complication management strategies, 81% listed complication prevention strategies, and less than 50% mentioned complication prevalence. Only 12 websites specifically referenced the author's credentials. 27% of sources included a medical disclaimer.

CONCLUSION: Rhinoplasty OPEMs are notably lacking in providing comprehensive procedural information and disclaimers acknowledging this. Though the majority list complications in plain language, there is a significant lack of mention of strategies to manage potential complications and author information. Given the prevalence of cosmetic surgery OPEM use, we hope this study highlights the importance of providing high-quality, accessible patient information.

Limitations include the limit to the first 100 search results and lack of video OPEM inclusion.

Future analyses will include validated quality assessments.

REFERENCES:

[1] Montemurro P, Porcnik A, Hedén P, et al. The influence of social media and easily accessible online information on the aesthetic plastic surgery practice: literature review and our own experience. Aesthetic Plast Surg. 2015;39:270.

[2] Heilbronn C, Cragun D, Wong BJF. Complications in Rhinoplasty: A Literature Review and Comparison with a Survey of Consent Forms. Facial Plastic Surgery and Aesthetic Medicine. 2020;22(1):50-56.

[3] Shamil E, Scenza GD, Ghani SA, Fan KS, Ragulan S, Salem J, Šurda P, D'Souza AR. A Quality Assessment of Online Patient Information Regarding Rhinoplasty. Facial Plast Surg. 2022 Oct;38(5):530-538. doi: 10.1055/s-0041-1735622. Epub 2021 Sep 28. PMID: 34583412.

NO MORE ECTROPION: LOWER EYELID REJUVENATION WITH HELIUM RF PLASMA RESURFACING AND FAT GRAFTING

Abstract Presenter
Melinda Lacerna Kimbrell MD

NO MORE ECTROPION! LOWER EYELID REJUVENATION WITH HELIUM RF PLASMA AND FAT GRAFTING
Goals/Purpose:

Traditional lower eyelid Blepharoplasty techniques with skin excision involves a significant risk of ectropion and lagophthalmos, despite incorporating intra-operative techniques such as lateral canthopexies or canthoplasties. In order to avoid these complications that are difficult to correct, the author presents lower eyelid rejuvenation without any skin excision, thereby avoiding trauma to the lower eyelid middle lamella, the most common area for scarring that can lead to post-operative cicatricial ectropion. Instead of skin excision, the author describes her technique of lower eyelid rejuvenation utilizing helium RF plasma skin resurfacing combined with structural macrofat grafting in the tear trough and lid-cheek junction areas. This technique is ideal for patients with lighter skin tones Fitzpatrick 1-3.
Methods/Technique:

The author presents her single surgeon retrospective experience of 60 patients treated in a five year period (2017-2022). Patients age range from 55-74, with 55 females and 5 males. Fifty patients underwent the procedure in conjunction with full face resurfacing and fat grafting, while ten patients had peri-orbital resurfacing only, along with fat grafting. Fifty five patients had their procedures performed under IV Sedation, and five patients were under general anesthesia. Patient follow up was one day after surgery, followed by weekly, then monthly for three months,

then annually. The longest follow up is five years. All patients were Fitzpatrick 1-3.
Technique:

Following successful induction of IV Anesthesia or General Anesthesia, the face is prepped and draped in the usual sterile fashion. The peri-orbital areas were then prepped with acetone, then corneal protectors placed. Tumescent solution was then infiltrated into the lower eyelids, approximately 7-10 cc per side. Next, helium RF plasma resurfacing was performed at 40% with 4 liter helium flow at a single pass. Next, macro fat grafting was performed utilizing blunt cannulas via radial Coleman technique, beginning from the tear trough or nasojugal fold, going laterally along the lid-cheek junction. Approximately 1 cc is placed along the nasojugal fold, and a range of 4-7 cc along the lid-cheek junction, just superficial to the infra-orbital periosteum. The patient is then instructed to wash their face twice a day and apply laser balm for the next two weeks.
Results/Complications:

There were no patients who experienced ectropion or lagophthalmos post-operatively. There were two patients in the full face resurfacing group who experienced complications. One patient experienced post-inflammatory hyperpigmentation of her forehead at three weeks post-op, but resolved after six weeks of treatment with hydroquinone based skin care. One patient experienced cellulitis of her forehead at eight weeks post-operative, but resolved after two weeks of oral antibiotics. All patients treated had significant improvement of the skin laxity in the lower eyelid area and correction of the volume loss in the nasojugal fold and the demarcation between the lid-cheek junction.
Conclusion:

Lower eyelid rejuvenation can be effectively and safely achieved utilizing a combination of helium RF plasma for lower eyelid skin resurfacing, along with macro fat grafting to correct the volume loss of the nasojugal area and the lid-cheek demarcation. By avoiding any skin excision, possible trauma to the middle lamella compartment of the lower eyelid is avoided, therefore preventing the occurrence of cicatricial ectropion and lagophthalmos. This technique also avoids the presence of a visible lower eyelid incision line. The author's goal is to continue to treat more patients and have longer post-operative follow up.

High-Definition Rib (HDR) Body Contouring Surgery: UUAIST and RIBOSS

Abstract Presenter
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BACKGROUND: High definition liposculpture (HDL) emerged as an innovative surgical technique that allowed plastic surgeons around the world to achieve higher aesthetic results by carving the underlying muscles and its contours in a new and different fashion compared to prior methods for lipoplasty . The innovative natural, anatomic, and athletic appearance of the body after surgery was achieved through minimal stealth incisions which ended up in imperceptible scarring . The technique has evolved throughout the years by incorporating different artistic concepts, new technologies, multiple approaches to protect the patient, and as a consequence improve the overall outcomes . One of the most recent improvements we have made to High-Definition Body contouring is the addition of bone remodeling surgeries to overcome the lack of silhouette over the waist, and as a result optimize the breast-waist-hip ratios.

METHODS: We are currently running a multi-center study in which we have completed 100+ surgeries of rib remodeling. UUAIST stands for Ultrasonic-piece and Ultrasound-Assisted Indentation Surgery of Torso, while RIBOSS does for Rib OsteoSynthesis Surgery. Both techniques have their ground on the previously described surgery for waist narrowing by Dr Kudzaev. However, we have improved the outcomes by doing minimally invasive surgery and also promoting fast recovery depending on each patient's case. We have also performed some cases of rib resection, under the technique of Dr Verdugo, however such technique is more time-consuming and technically riskier.

RESULTS: No major complications have been reported. Most common complication is related to prolonged pain, and contour asymmetry, which have both been associated with the non-compliance of constant garment + corset wearing. Riboss technique has a faster recovery and does not require constant use of corset. However, compression garments are required, and scar length is considerable bigger than that from UUAIST technique.

CONCLUSIONS: High Definition and Dynamic Definition liposculpture procedures are safe and reproducible techniques to attain not only an athletic and but also a natural body contour. The evolution of the technique has incorporated multiple technologies, advancements of the technique and also excisional procedures. Bone remodeling surgery might be the new game-changer for those individuals who require even more waist definition and improve the overall breast-waist-hip ratio. We have designed new approaches tailored to the needs and preferences of patients who usually lack a curvy structure of the body, especially for those extremely fit patients and those who seek gender affirming surgeries to change their overall body silhouette.

REFERENCES

1. Hoyos AE, Perez ME, Domínguez-Millán R. Variable Sculpting in Dynamic Definition Body Contouring: Procedure Selection and Management Algorithm. Aesthet Surg J. 2021;41(3):318-332. doi:10.1093/asj/sjaa133
2. Zarins U, Kondrats S. Anatomy for Sculptors: Understanding the Human Figure. Seattle, WA: Exonicus, LLC; 2019.
3. Hoyos AE, Cala LC, Perez ME, Mogollon IR, Dominguez-Millan R. High Definition Liposculpture's 18-year Evolution: Patient Safety and Aesthetic Outcomes [published online

ahead of print, 2022 Dec 5]. Plast Reconstr Surg. 2022;10.1097/PRS.0000000000009988. doi:10.1097/PRS.0000000000009988
4. Kudzaev KU, Kraiushkin IA. Waist Narrowing without Removal of Ribs. Plast Reconstr Surg Glob Open. 2021;9(7):e3680. Published 2021 Jul 12. doi:10.1097/GOX.0000000000003680

Frozen Cadaveric Rib Grafts in Primary or Revision Rhinoplasty: A Systemic Review and Meta-analysis

Abstract Presenter
Abdullah Al Qurashi Dr.

BACKGROUND: Primary and secondary rhinoplasty frequently requires addition of cartilage to support the osseocartilaginous framework of the nose. Autologous and irradiated homologous cartilage have been used as the cartilage graft source, each with its pros and cons. There has been an increasing popularity of fresh frozen rib grafts, which may mitigate the complications involved in using autologous or irradiated homologous costal cartilage, and may have a lower incidence of complications. However, the outcomes associated with the use of fresh frozen rib grafts have only been assessed in small clinical studies. Thus, we conducted a meta-analysis to provide a holistic, better-powered assessment of outcomes after primary and revision rhinoplasty using fresh frozen rib grafts.

METHODS: For this systematic review and meta-analysis, MEDLINE, Embase, Scopus, Cochrane Central Register of Controlled Trials, and ClinicalTrials.gov were searched for articles published from inception to January 2023. The following search strategy was used (septorhinoplasty OR rhinoplasty) AND (fresh frozen costal cartilage OR costal cartilage allograft OR rib graft OR cadaveric cartilage graft OR homologous costal cartilage graft). Inclusion and exclusion criteria was applied and patients receiving hybrid grafts were excluded to ensure a homogenous study sample. Data were pooled using a random-effects model and analysed using Open Meta Analyst. The effect size was measured for all reported complications including incidence of total complications, graft warping, resorption, infection, and revision surgery among patients receiving frozen aseptic grafts.

RESULTS: Of 306 citations, 5 studies were included in our systematic review and meta-analysis. Our study, which captured 440 patients, concluded a low rate of all complications with total complications (4.4%; 95% CI, 1.1%-9.8%), infections (2.6%; 95% CI, 1.2%-4.6%), warping (2.3%; 95% CI, 0.9%-4.3%), revision surgery (4.4%; 95% CI, 1.0%-9.9%) and resorption (1.8%; 95% CI, 0.2%-5.2%).

CONCLUSION: This meta-analysis suggests that frozen cadaveric costal cartilage may be used for rhinoplasty with minimum and comparable complications with other commonly used graft types, along with the advantage of no donor site morbidity over autologous grafts and decreased

resorption rates over irradiated homologous cartilage.

Correlations of Psychiatric Comorbidities with Body Image and Maintenance of Weight Loss Following Body Contouring Procedures Correlations of Psychiatric Comorbidities with Body Image and Maintenance of Weight Loss Following Body Contouring Procedures

Abstract Presenter
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INTRODUCTION: An estimated 46,000 patients undergo body contouring procedures in the U.S. each year. This patient population has a high prevalence of obesity and is subject to significant stigma. The relationship between obesity and psychiatric comorbidities is widely documented, and it has been estimated that anywhere between 20 and 60 percent of patients who pursue bariatric surgery suffer from axis I psychiatric disorders, especially anxiety and mood disorders. However, there is comparatively fewer investigations regarding psychosocial functioning of post-bariatric patients preparing to undergo body contouring surgery, though research in this field has been steadily growing over the past decade. This study aims to describe the implications of specific psychiatric comorbidities, including major depressive disorder (MDD) and generalized anxiety disorder (GAD) on the management and outcomes of patients who undergo body contouring procedures.

METHODS: A retrospective review was performed of patients who presented to a single institution for body contouring procedures between 2002 and 2018. Variables studied included demographic information, medical and psychiatric history, smoking and drinking history, self-image, social support, procedure history, outcomes and follow up. Univariate analysis, two-sample t-tests, and multinomial logistic regressions were performed using R statistical software (Version 1.3.1093).

RESULTS: A total of 1187 patients received at least one body contouring procedure within the study timeframe. The mean age of patients at presentation was 50.08 ± 0.78 years. The majority of our patient cohort was female (90.1 percent) and Caucasian (93 percent). Mean BMI at presentation was 31.21 ± 10.49 BMI units. A total of 50.2% of our patient cohort had history of at least one psychiatric comorbidity. GAD was found in 26.4% of the overall patient population. Patients with history of GAD were 1.4 times less likely to rate their pre-operative body image as "somewhat positive" or "very positive" ($p<0.05$) and were 1.69 times less likely to maintain 6-month post-op weight loss through regular exercise than patients without GAD ($p<0.02$). History of MDD or other psychiatric disorders was not significantly associated with lower ratings of pre-

operative self-image ($p>0.05$). When controlling for the effects of a history of anxiety, larger decreases between a patient's historical maximum BMI and BMI at the time of pre-operative body contouring association were significantly associated with a 2% increased likelihood of reporting a "somewhat positive" or "very positive" self-image ($p <0.05$).

CONCLUSION: Psychiatric comorbidities such as GAD have important implications on management and outcomes in patients undergoing body contouring procedures. Patients with GAD are less likely to report positive pre-operative body-image and are less likely to maintain weight loss than patients without GAD.

The Use of Hyaluronic Acid in Non-Surgical Rhinoplasty: A Systematic Review of Clinical and Patient-Reported Outcomes

Abstract Presenter
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INTRODUCTION: Non-surgical rhinoplasty using dermal filler is gaining increasing popularity as a non-invasive, lower-cost alternative to surgery in the correction of nasal irregularity or deformity. Hyaluronic acid (HA) represents the most commonly used filler and is used across a variety of practitioner settings. In spite of this, outcomes and complications following HA use have not been studied using high-quality systematic review methodology. An overview of these measures can support clinicians in appropriate selection of patient and technique as well as in guiding patient expectations. We conducted a systematic review to this end to evaluate clinical and patient-reported outcomes following non-surgical rhinoplasty using HA filler.

METHODS: The study protocol was registered in PROSPERO a priori (ID: CRD42022369278). MEDLINE, EMBASE and Cochrane databases were searched systematically and bibliographies of reviewed articles screened for all relevant English-language papers. Included articles were original studies that reported on clinical patient-reported outcomes, patient satisfaction or complications as outcomes of interest following non-surgical rhinoplasty using HA filler. In all stages of the search, PRISMA guidelines were adhered to. Risk of bias and methodological quality were assessed using MINORS criteria and methodological

quality and synthesis of case series.

RESULTS: Of 874 publications, 23 full-text studies comprising 3928 patients were included. Nasal hump deformity was the most common indication for non-surgical rhinoplasty using HA filler, with the nasal tip as the most commonly injected site (13 studies), followed by the columella (12 studies). JUVÉDERM ULTRA® was the most widely used HA filler and high levels of patient satisfaction were reported in all studies that recorded this outcome measure. Pooled post-procedural patient satisfaction was 93.4% [95% CI: 90-97%] from studies using verbal patient self-assessment scales and the majority of patient satisfaction scores were >7.5/10 in studies using numerical self-assessment scales. Follow-up duration ranged from 2 weeks to 18 months. Major complications (skin necrosis, pustules, vascular impairment and infection) were reported in 6/23 studies (n=8). Minor complications (edema, bruising, erythema and pain) were more common and recorded in 16/23 studies.

CONCLUSION: Non-surgical rhinoplasty using HA filler demonstrated few side effects and a short recovery period in this systematic review. High rates of patient satisfaction were recorded unanimously across the literature. However, evidence is limited by an absence of randomized controlled trials (RCTs) reporting on outcomes or complications and variability in outcome measurement, technique used and duration of follow-up. Standardized outcome measures and further, well-designed RCTs will optimize the available evidence base for HA fillers.

Putting the "Fat" in Satisfaction: A Study on Fat Grafting Patient-Reported Outcomes for Breast Revision"

INTRODUCTION: Autologous fat transfer is a method that plastic surgeons often use to improve asymmetries and contour deformities.1 For post-mastectomy breast reconstruction patients, an important metric to evaluate operative outcomes is the degree of patient satisfaction. The Breast-Q is a validated questionnaire designed to evaluate patient reported outcomes following breast surgery in domains pertaining to breast appearance, physical wellbeing, psychosocial wellbeing, sexual wellbeing, and satisfaction with overall treatment.2 The objective of this study is to provide a standardized analysis of patient input and feedback before and after autologous fat grafting, and assess whether the technique of lipid transfer affects patient satisfaction and self-reported quality of life.

METHOD: Female adults aged >18 with a history of prior breast surgery (either complete or partial mastectomy) undergoing fat grafting from available donor sites, BMI >20, and anticipated harvested fat volume >50 cc were enrolled in the study. Patients were randomized into one of three treatment arms in a 1:1:1 ratio (standard decantation, active filtration, low pressure decantation). The pre-operative BreastQ survey was administer at the initial consultation. The post-operative BreastQ survey was given at the three-month follow-up after fat grafting surgery completion. Unpaired t-test and One-way ANOVA were used to evaluate statistically significant differences between the cohorts.

RESULTS: When comparing post-operative measures, active filtration achieved the highest patient satisfaction in categories of physical wellbeing of the back, animation, psychosocial wellbeing, and overall satisfaction. The standard decantation group reported the highest level of physical wellbeing of the chest and sexual wellbeing. Overall, pre-operative survey results did not differ significantly from post-operative results, and the three treatment groups did not differ significantly from each other.

CONCLUSION: The BreastQ survey is a useful tool for evaluating and improving patient outcomes and satisfaction following breast surgery. Within the context of fat grafting, it helps elucidate patient needs and preferences, identify areas for improvement, and tailor care to individual patients. Our results show that patient satisfaction and wellbeing did not consistently improve after the procedure, and that the method of fat grafting did not lead to significant differences from the patient's perspective. Therefore, it may be important to manage patient expectations during preoperative counseling and educate patients on the potential need for multiple surgeries to achieve the desired result.

1. Strong, Amy L. Ph.D., M.P.H.; Cederna, Paul S. M.D.; Rubin, J. Peter M.D.; Coleman, Sydney R. M.D.; Levi, Benjamin M.D.. The Current State of Fat Grafting: A Review of Harvesting, Processing, and Injection Techniques. Plastic and Reconstructive Surgery 136(4):p 897-912, October 2015. | DOI: 10.1097/PRS.0000000000001590
2. Pusic AL, Klassen AF, Scott AM, Klok JA, Cordeiro PG, Cano SJ. Development of a new patient-reported outcome measure for breast surgery: the BREAST-Q. Plast Reconstr Surg. 2009 Aug;124(2):345-353. doi: 10.1097/PRS.0b013e3181aee807. PMID: 19644246.

BEST PRACTICES FOR FACE-Q AESTHETICS RESEARCH: A SYSTEMATIC REVIEW OF STUDY METHODOLOGY

Abstract Presenter
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INTRODUCTION: The FACE-Q Aesthetics module is a validated patient-reported outcome measure (PROM) that evaluates perspectives on facial aesthetic treatments. Improper administration and poor study methodology can compromise the validity and interpretation of this PROM. This systematic review sought to evaluate the administration and scoring of the FACE-Q Aesthetics scales within the literature.

METHODS: A search of Ovid Medline, Embase, Cochrane, and Web of Science was performed on December 20, 2022 with the assistance of a health-research librarian (CRD42022383676). Studies that examined facial aesthetic interventions using the FACE-Q Aesthetics module as a primary or secondary outcome measure were included for analysis.

RESULTS: There were 114 studies included. The Face Overall (n=52, 45.6%), Psychological (n=45, 39.4%), and Social (n=43, 37.7%) scales were most frequently reported. Errors in FACE-Q administration were identified in 30 (26.3%) studies. The most common error was the presentation of raw ordinal scores rather than the converted Q score (n=23). Most studies reported a time horizon for their primary analysis (n=76, 66.7%); however, only four studies provided a rationale for this selection. Sample size calculations for the primary outcome were rarely performed (n=9, 7.9%).

CONCLUSION: There continues to be limitations in PROM administration and the quality of articles that report FACE-Q Aesthetic scale data. The authors suggest that future investigators using the FACE-Q refer to the User's Guide regarding administration and scoring of this scale, report and provide a rationale for the study time horizon and provide an apriori sample size calculation for the primary outcome of interest.

Willingness to Pay for Scar Removal on Child vs Adult: What Demographic Group Pays More?

Abstract Presenter
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BACKGROUND: Willingness to pay (WTP) has been an important tool in healthcare used to understand public priorities and satisfaction rates. To our knowledge, no study compared WTP for pediatric and adult patients in scenarios applicable to both populations, such as scars. We assessed general public's WTP for scar removals on adults and children. We hypothesized that scar location and age of the person with a scar would have a significant effect on WTP. We also

assessed the effect of respondents' income, gender, and having own children.

METHODS: Shutterstock, a free image database, was used to obtain images of scars on adults and children. Focus group was used to match images in terms of scar severity and location. Two pairs of images were selected (Figures 1 and 2). Two Qualtrics surveys were created. Each consisted of three blocks of questions. First two blocks included either a picture of a child's or an adult's scar, and assessed WTP supposing no insurance coverage and severity rating from 1 to 5. Third block assessed demographics of interest. Surveys were dispersed via social media platforms. Identifying information was not collected. Partially completed surveys were not excluded. Data was analyzed using IBM SPSS to identify significant predictors of higher WTP for scar removal.

RESULTS: Face scar survey obtained 100 responses. 37% were males, 34% were females, 14% were non-binary/third gender, and 15% chose not to respond. WTP was higher for child's face scar removal than adult's ($4,946 vs $3,130; $p<0.001$). Higher income correlated with higher WTP for both child ($p=0.011$) and adult ($p<0.001$). Having children correlated with higher WTP for child ($p=0.01$) but not adult ($p=0.52$). Overall, women with children and income over 200k reported highest WTP for both child's and adult's face scars. For each point on the severity perception scale, respondents were willing to pay extra $2800 ($p<0.001$; $r2=0.259$) for a child, and extra $2240 ($p<0.001$; $r2=0.194$) for an adult. Hand scar survey obtained 142 responses. 38.7% were males, 37.3% were females, 8.5% were non-binary/third gender, and 15.5% chose not to respond. WTP was higher for child's hand scar removal than adult's ($1,418 vs $807; $p<0.001$). Neither higher income range nor having children correlated with higher WTP. Overall, women with children and income over 200k reported highest WTP for child's hand scar, and non-binary folks without children and income range 15-25k reported highest WTP for adult's. For each point on the severity perception scale, respondents were willing to pay extra $1390 ($p<0.001$; $r2=0.217$) for a child, and extra $562 ($p<0.001$; $r2=0.104$) for an adult. This study was limited by inadvertent exclusion of cohorts that don't use social media.

CONCLUSION: This study demonstrated that WTP was highest for child's face scar. Higher income had an effect on WTP for face, but not hand scars. Having children had an effect on WTP for child's face scar only. Women with children and income 200k+ were willing to pay most for scar removal from child's and adult's faces and child's hand, but not adult's hand.

Preferences and Barriers of Male Patients Seeking Aesthetic Surgery

Abstract Presenter
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BACKGROUND: The prevalence of men seeking plastic surgery has been increasing in recent years, especially as societal attitudes towards plastic surgery continue to evolve. By delving into the factors driving male patients to seek plastic surgery and the obstacles they encounter, this study aims to facilitate the development of more inclusive and effective approaches to cater to the unique needs and goals of male patients.

METHOD: An anonymous 41 question survey was conducted among adult men in the United States via the Amazon Mechanical Turk crowdsourcing platform. Questions assessed demographic information and identified factors that influenced males to seek plastic surgery care, the barriers they experienced while seeking care, and their preferences. Multivariate logistic regression was used to assess relationships between demographic variables and likelihood of getting cosmetic surgery.

RESULTS: Four hundred and eleven complete responses were analyzed. The median (IQR) age of respondents was 32 (30, 40) years old. Of the respondents, 60% had previous experience with plastic surgery. Functional improvement (40%), personal aspiration (32%), and partners' opinions (22%) were the most commonly cited reasons for undergoing procedures. The most common barriers faced by this population were recovery time following a procedure (52%), perceived risk of complications (48%), cost (43%), fear of being identified as having had plastic surgery (32%), and surgeons not being able to meet expectations (31%). 89% of respondents who underwent plastic surgery procedures reported facing at least one barrier. Multivariate regression demonstrated that higher education levels were strongly associated with a likelihood of undergoing cosmetic surgery ($p < 0.001$). Income ($p = 0.44$) and region ($p = 0.23$) did not significantly affect the likelihood of undergoing plastic surgery.

CONCLUSION: Despite improving societal stigma, many male patients continue to face barriers when obtaining plastic surgery care. Efforts should be made to alleviate these barriers and surgeons looking to expand their practice may benefit from increased outreach to male patients. This outreach should be compounded with improved education targeting stigma and risks of procedures, increasing male specific advertisement to make them feel welcome in an industry predominantly focused on female patients, and offering male tailored procedures.

Analysis of Facial Contour in Attractive Celebrities: How does Forehead and Jawline Shape Contribute to Facial Contour?

Abstract Presenter
Cristina Salinas

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PURPOSE: Facial sexual dimorphism influences facial appearance. Understanding how differences in forehead and jawline morphometrics create distinct facial contours in attractive men and women is important in planning facial aesthetic surgery. In this study, facial measurements of male and female celebrities and models were analyzed and compared to investigate the anthropometrics of attractive individuals.

METHODS: 47 Caucasian female and 21 Caucasian male celebrities were included. Full-face front view photos were evaluated by a facial analysis program using Vision framework and MATLAB to detect facial landmarks. Pixel distances were converted to physical distances by dividing the pixel measurement by the subject's white-to-white corneal diameter in pixels, and then multiplying the ratio by the average white-to-white corneal diameter in millimeters (11.71 +/0 0.42 mm in Caucasians). Morphometrics of the upper and lower third of the face were compared between males and females. Additionally, measurements from the subnasale to 24 facial contour points were calculated to create the average facial contour for both genders.

RESULTS: The mean ages of the female and male celebrities at the time of the photo were 29 and 31, respectively. Forehead height (trichion-glabella) and width (at the same horizontal level as the glabella) were similar among attractive males and females. Forehead height to width ratios were not significantly different between genders. The facial contour of attractive males exhibited significantly greater lateral forehead heights (hairline to lateral brow) than that seen in attractive females, while the medial forehead height was similar between the two groups. The average lower facial height (subnasale to menton) and bigonial width were greater in attractive males than in females, making the lower facial contour in males significantly longer at all points. The ratio of facial height (trichion to menton) to lower facial height more closely approximated 3:1 in female faces than in male faces. This indicates that the rule of horizontal facial thirds is more applicable in attractive female faces, while a longer lower facial height is more common in the attractive male face. The female facial contour was also more tapered at the gonial angles and chin compared to the males. Interestingly, a greater variety of jawline shapes were observed in attractive female faces, even those not classically narrow and oval-shaped.

CONCLUSION: Distinct facial contours of attractive males and females were created by differences in lateral forehead heights and lower face size and shape. Central forehead heights

and forehead widths were similar among attractive males and females; however, lateral forehead height was significantly shorter in female faces. While the lower facial contour was more tapered at the chin and gonial angles in females, the other lower facial ratios were similar between the two genders.

Ancillary procedures used in our practice to improve the eyelid surgery outcomes

Abstract Presenter
Katarina Andjelkov MD, PhD

INTRODUCTION: Blepharoplasty is one of the most commonly performed cosmetic surgical procedures. To date, it remains the most powerful method of periorbital rejuvenation when compared to other non-surgical modalities, especially in the ageing face.
Conventional upper blepharoplasty relies on skin, muscle, and fat excision to restore ideal pretarsal space–to–upper lid fold ratios. But, according to some publications, many patients that are searching for upper blepharoplasty have complete pretarsal show and are in the risk for worse cosmetic outcomes using conventional excision techniques. [1]
Modern blepharoplasty relies on tissue conservation and volume enhancement rather than aggressive removal. The concept of blepharoplasty has evolved over the years secondary to increasing knowledge of:
periorbital anatomy, facial topography, and the ageing process. Common issues of the lower eyelid such as: malar descent, tear trough deformity, pseudoherniated fat, lid laxity, skin texture changes, dermatochalasis and festoons must be recognized and treated.

METHODS: We present a retrospective study of consecutive patients who underwent blepharoplasty surgery, in our clinic, from June 2022 till December 2022. Patients were asked to fill the questionnaire created by the authors and consisted of 10 questions that detailed patient characteristics and epidemiological background, motivation for undergoing surgery, and psychosocial and cosmetic changes. Various demographic factors, including participant age, as well as a type of the procedure performed. We also analysed complication rates and presented them for each procedure. The minimum follow up period was 3 months.

RESULTS: In total we had 92 patients. The average age was 46.0±7.5 years. Patients underwent upper and lower blepharoplasty in conjunction with ancillary procedures to maximize safety and improve the aesthetic results such as: fat grafting, cantopexy, conservative skin excision ("pinch"), muscle flap, laser tightening of the anterior lamela, temporal lift, browpexy and brow fixation, eyelid rejuvenation with nano-fat and so on. We analysed the frequency of each procedure, their complication rates and patients' satisfaction rates with the final outcome. We present here our experience with all these ancillary techniques and the way we indicate and apply them in our cases of blepharoplasty.
Conclusion: Ancillary procedures significantly improve the aesthetic outcomes in blepharoplasty surgery but, in many cases, should be considered as a main procedure.

LITERATURE:

Alghoul, M; Bricker, J., Venkatesh, V., et al. Rethinking Upper Blepharoplasty: The Impact of Pretarsal Show. Plast and Reconstr Surg146(6):p 1239-47.

The Presence of BBL Content Within Plastic Surgery TikTok

Abstract Presenter
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GOALS/PURPOSE: TikTok has rapidly become one of the most popular social media apps in the world with over two billion downloads and one billion active monthly users. Videos related to medicine are popular, with the hashtag #plasticsurgery producing hundreds of thousands of videos. A prevalent topic within Plastic Surgery TikTok is the Brazilian Butt Lift (BBL), a cosmetic procedure to enhance the shape of the buttocks using autologous fat grafting. However, it has been demonstrated to have the highest mortality of any cosmetic surgery, with mortality being reported as high as 1 in 2,351. Despite this, it remains one of the most discussed and sought after cosmetic procedures in our field. This study aims to understand how the TikTok algorithm presents BBL content within Plastic Surgery social media.

METHODS: To look at BBL related content within Plastic Surgery TikTok, we analyzed the top recommended videos produced from searching the three most popular plastic surgery related hashtags: #plasticsurgery, #plasticsurgerycheck, and #plasticsurgeon. A total of 105 videos containing the hashtag #bbl were identified from a sample of 500 plastic surgery related TikTok videos. Videos were categorized by creator role and content category, and the hashtags used in each video were documented. Videos characterized as a "personal experience" were labeled as either positive, negative, or neutral depending on the tone of the video.

RESULTS: Videos containing the hashtag #bbl were significantly more likely to be created by non-physicians instead of physicians ($p<0.001$). Only 10% of videos containing #bbl were categorized as "educational", with less than half of these videos (45%) created by a physician, none of whom discussing any potential negative effects of the BBL procedure itself. Videos containing #bbl were significantly more likely to be a categorized as a "personal experience." These videos were further characterized as being a positive, negative, or neutral experience, with 54 (81%) being positive experiences, six (9%) being negative experiences and seven (10%) being neutral experiences ($p<0.001$). All "negative personal experience" videos were created by patients.

CONCLUSIONS

With its massive audience, TikTok video creators can engage with and influence the public. Viewers of plastic surgery related content commonly encounter #bbl tagged videos, however, majority of these videos are created by non-physicians, many of whom are patients with a positive personal experience with a BBL. There are extremely few videos detailing negative personal experiences with BBLs, or physicians educating viewers on the negative effects of BBLs. Plastic surgeons that create TikTok videos with the hashtag #bbl which provide education on the negative effects of BBLs may increase awareness of the risks of a BBL procedure, leading to a more informed public.

Tranexamic Acid Irrigation in Liposuction: A Double Blind, Half-Body, Randomized, Placebo Controlled Trial.

Abstract Presenter
Yoram Wolf MD

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ron skorochod
Liran Shapira

BACKGROUND: Hematomas are common complications following plastic and aesthetic surgeries. Large and complex hematomas might result in prolonged hospitalization, further interventions, additional expenses, and poor aesthetic outcome. Tranexamic acid (TXA), an anti-fibrinolytic agent, has long been used to reduce blood loss in cardiac and orthopedic surgeries, trauma, and in menstrual bleeding. Its use in the field of plastic surgery, and more specifically in liposuctions, has gained more popularity in the last years. A few studies have presented the ability of TXA to reduce blood loss, hematomas, and ecchymoses after liposuctions. However, the proper dose and the route of administration remained controversial.

OBJECTIVE: Our aim in this study was to illustrate the effect of a low dose of TXA in an irrigation method in reducing hematomas and ecchymoses following liposuction.
Methods: Nineteen patients who underwent liposuction as an auxiliary procedure to an aesthetic surgery were included. Following liposuction, 400mg of TXA were administered in an irrigation protocol to one side of the body in each patient, while the other side was administered with saline. The patients were photographed on 1, 2, 4, and 11 post-operative days. Each ecchymosis and hematoma were measured and rated.

RESULTS: The results showed a decrease in hematomas and ecchymoses size during 1, 2, and 11 post-operative days. However, these results were not statistically significant.

CONCLUSIONS: The use of low dose TXA irrigation solution, did not demonstrate a statistically significant difference in post-operative hematoma formations rates and subsequent ecchymosis size and scale

Force Displacement of The Abdominal Sub-Scarpal Lipoaponeurotic System

Abstract Presenter
Yoram Wolf MD

Abstract Co-Author
ron skorochod

BACKGROUND: The sub-scarpal lipoaponeurotic system (SLAS), has been previously introduced to the literature as an important point of reference in the biplanar lipoabdominoplasty. [1].
During the procedure, the SLAS layer is utilized as a flap to further tighten the skin and improve post-operative tissue perfusion and lymphatic drainage. The satisfactory aesthetic outcomes combined with the low rates of seroma development, required further research to properly analyze the layer. In previous preliminary reports, the layer has been characterized histologically and radiologically. Upon radiological imaging using contrast CT, the SLAS appeared to be a circumferential layer, below the Scarpa's fascia, extending posteriorly until the spinous process adhesion line, overlying the anterior rectus sheath medially and the external oblique fascia laterally.

Histologically the SLAS was superficially inspected and demonstrated subjectively more collagen bundles, oriented in a parallel direction to the fascia fibers. Additionally, the SLAS appeared to have approximately 10% more blood capillaries and vessels, greater in size when compared to the fat layer above the Scarpa's fascia.

PURPOSE: Analyze the "Sub-Scrapal Lipoaponeurotic System" (SLAS) using tissue straining and mechanical testing to assess the force and flexibility of the SLAS.

MATERIALS AND METHODS: Cadaver dissections were conducted after receiving IRB approval for the study protocol. The SLAS layer was identified and its borders of were defined. Subsequently, several samples were resected from anatomically defined locations, representing the center and periphery of the layer. For comparison purposes, parallel samples from the subcutaneous fat layer were dissected from the studied cadavers and similarly analyzed.

Samples from both tissues were inserted to a tensile machine INSTRON (electropuls E10000) while being held by specifically designed grips. The "INSTRON" machine was used to stretch the specimen at a constant velocity, while recording the force required to do so [figure 1].
Tests were carried out under displacement control at a crosshead velocity of 20 mm/min. The typical strain rate of the experiments was 0.67 1/sec based on a 30 mm representative gauge length.
The measured load-displacement data were translated into nominal stress-strain curves, using the original specimen's gauge length and cross section.

RESULTS: Subcutaneous samples required significantly less stress to produce similar strain when being compared to the SLAS tissue. For a strain of 0.6 (60% of lengthening from the initial length), we forced a stress of 0.6×〖10〗^5 [Pa] on the subcutaneous fat tissues. In contrast, for the same strain, we forced approximately 1.5×〖10〗^5 [Pa] on the SLAS tissues [Figure 2]

CONCLUSION: SLAS possess unique mechanical characteristics that ascertain its importance in the biplanar lipoabsominoplasty. The SLAS was found to be substantially stronger when compared to the subcutaneous fat tissue.

REFERENCES:
1. Wolf Y, Weissman O, Dima H, Sandbank J, Fainzilber-Goldman Y. Biplanar Lipoabdominoplasty: Introducing the Subscarpal Lipo Aponeurotic System. Plast Reconstr Surg Glob Open. 2022 Jan 5;10(1):e4000. doi: 10.1097/GOX.0000000000004000. PMID: 35186612; PMCID: PMC8849338.

Bibliometric Analysis of the 50 Most Cited Papers on Body Contouring After Massive Weight Loss

Abstract Presenter
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INTRODUCTION: Reconstructive body contouring surgery is an essential step in the multidisciplinary approach and algorithm of the surgical treatment of morbid obesity. This bibliometric analysis aims to provide a comprehensive overview of the current state of literature on body contouring after massive weight loss, identifying research trends and areas for future investigation.

METHODS: The 50 most cited publications on post-massive weight loss surgery were identified from the World of Science Core Collection on February 19th 2023. The following data were extracted from each article: title, journal, publication year, total citations, average citations per year, authors, study type, study topic, country, and institution of origin.

RESULTS: The average number of citations per article was 70.98±34.04 (median 56; range 43–224). The average number of citations per year was 4.94±1.95 (median 4.40; range 2.43–9.64). The decades during which the 50 most cited papers were published were the 1990s (n=2; 4%), 2000s (n=29; 58%), and 2010s (n=19; 48%). The top three journals were Plastic and Reconstructive Surgery (n=23; 46%), Obesity Surgery (n=11; 22%), and Annals of Plastic Surgery (n=5; 10%). Most articles originated from the United States (n=32; 64%), followed by

the Netherlands (n=3; 6%) and France (n=3; 6%). The institutions that contributed the most to the 50 most cited papers were the University of Pittsburgh (n=11; 22%) and Johns Hopkins University (n=6; 12%). The authors who contributed the most to the 50 most cited papers were Rubin JP (n=9; 18%), Hurwitz DJ (n=7; 14%), Shermak M (n=6; 12%), and Gusenoff JA (n=5; 10%). Study types included retrospective outcomes analysis (n=13; 26%), patient surveys/questionnaires (n=13; 26%), surgical technique papers (n=9; 18%), review articles (n=5; 10%), prospective outcomes analysis (n=4; 8%), patient interviews (n=2; 4%), a survey of surgeons (n=1; 2%), a classification system paper (n=1; 2%), and an anatomical study (n=1; 2%). Surgical technique papers described methods of brachioplasty (n=3, 33.3%), lower body lift (n=2; 22.2%), upper body lift (n=1; 11.1%), total body lift (n=1; 11.1%), mastopexy (n=1; 11.1%), and abdominoplasty (n = 1; 11.1%). Outcomes papers focused on body contouring generally (n=8; 47.1%), abdominal contouring (n=4; 23.5%), brachioplasty (n=1; 5.9%), thighplasty (n=1; 5.9%), and autologous breast augmentation (n=1; 5.9%). Other notable study topics in the 50 most cited papers were quality of life and body image after body contouring (n=9; 18%), factors affecting desire for and expectations of body contouring after bariatric surgery (n=8; 16%), the effect of nutritional deficiency on body contouring in postbariatric patients (n=2; 4%), and venous thromboembolism after body contouring (n=2; 4%).

CONCLUSION: This bibliometric analysis provides valuable insights for research and clinicians interested in body contouring after massive weight loss. In addition to surgical technique and outcomes research, areas of significant interest are the factors that influence the decision to pursue body contouring, as well as quality of life and body image after body contouring. Interestingly, the latter topics have been increasingly emphasized in recent literature, underscoring the importance of recognizing and pursing further research on the psychosocial aspects of plastic surgery in postbariatric patient care.

The Role of Platelet-rich Plasma (PrP) in Androgenetic Alopecia: A Systematic Review and Meta-analysis

Abstract Presenter
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INTRODUCTION: Androgenetic alopecia (AGA) is the most common cause of chronic hair loss affecting up to 80% of men by the age of 70. [1, 2] The use of intradermal application of platelet-rich plasma (PrP) to areas affected by AGA is thought to regenerate atrophic follicles and has been proposed as a novel treatment for AGA. [3] Previous systematic reviews and meta-

analyses evaluating the use of PrP use in AGA have been convoluted by mixed statistics from different genders and low power studies. This systematic review aims to clarify the efficacy of PrP in treatment of AGA in male patients only. [3, 4]

METHODS: The study protocol was published a priori (PROSPERO: CRD4202165858). MEDLINE, Embase, Web of Science, and CENTRAL were searched for studies comparing use of PrP versus placebo and reporting at least one outcome of interest (clinical or patient-reported outcomes, PROs). Methodological quality and risk of bias were assessed using GRADE and Cochrane's RoB-2/ROBINS-I tools, respectively. Random effects models were applied due to the heterogeneity of studies.

RESULTS: Of 402 articles, 8 studies (7 randomized controlled trials; 1 prospective cohort study) were included. PrP was associated with significantly increased hair density [mean difference 45, 95% CI [24.21, 65.8], $P<0.0001$, $I2=75\%$] and hair count (mean difference 35.89, 95% CI [29.57, 42.21], $P<0.00001$, $I2=0\%$) compared with control. The AMSTAR2 tool identified this review as having addressed the methodological limitations of previous reviews.

CONCLUSION: This systematic review and meta-analysis provides support for use of PrP in the treatment of AGA. As PrP classification systems develop, studies consisting of high-quality level I data are needed to quantify the components of PrP to guide future recommendations, and optimise clinician-patient shared decision making.

REFERENCES:

1. Varothai S, Bergfeld WF. Androgenetic alopecia: an evidence-based treatment update. Am J Clin Dermatol. 2014;15(3):217–30. PMID: 24848508.
2. Roohaninasab M, Goodarzi A, Ghassemi M, Sadeghzadeh-Bazargan A, Behrangi E, Najar Nobari N. Systematic review of platelet-rich plasma in treating alopecia: Focusing on efficacy, safety, and therapeutic durability. Dermatol Ther. 2021. 34(2):e14768. PMID: 33421285.
3. Qu Q, Shi P, Yi Y, et al. Efficacy of Platelet-rich Plasma for Treating Androgenic Alopecia of Varying Grades. Clin Drug Investig. 2019 Sep;39(9):865-872. PMID: 31228018.
4. Marx RE. Platelet-rich plasma (PRP): what is PRP and what is not PRP? Implant Dent. 2001;10(4):225-8. PMID: 11813662.

Absorbable Versus Non-Absorbable Sutures for Facial Skin Closure: A Systematic Review and Meta-Analysis of Clinical and Aesthetic Outcomes

Abstract Presenter
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INTRODUCTION: When repairing facial wounds, it is essential to have a good understanding of appropriate suture materials and their evidence base. The lack of high-quality and robust systematic reviews makes decision-making difficult. We reviewed the available literature and evaluated the quality of current evidence on the clinical, aesthetic, and patient-reported outcomes of absorbable versus non-absorbable sutures for facial skin closure.

METHODS: The study was registered on PROSPERO a priori. EMBASE, OVID, and PUBMED/MEDLINE were searched. Only randomized controlled trials (RCTs) were included. Study quality was assessed using the American Society of Plastic Surgeons' level of evidence and grading recommendations, and the risk of bias was assessed using Cochrane's Risk of Bias Tool for randomized studies. Statistical analysis was performed with the Review Manager (RevMan).

RESULTS: The study included nine RCTs with 804 participants with facial injuries. In 50.2% of these injuries (403 injuries), absorbable sutures were used, and in 49.8% (401 injuries), non-absorbable sutures were used. In terms of cosmesis scales, there was no statistically significant difference between absorbable and non-absorbable stitches in terms of infections ($p = 0.54$), visual analog scale (VAS) ($p = 0.69$), wound dehiscence ($p = 0.27$), and scarring ($p = 0.46$). Regarding VAS assessment, the MD in VAS was 1.06 (95% CI −4.06, 6.22, $p = 0.12$; $I2 = 45\%$), and SMD 0.08 (95% CI -0.18, 0.33, $p = 0.16$, $I2 = 39\%$). For Wound infection, the OR was 0.66 (95% CI 0.18, 2.45, $p = 0.72$; $I2 = 0\%$). The overall OR was 0.33 (95% CI 0.05, 2.04, $p = 0.27$; $I2 = 24\%$). In the combined analysis for scarring, the OR was 0.82 (95% CI 0.25, 2.64, $p = 0.45$; $I2 = 0\%$). Two reviewers independently assessed the risk of bias for eligible RCTs using the Cochrane Risk of Bias Assessment Tool for Randomized Trials (RoB 2). Eight of the included RCTs were considered low risk of bias, and only one was considered high risk. According to the level of evidence and grading recommendations of the American Society of Plastic Surgery, all of the articles included were level I.

CONCLUSION: Absorbable sutures are a viable alternative to non-absorbable sutures, with current evidence supporting equivalent aesthetic and clinical outcomes. Future, high-quality level I evidence with cost-effectiveness analysis is required to optimize clinician-patient shared decision-making.

Would the US population Share their Visual Data to Serve the Field of Aesthetic Surgery's Expectations and Outcomes? A Cross-Sectional Study.

Abstract Presenter
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BACKGROUND: Most of the existing aesthetic surgery literature is based on Caucasian populations. Several studies have found that non-Caucasians are less represented where surgical techniques do not preserve their ethnic features. A solution to this could be found with machine learning applications that can predict surgical outcomes to address patients' expectations. The aim of this study is to understand the knowledge and attitude of the United States population of different races towards sharing their visual data in machine learning research and applications for aesthetic purposes.

METHODS: A cross-sectional study was conducted among the United States adult population through Amazon mTurk. The questionnaire contained several sections including sociodemographic information, aesthetic procedures and surgeries undergone by the participants, general acceptance towards aesthetic surgeries, and acceptance towards the use of machine learning applications in aesthetic surgery.

RESULTS: The typical respondent was a white, married woman in her thirties with a bachelor's degree and income ranging between $20,000 to $40,000. The most common aesthetic procedures sought were laser hair removal, chemical peels, Botulinum Toxin type A and the most common surgeries were breast augmentation/reduction, rhinoplasty, mastopexy. Several influences were investigated that harbor the attitude towards the acceptance of cosmetic surgery. 77% would have an accepting attitude if it supported oneself-image, and 76.8% if it would make one happier. 66.39% of participants were familiar with the term "machine learning." Attitudes towards its use in aesthetic surgery was investigated, and participants did not have a preference whether the surgery was of a reconstructive nature or an aesthetic nature (<1%). The identity of the individuals (i.e., use of their faces) did not make significant difference as using photographs of patients' identifiable faces or non-identifiable had <3% difference in acceptance rates. When investigating the attitude towards the use of participants' own photographs, the most accepted surgical use was hand surgery (73.49%) and the least accepted was genital surgery (45.09%).

CONCLUSIONS: The United States population has an accepting attitude towards the use of machine learning applications in aesthetic surgery. There is a wide variety of benefits of using machine learning in aesthetic surgery, one of which would be to give participants better expectations of surgery results based on their race. Diversity in patient populations undergoing aesthetic surgery is increasing. Using images races more aligned with the patient population might align expectations better. Further research is warranted.

A Comparison of Tranexamic Acid Administration Methods on Intraoperative and Postoperative Outcomes in Elective Rhytidectomies: A Randomized, Double-Blind Study

Abstract Presenter
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BACKGROUND: Tranexamic acid (TXA) is an anti-fibrinolytic agent routinely used to reduce bleeding, with a well-documented safety profile. It has had recent adoption in cosmetic and facial surgery. Still, there is little to no data in the field of plastic surgery on its best route of administration. As such, this prospective, randomized, double-blind study compares the efficacy of systemic IV dosing of TXA versus local infiltration of TXA in rhytidectomy patients.

METHODS: Thirty patients scheduled to undergo an elective rhytidectomy were randomly assigned to two groups. Group 1 received 1g of TXA intravenously, and Group 2 received 150mg of TXA via local infiltration. Blood loss and surgeon-assigned rate of bleeding were recorded for each side of the face during surgery. Postoperatively, time to drain removal and complication incidence were documented, and data on patient satisfaction and perceptions of bruising and swelling along with physician perceptions of ecchymosis and edema were prospectively collected with surveys employing Likert scales. All subjects were photographed 5-7 days after surgery to monitor healing.

RESULTS: Side one and side two blood loss were 35.0±28.5mL and 32.7±16.1mL in Group 1 and 33.7±25.9mL and 37.3±26.0mL in Group 2, respectively. Both groups had the same median values for side one bleeding rate (1), side two bleeding rate (2), patient satisfaction (9), patient perception of postoperative healing and bruising (2), and days until drain removal (1). The median score for physician rated postoperative ecchymosis and edema was 2 in Group 1 and 1.5 in Group 2. There were 2 complications in Group 1, and 1 complication in group 2, none of which were thromboembolic events. There were no significant differences between the subject photographs and measured values of intra-operative and postoperative outcomes for the IV and local infiltration groups. Notably, group 2 had substantially more variation in patient satisfaction ($p=0.00095$) and days until drain removal ($p=0.0022$).

CONCLUSION: The studied routes of TXA administration do not differ in their effect on intra-operative bleeding or postoperative healing for rhytidectomy patients. However, intravenous administration may have a slight advantage as it yields more precise outcomes for patient satisfaction and days until drain removal as demonstrated by the relatively low variation of these values.

REFERENCES

[1] Locketz, G. D., Lozada, K. N., & Bloom, J. D. (2020, September). Tranexamic acid in aesthetic facial plastic surgery: a systematic review of evidence, applications, and outcomes. In Aesthetic Surgery Journal Open Forum (Vol. 2, No. 3, p. ojaa029). US: Oxford University Press.

BREAST

Alloplastic Breast Reconstruction with Absorbable Co-Polymer Mesh and Comparison with Acellular Dermal Matrix

Abstract Presenter
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INTRODUCTION: Despite numerous European reports exploring synthetic alternatives, acellular dermal matrix (ADM) is ubiquitously employed for implant-based breast reconstructions (IBR) within the United States. The direct cost of ADM devices encourages further exploration of synthetic alternatives. No mesh device has gained FDA approval for the specific indication of breast reconstruction.

This study is the first to report experience with Enform® (Gore, USA) mesh in IBR. Enform® is a readily absorbed polyglycolic acid:trimethylene carbonate co-polymer with premarket approval for soft tissue reinforcement in plastic and reconstructive surgery. The authors make comparison with a contemporary institutional cohort of cases employing ADM. We hypothesized that short-term outcomes would be similar between cohorts.

METHODS: In a single-institution retrospective study, short-term outcomes at 3-month follow-up were compared between all pre-pectoral and partial sub-pectoral breast reconstructions employing Enform® and a randomly selected cohort of cases using ADM. Demographics, operative details, complications, and failures were analyzed at the 0.05 significance level. Logistic regression models for mesh effect on complication were built by backward selection at the 0.15 significance level. Example intraoperative, histological, and long-term figures are additionally provided. All outcomes were assessed on a per-breast basis.

RESULTS: Synthetic and ADM cohorts included 42 subjects (54 breasts) and 43 subjects (55 breasts) respectively, with similar age, BMI, smoking history, breast cancer status, radiation and chemotherapy history, and operative details ($p<0.05$). Synthetic and ADM cohorts were not significantly different in rate of complication (26% vs 36%; $p=0.24$) or explant (14.8% vs 29.1%, $p=0.11$). In regression, mesh device (Synthetic/ADM) was not a significant predictor of complication (OR=0.77; 95%CI[0.32-1.86]) or tissue necrosis (OR=0.46; 95%CI[0.13-1.44]).

Histology demonstrated Synthetic integration at three-months without evidence of bacteria or inflammation. An estimated ~$175,000 in direct device costs were saved with synthetic mesh employment.

CONCLUSIONS: This is the first US report to compare outcomes between synthetic mesh and ADM. Enform® demonstrated cost-effective viability with similarity between cohorts, insignificantly lower major complication and explant rates with synthetic mesh, and no difference in overall complication or tissue necrosis rates in multivariate regression models. Further synthetic mesh breast reconstruction investigations are warranted, particularly within the United States. Reliance on ADM should be reviewed in comparison with alternatives.

Antibiotic-loaded Polymethylmethacrylate Plates in Tissue Expander Breast Reconstruction: A Multi-Institutional Study

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BACKGROUND: Periprosthetic infection following tissue expander (TE) breast reconstruction remains a devastating complication, with rates as high as 35%. While prophylactic antibiotic-loaded polymethylmethacrylate (PMMA) cement is routinely used in orthopedic surgery, few reports exist documenting employment in breast reconstruction. This is the first multi-institutional study to report on outcomes following the use of intraoperatively-crafted tobramycin-vancomycin PMMA plates (ABP) for periprosthetic infection prophylaxis in TE-based breast reconstruction.

METHODS: All patients with >3mo follow-up undergoing breast reconstruction with pre-pectoral or sub-pectoral tissue expansion and concomitant ABP insertion at 3 institutions (2021-2022) were reviewed. Practice patterns among the 3 surgeons are comparable, with all current TE patients receiving ABP. Patient demographics, operative details, and outcomes, including major postoperative complications (necessitating readmission/reoperation), are described by patient. Backward-selection logistic regression modeling of literature-reported confounders on major complication was performed with predetermined alpha set to 0.05.

RESULTS: 146 cases (198 breasts) were identified with mean follow-up of 7.4+/-3.1 months. Reconstruction was immediate in 95% of cases. Mean age was 49+/-10 and BMI was 26.5+/-4.7. Comorbidities included smoking (19.2%), and diabetes (8.9%). Patients received neoadjuvant chemotherapy in 24% of cases, neoadjuvant radiation therapy (RT) in 8.2%, and lymph node dissection in 8.2%. Expansion was completed at median day 49 with fill volume of 452+/-138cc,

and second stage completed in 35.6% of patients at median month 5.

Major complications occurred in 13.8% of cases including tissue necrosis in 7.3%, infection in 5.5%, seroma/hematoma in 3.4%, and dehiscence in 2.1%. Expander explant without salvage, indicating reconstructive failure, occurred in 6.2% of cases. Logistic regression modeling demonstrated neoadjuvant chemotherapy and neoadjuvant RT to have significant effect on odds of major complication (Chemotherapy; OR 1.16[1-1.3], p=0.02*, RT; OR 1.22[1-1.5], p=0.05*).

CONCLUSION: This multi-institutional study demonstrates potential in employing antibiotic-loaded PMMA plates for prophylaxis in TE breast reconstruction with overall major complication and infection rates well-below the most reported. Odds of major complication were significantly greater with neoadjuvant chemotherapy and RT. Previous experience indicates that >75% of complications occur within the minimum follow-up of included cases. Further study will include comparison with a non-ABP cohort and extended follow-up encompassing more subjects having completed second stage.

Intra-Operative Evaluation of Textured Anatomic Implant Rotation: A Prospective Study

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PURPOSE: Textured implants were developed to reduce rates of capsular contracture and prevent implant malposition (e.g., malrotation). Recent evidence has questioned whether textured implants are as resistant to malrotation as previously reported.

METHODS: Women presenting to a single healthcare system for removal of textured implants were prospectively enrolled in the study from September 2019 to July 2022. Patients who underwent removal of an anatomic, textured implant in the operating room were included in the study, while those who did not undergo implant removal or were found to have a smooth implant, or a round, textured implant were excluded. The degree of implant rotation upon removal of the implant was measured intra-operatively. Implant-specific factors, patient demographics, clinical factors, and operative characteristics were collected.

RESULTS: A total of 51 patients (80 implants) were included in the study. 45% of implants

were malrotated (rotated >30 degrees) and the median degree of rotation was 30. More than one previous revision of the breast pocket was predictive of implant rotation (42 degrees) on multivariate linear regression analysis. Patients who presented with a complaint of "Aesthetic Dissatisfaction" had 2.89 increased odds of having an implant rotated > 30 degrees.

CONCLUSION: Our study found an alarmingly high rate of malrotation of textured, shaped implants upon explantation. We do not see a role for textured implant placement, particularly for patients undergoing breast reconstruction.

Reducing Opioid Prescribing After Ambulatory Breast Reconstruction Surgery

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PURPOSE: Opioids are routinely prescribed for pain management following breast reconstruction procedures; however, there is an associated risk of abuse, addiction, and overdose that ultimately contributes to the ongoing opioid epidemic and public health crisis in the US. Overprescribing of opioids after surgery is common and results in excess opioid pills that are available for potential misuse. The lack of procedure-specific postoperative opioid prescription protocols contributes to the wide variation in prescribing practices, emphasizing the critical need for evidence-based guidelines. In this study, we propose evidence-based prescription guidelines for postoperative opioid use based upon analysis of our quality improvement (QI) initiative, which standardized opioid use in patients who underwent outpatient reconstructive surgeries at the Memorial Sloan Kettering Cancer Center ambulatory oncology facility.

METHODS: Between August 2019 to December 2019, women who underwent outpatient procedures including exchange of tissue expander to permanent implant, removal and replacement of breast implant, revision of reconstructed breast including autologous fat grafting, and reduction mammoplasty or mastopexy were surveyed via telephone 7–10 days after surgery, before (n=97) and after (n =101) implementing a standardized opioid prescription reduction initiative. We compared postoperative opioid use, pain control, and refills in both groups of

patients. Patient-reported outcomes were compared using the BREAST-Q Physical Wellbeing of the Chest domain and a novel symptom Recovery Tracker.

RESULTS: 198 patients were included in the analysis. Pre-standardization (n=97), patients were prescribed a median of 30 pills and consumed 3 pills [IQR:1,9]. After standardization, the median number of pills prescribed was 8. Post-standardization, the median number of pills consumed (3 pills [IQR:1,6]) did not significantly differ between the groups, however, post-standardization patients had significantly fewer excess pills than pre-standardization patients (5 vs. 23 excess pills; $p<0.001$), lowering the risk for diversion and misuse. Additionally, a statistically significant smaller proportion of post-standardization patients had excess pills (81% vs. 99%, $p<0.001$). Pre-standardization 78% of the pills prescribed were in excess, and post-standardization, 50% of prescribed pills were in excess. Data from the Recovery Tracker demonstrated that after adjusting for postoperative day, there was no evidence of an association between study period and experiencing moderate or greater pain across the 10 postoperative days ($p=0.8$). The BREAST-Q Physical Wellbeing of the Chest scores were not significantly different between pre- and post-standardization (median 64 [IQR 55, 80] versus median 68 [IQR 55, 85]) at the two-week time point ($p=0.3$).

CONCLUSIONS: This QI initiative demonstrated that patients were prescribed more opioids than they required after ambulatory plastic surgery procedures. Standardizing and reducing opioid prescriptions for patients undergoing ambulatory reconstructive breast surgery is feasible and can significantly decrease the number of excess pills prescribed. Prior studies have revealed the prevalence of opioid over-prescription and excess pills; however, our current initiative is strengthened by feedback coming directly from patients. The opioid reduction guidelines implemented in this study promote safety and reduce the potential for diversion, addiction, and fatalities from opioid misuse.

Indocyanine Green Angiography Guidance for Vascular Preservation in Skin and Nipple Sparing Mastectomy

Abstract Presenter
Thor Stead

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INTRODUCTION: The nipple-sparing approach has become an oncologically sound and desirable choice for women choosing mastectomy. Indocyanine green (ICG) perfusion imaging has been shown to reduce ischemic complications in mastectomy skin flaps. Direct-to-implant reconstruction requires a well-vascularized skin flap capable of tolerating full expansion. Identification of the perforating subcutaneous vessels to the skin envelope may allow for better and more consistent blood vessel preservation and flap perfusion.

METHODS: The authors conducted an institutional review board-approved prospective study with 41 patients to assess the feasibility of using ICG perfusion imaging to visualize, cutaneously map, and preserve the vessels that supply the skin flap and nipple-areolar complex. For each patient, the number of vessels initially mapped, the number of vessels preserved, the extent to which each vessel was preserved, and the proportion of the flap with adequate perfusion (as defined by the SPY-Q >20% threshold) were recorded and analyzed.

RESULTS: Vessels were able to be identified and marked in a high majority of patients (90%). There was a moderate linear relationship between the number of vessels marked and the number preserved. Successful mapping of vessels was associated with lower rates of wound breakdown (p=0.036). Mapping and preserving at least one vessel led to excellent flap perfusion (>90%). No increase in complications was observed from utilizing ICG angiography preoperatively.

CONCLUSION: This prospective study using preoperative ICG perfusion mapping demonstrated safety, feasibility, and good prognostic outcomes.

Clinical and aesthetic outcomes of secondary reduction mammaplasty

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BACKGROUND: Secondary reduction mammaplasty (SRM) is a challenging procedure that may be performed for patients who present with recurrent macromastia, breast asymmetry, poor contour, or inadequate prior reduction. Due to low incidence, there is limited data on SRM outcomes and technical guidelines – especially in cases for which the vascular pedicle of the prior breast reduction is unknown. This study seeks to assess clinical and aesthetic outcomes with respect to operative factors in SRM.

METHODS: All reduction mammaplasties performed by 6 surgeons across 2017-2021 at a single institution were included. SRM patients, defined by an additional reduction with a pedicled nipple-areolar-complex (NAC), were compared to a randomized unmatched control group of primary mammaplasty (PRM) patients (1:3 cases to controls). Clinical data was extracted via retrospective chart review. Clinical photographs obtained 2-12 months postoperatively were graded by five non-experts (research assistants) in blinded surveys using

the 13-item Validated Breast Aesthetic Scale developed by Duraes et al.1 Univariate analyses were performed.

RESULTS: Of the total 723 reduction mammaplasties identified, 27 (3.7%) were secondary. Among SRM patients, 7 (26.0%) had unknown prior pedicles. Patients on average underwent SRM 15.3±9.2 years after prior reduction. Compared to PRM patients, SRM patients were significantly older ($p<0.0004$) and more likely to have hyperlipidemia ($p=0.0495$) and hypertension ($p=0.0767$). SRM patients trended toward lower resection volumes ($p=0.0608$) and were less likely to undergo inferior and superomedial pedicle-based reductions ($p<0.0001$). Wise-pattern incisions were used in nearly all SRM patients. Rates of complications, readmission, revision, and hypertrophic/keloid scarring between SRM and PRM patients were equivocal. Breast symmetry, naturalness of breast shape and contour, naturalness of inframammary fold, NAC position, NAC projection, and NAC size were rated significantly lower on aesthetic assessment of breasts following SRM. On subset analysis of SRM cases, patients with unknown initial pedicles were more likely to undergo inferior pedicle reduction, vertical bipedicle reduction, or liposuction with skin resection, and less likely to undergo superior/superomedial pedicle-based reduction. Patients with known initial pedicles were more likely than not to undergo SRM using the same pedicles. Based on these operative factors, complication rates, need for readmission or revision, incidence of hypertrophic/keloid scarring, and aesthetic ratings across all measures were equivocal between patients with known and unknown initial pedicles.

CONCLUSION: SRM patients were found to have poorer aesthetic outcomes on photographic analysis than PRM patients despite equivocal complication rates, demonstrating the consequence of achieving a non-satisfactory result during PRM. Importantly, we found that successful SRM can be safely achieved even without knowledge of the initial pedicle; patients with unknown initial pedicles who subsequently underwent reduction with a vertical bipedicle or inferior pedicle technique were not found to be at higher risk for complications or poorer aesthetic outcomes than those in which the previous pedicle was known.

REFERENCES:

Duraes EFR, Durand P, Morisada M, et al. A Novel Validated Breast Aesthetic Scale. Plast Reconstr Surg. 2022;149(6):1297-1308. doi:10.1097/PRS.0000000000009156

Prepectoral Breast Reconstruction With or Without Acellular Dermal Matrix: Outcomes after Tissue Expander Exchange for Implants

Abstract Presenter
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PURPOSE: Since its introduction, ADM has transformed two-stage breast reconstruction with proponents of its use citing superior aesthetic outcomes, accelerated tissue expansion, and fewer complications as a rational for its use. Enthusiasm for submuscular prosthesis placement dampened and has led to a shift towards the prepectoral approach. Our previous work demonstrated little difference in three-month postoperative complications after prepectoral tissue expander placement with and without ADM. As prepectoral implant placement becomes more widely adopted, conflicting data exists whether the inclusion of ADM at the time of placement of a tissue expander confers any additional benefit in regard to implant rippling, capsular contracture, or long-term aesthetic outcomes. We sought to evaluate outcomes of after tissue expander exchange for implants comparing those who had undergone placement of a tissue expander with and without the use of ADM.

METHODS: A single institution retrospective chart review was performed to identify consecutive patients undergoing prepectoral tissue-expander based breast reconstruction from August 2020 to January 2022. Our institution stopped utilizing ADM for prepectoral reconstruction in May 2021. Patients were then followed for 9 months after their tissue expander exchange for implants. Second-stage outcomes of interest after tissue expander exchange for implant including the number and type of revision surgeries performed, implant rippling, capsular contracture, implant exchange, and explantation were collected and compared between the ADM and no ADM cohort.

RESULTS: Of the 239 patients originally enrolled, 74 (108 breasts) received ADM and 74 (131 breasts) did not receive ADM. Of this original cohort, 44 patients (68 breasts) in the ADM cohort and 32 patients (61 breasts) in the no ADM cohort underwent a tissue expander exchange for implant. Demographics, oncologic characteristics (including adjuvant chemo/radiotherapy) and first stage surgical characteristics were similar between the two groups, The median final implant size was 450 in the ADM cohort and 425 in the no ADM cohort (p=0.35). When compared to the ADM cohort, the no ADM cohort underwent fat grafting at the time of implant exchange more often (44.3% v 28.8%, p=0.07). 18.2% of the ADM cohort and 14.8% of the no ADM underwent additional fat grafting at a later date, (p=0.6). Second-stage outcomes of interest were similar between the ADM and no ADM cohort with no statistically significant differences identified in regard to incidence of rippling (22.7% v 13.1%, p=0.16), capsular contracture (4.5% v 3.3%, p=1.00), implant exchange (7.6% v 6.6%), explanation (7.6% v 1.6%, p=0.21), or average number of subsequent surgeries after IBR (0.5 v 0.3%, p=0.44) between the two cohorts.

CONCLUSION: Our study demonstrates similar proportions of implant rippling, capsular contracture, implant exchange, explantation, and need for additional revision surgeries between those with and without ADM. Though the no ADM cohort received fat grafting at the time of implant placement more often, which may reduce implant rippling, the occurrence of rippling remained low in both cohorts and this did not reach significance. Further study is needed to demonstrate long-term outcomes of interest including ptosis and long-term aesthetic outcomes.

Comparing Wise Pattern to Non-Wise Pattern Incision Skin Sparing Mastectomy: A Critical Evaluation of Patient Demographics and Surgical Outcomes

Abstract Presenter
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BACKGROUND: Two-stage implant-based reconstruction using tissue expanders (TE) is a commonly performed technique for immediate post-mastectomy breast reconstruction.1 Multiple skin-sparing incisions are utilized, however the Wise pattern incision (WPI) with a de-epithelialized inferior mastectomy flap may have superior cosmetic outcomes for large ptotic breasts.2,3 Some surgeons are reluctant to perform WPI due to its historically unfavorable complication profile when compared to other non-Wise pattern incision (NWPI) types.4 We evaluated patient demographics and surgical outcomes in breast reconstruction with WPI compared to NWPI with the goal of aiding physician incision selection for breast reconstruction.

METHODS: An electronic medical record search was performed for all patients at a single institution from 2019 to 2021 with ICD-10-CM diagnosis code "Z42.1: encounter for breast reconstruction following mastectomy." A retrospective chart review was performed evaluating patient demographics, incision type, ptosis grade, intraoperative factors, and 90-day post-operative complications. Results were analyzed using Wilcoxon-Mann-Whitney tests for continuous variables and Chi-Square tests for categorical variables. Significance level was determined using $\alpha = 0.05$.

RESULTS: 236 patients had immediate reconstruction; 40 had WPI (29%) and 196 had NWPI (71%). There was a significant difference in median BMI between WPI (28.6) and NWPI (26.5) (p=0.0097). Mean preoperative ptosis grade significantly differed between WPI (L:2.21, R:2.23) and NWPI (L:1.66, R:1.65) (L: p=0.0015, R: p=0.0007). Left and right mastectomy weight significantly differed between groups (L: p=0.0008, R: p=0.0006). There were no significant differences in age, medical comorbidities, or cancer treatment before or after mastectomy. While no significant difference was found in median operative times (WPI: 205 minutes, NWPI: 201 minutes, p=0.4989), there was a significant difference found in use of acellular dermal matrix (WPI: 43%, NWPI: 68%, p=0.0024). Rate of postoperative complications did not significantly differ between WPI (55%) and NWPI (45%) (p=0.2431). Median total charge for surgery did not significantly differ between WPI ($32,038) and NWPI ($31,048) patients (p=0.3539).

CONCLUSION: Compared to the NWPI cohort, WPI was performed in patients with significantly higher average BMI, ptosis grades, and mastectomy weights and less frequently involved the use of acellular dermal matrix. There was no significant difference in OR time, complications, or charge between NWPI and WPI patients. Surgeons should consider WPI in patients with higher BMI and ptosis grade without concern for longer operative times or higher complication rates.

1. American Society of Plastic Surgeons. 2020 Plastic Surgery Statistics Report: ASPS National Clearinghouse of Plastic Surgery Statistics [ASPS], 2020. Available at: https://www.plasticsurgery.org/documents/News/Statistics/2020/plastic-surgery-statistics-full-report-2020.pdf. Accessed April 30, 2022.
2. Inbal A, Gur E, Lemelman BT, et al. Optimizing patient selection for direct-to-implant immediate breast reconstruction using wise-pattern skin-reducing mastectomy in large and ptotic breasts. Aesthetic Plast Surg. 2017;41:1058–1067.
3. Calderon T, Skibba KE, Hansen T, Amalfi A, Chen E. Safety of breast reconstruction using inferiorly based dermal flap for the ptotic breast. Ann Plast Surg. 2022;88:156–162.
4. Lin IC, Bergey M, Sonnad SS, Serletti JM, Wu LC. Management of the ptotic or hypertrophic breast in immediate autologous breast reconstruction: a comparison between the wise and vertical reduction patterns for mastectomy. Ann Plast Surg. 2013;70:264–27.

Differences in Cost of Care and Operative Outcomes Between Direct-To-Implant and Tissue-Expander Breast Reconstruction

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PURPOSE: Breast reconstruction using implants can be done in two ways: single-stage direct-to-implant (DTI) or two-stage using a tissue expander (TE). However, fixed costs and post-operative complications can result in a substantial financial burden. In this study, we aim to compare the direct costs of DTI and TE implant-based breast reconstruction (IBBR) to determine their relative financial burden and identify the factors that affect the cost.

METHODS: A retrospective chart review and analysis of specific cost data provided by institutional finance department of patients who underwent implant-based BR was conducted to evaluate differences in costs of episode of care (EOC). Multivariable regression analysis and one-way sensitivity analysis were conducted to determine key price drivers for each operation. Statistical analyses were conducted with t-tests, Poisson distribution comparisons and Chi-

Square/Fisher Exact Tests.

RESULTS: Two hundred and five patients (310 breasts) undergoing DTI (n = 167, 54%) or TE (n = 143, 46%) were evaluated over their entire EOC. The mean follow-up period was 1.6 ± 1.24 years for the DTI cohort and 2.14 ± 1.22 years for the TE cohort ($p < 0.001$). The DTI cohort had a lower rate of major complications (13% to 22%, $p = 0.033$) but similar rates of aesthetic revisions (18% to 19%, $p = 0.835$). The average cost of a DTI EOC ($13,719.39 ± $5,499) was found to be significantly lower than for TE patients ($16,589.54 ± $6,586.95, $p < 0.001$), with lower operative costs ($10,460.2 ± $4,059.81 and $12,242.87 ± $4,403.81, $p = 0.002$) and number of postoperative follow-up visits (13.27 ± 7.76 and 23.03 ± 9.05 , $p < 0.001$). There were no differences in operative costs from complications and aesthetical revisions. The cost of an average DTI EOC is most sensitive to the rate of bilateral operations. For TE, the EOC is most sensitive to the incorporation of acellular dermal matrices.

CONCLUSION: DTI BR incurs lower cost over an EOC compared to TE surgery, likely due to greater planned operative costs and number of postoperative follow-ups. Both operations shared similar complication rates and aesthetic outcomes.

Clinical Management of the Infected Tissue Expander: Assessing Salvage and Factors Associated with Successful Reconstruction

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BACKGROUND: A large majority of implant-based breast reconstructions (IBBR) are performed in two-stages, first placing a tissue expander (TE), then exchanging to an implant. TE infections can be devastating to the reconstructive process and may add to the cost of reconstruction. We examine the salvage rate for infected TEs at our institution and assess variables associated with reconstructive outcomes in managed cases of infection.

METHODS: We retrospectively reviewed patients who underwent TE placement from 2017 to 2022. Patients were included if they had clinical signs or symptoms of infection within 1 year of TE placement. They must also have received treatment with either intravenous (IV) antibiotics, interventional radiology (IR) drainage, or operative management. Patients solely treated with oral antibiotics were excluded. We identified five management groups: 1) treatment with IV

antibiotics only 2) IR drainage 3) TE removal and replacement with a new TE 4) TE removal and replacement with an implant 5) TE removal without replacement. Patients were followed for 1 year after TE placement to assess their reconstructive outcome.

RESULTS: 4619 female patients had TEs placed in the examined time frame, of which 347 had an infection within 1 year (7.5%). Factors associated with TE infection included age, BMI, comorbid hypertension and diabetes, radiation, reconstruction timing (immediate versus delayed), ADM, TE pocket (prepectoral versus subpectoral), and average mastectomy weight. 36 patients were excluded because they were managed with oral antibiotics or their operative management did not disturb the previously placed TE. Consequently, 311 patients with infected TEs were evaluated: 115 in treatment group 1, 42 in group 2, 28 in group 3, 18 in group 4, and 108 in group 5. There was a 54% failure rate (167/311) within 1 year for patients with managed cases of infected TEs. 108 of these patients had their TE removed during admission and thus failed during infection management; however 59 displayed improvement for discharge but subsequently lost their reconstruction at a later date. The most favorable rates of success occurred in the replacement with implant cohort, where only 11% of patients failed within 1 year (2/18). This was followed by the IV antibiotic cohort at 24% (28/115). Patients treated with IR intervention had the highest 1-year failure rate at 45% (19/42). For patients who failed reconstruction, the median survival time of the reconstruction was 240 days (7.9 months). There were significant differences between groups in race, infection management plan, and cultured bacteria when assessing patients by reconstructive outcome. 68% of patients had a culture taken from the breast pocket or fluid, and when evaluating reconstructive outcome by gram stain, success was not favorable in patients who grew gram negative organisms.

CONCLUSION: All efforts should be made to limit prosthesis infection as patients who undergo IBR have a greater chance of reconstructive failure than success following infection. For patients who end up with an infectious picture, rather than sending patients to IR, surgeons should consider IV antibiotics or TE removal with replacement by another prosthesis, as salvage rates are higher.

Do we need to reevaluate the Body Mass Index cutoff in Breast Reconstruction? An assessment of the preferred cutoff values to minimize venous thromboembolism and wound complications.

Abstract Presenter
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PURPOSE: BMI cutoffs for breast reconstruction can vary across providers. The PURPOSE of

this study was to describe an optimal BMI threshold for breast reconstruction using a large national database.

METHODS: The 2010 to 2020 National Surgical Quality Improvement Program (NSQIP) was queried for patients who underwent both autologous and implant based breast reconstruction. A multivariable logistic regression analysis was used to determine any significant preoperative predictors of either wound or venous thromboembolism (VTE) complication, and patients with the predictive characteristics were excluded from analysis. A receiver operating characteristic (ROC) curve and subsequent Youden Index (J) was used to determine optimal BMI thresholds for wound and VTE complications within each surgery cohort.

RESULTS: A total of 13,087 patients were included in the autologous cohort for wound complication, 724 (5.5%) of which were found to have wound complications. The BMI cutoff, as determined by the maximum J value (Jmax), was 29.0. In the autologous cohort for VTE complication 20,869 patients were included, and a total of 226 (1.1%) VTE complications were reported. The Jmax was 29.3. Overall, 58,734 patients were included in the implant cohort for wound complications. Within this cohort, 1836 (3.1%) wound complications were found, and the Jmax was 27.8. The implant cohort for VTE complications consisted of 90,924 patients with a total of 285 (0.3%) VTE complications. Jmax was 30.0.

CONCLUSION: Our data indicates that optimal BMI cutoffs after AR and IR procedures vary based on procedure and complication category with the majority of BMI thresholds found to be at the border of Overweight (25 - 29.99) and Obesity Class 1 (30 - 34.99). These cutoff values can be used as a tool to guide surgical risk assessment and discussions of safety.

What a "Feeling": The Role of Breast Sensation on Quality of Life after Mastectomy and Alloplastic or Autologous Reconstruction

Abstract Presenter
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INTRODUCTION: Following mastectomy, patients often experience loss of breast sensation. The return of sensation commonly takes time and depends on a variety of factors, including patient comorbidities, breast size, mastectomy type, and method of reconstruction. Quality of life (QoL) in patients after mastectomy has been well studied and tends to decline in the context of changes to usual appearance, post-operative complications, and the psychologic stressors of undergoing oncologic treatments. However, few studies have examined the relationship between

quantitative breast sensation and patient wellbeing after mastectomy and reconstruction. The goal of this study is to measure the impact of breast sensation on QoL in patients who underwent nipple sparing mastectomy with alloplastic or autologous reconstruction.

METHODS: Patients undergoing mastectomy with implant-based or deep inferior epigastric perforator (DIEP) flap reconstruction were identified and prospectively followed at pre- and post-operative timepoints. Neurosensory evaluation was performed in 9 breast regions, utilizing a pressure-specified sensory device to determine 1 point-static cutaneous thresholds (range: 0 – 100 g/mm^2). At these same timepoints, the BREAST-Q reconstruction module, an externally validated patient-reported outcome measure, was administered. Patients were stratified by reconstructive method and time from mastectomy. Univariate linear regression models were used to measure the correlations between quantitative average sensory measurements and BREAST-Q physical wellbeing, psychosocial wellbeing, sexual wellbeing, and breast satisfaction scores (alpha=0.05).

RESULTS: 109 patients met the inclusion criteria for this study. 85 patients underwent bilateral reconstruction, and 21 patients underwent neurosensory testing and survey administration at multiple timepoints, accounting for a total of 218 breasts. Patients were followed for an average of 30 months after mastectomy (range: 3 – 311 months). 102 breasts underwent alloplastic reconstruction and 116 received autologous DIEP flap reconstruction. Preoperatively, breast sensation was significantly associated with higher self-reported psychosocial and sexual wellbeing. Linear regression revealed that for every 1 g/mm^2 decrease in sensation threshold, psychosocial wellbeing scores increased by 0.27 and sexual wellbeing scores increased by 0.37. A similar association was seen post-operatively in patients who underwent DIEP flap reconstruction, with improved sensation correlating with higher self-reported psychosocial and sexual wellbeing (coef: 0.15 and 0.20, respectively). In these patients, improved sensation was also significantly associated with higher overall breast satisfaction (coef: 0.25). For patients who underwent implant-based reconstruction, significant correlations between breast sensation and breast satisfaction, psychosocial, sexual, or physical wellbeing were not seen.

CONCLUSION: Prior to mastectomy and reconstruction, breast sensation is positively correlated with quality of life, particularly in terms of psychosocial and sexual wellbeing. Following autologous DIEP reconstruction, the significant association between improvement in breast sensation and higher self-reported quality of life in these domains continues to be seen. Therefore, surgical techniques that target improvement in breast sensation should be employed to improve patient quality of life postoperatively. Further follow-up is needed to appreciate the long-term impact of postoperative return of sensation and method of reconstruction on patient wellbeing.

Evaluation of the Safety of Oncoplastic Breast Reduction as compared to Bilateral Reduction Mammaplasty for Macromastia: A National Surgical Quality Improvement Project-Based Study

Abstract Presenter

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INTRODUCTION: Oncoplastic breast reduction (OBR) combines lumpectomy with reduction mammoplasty to provide effective tumor resection while achieving aesthetic surgical outcomes. However, combining lumpectomy with breast reduction may increase perioperative risks. Our goal was to understand if oncoplastic reduction confers a higher operative risk profile than bilateral breast reduction (BBR) alone.

METHODS: Patients from the National Surgical Quality Improvement Program (NSQIP) were identified by appropriate codes (19318 for BBR, 19301 or 19302 with 19318 for OBR). Demographics, preoperative comorbidities, and postoperative complications were extracted and analyzed with univariate and multivariate regressions.

RESULTS: A total of 40,618 patients were included (BBR n=38,461, OBR n=2157). Compared to BBR patients, OBR patients were older (54.5 vs 41.1), more frequently Caucasian (63.3% vs 44.2%), with a higher BMI (32.4 vs 30.9), more medical comorbidities (10.9% DM, 37.2% HTN), and worse ASA (33.6% with score >2). OBR patients had higher rates of all complications (8.2% v 6%, $p<0.001$), reoperation (2.5% v 1.5%, $p<0 .001$), and readmission (2.5% v 1.3%, $p <0.001$). When controlling for confounding variables in multivariate regression, OBR predicted higher reoperation and readmission at 30 days.

CONCLUSION: Patients undergoing OBR have higher rates of reoperation and readmission than BBR, likely due to the combination of greater comorbidities and additional surgical burden. When controlling for preoperative characteristics, OBR was not an independent predictor of total complications. OBR patients were also significantly more frequently white when compared to BBR patients, which may reflect disparities in access to care.

The Effect of Insurance Type on Complications and BREAST-Q Scores Following Autologous DIEP Breast Reconstruction

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INTRODUCTION: Autologous breast reconstruction rates have been increasing due to associations with fewer reconstructive failures, decreased hospital readmission rates, and higher BREAST-Q scores, relative to prosthetic techniques. However, previous studies suggest that Black patients and those with public insurance are less likely to undergo autologous reconstruction.1,2 The aim of this study was to characterize the relationship of insurance type with complication rates and patient reported outcome measures (PROMs) after deep inferior epigastric artery perforator (DIEP) flap breast reconstruction. We hypothesize that there will be greater complication rates and lower PROM scores in patients with public insurances.

METHODS: A single-center, retrospective analysis of patients who underwent postmastectomy immediate, autologous DIEP flap breast reconstruction between January 2010 and December 2020 was performed. Types of insurances were categorized into commercial, Medicaid, Medicare. PROMs were measured by the five main domains of the BREAST-Q. A minimal clinically important difference of 4 points was used to determine clinical significance.

RESULTS: A total of 674 patients who underwent immediate, autologous DIEP flap breast reconstruction were included. A majority of patients (78.8%) had commercial insurance, followed by Medicare (15.3%) and Medicaid (5.9%). There were significant differences in median age, ethnicity, marital status, median household income, and receipt of radiation by insurance type.

There was a significant association between insurance type and complications following DIEP flap. Patients with Medicaid (32%) were significantly more likely to experience cellulitis/abscess than patients with Medicare (21%) or commercial insurance (15%) ($p=0.024$). Notable differences between insurance types were observed in delayed healing ($p=0.052$), flap compromise ($p=0.058$), and seroma rates ($p=0.059$). Patients with commercial insurance had significantly greater long-term physical well-being of the chest. At 2 years postoperatively, patients with commercial insurance had a median score of 80 (68, 92) while Medicare patients had a median score of 76 (63, 91) and those with Medicaid had a median score of 60 (54, 72) ($p=0.013$).

CONCLUSION: Patients with commercial insurance are less likely to experience some types of perioperative complications, including cellulitis/abscess, delayed healing, flap compromise, and seroma, than those with public insurance. These patients also have significantly higher physical well-being of chest scores at 2 years. Further work should be conducted to assess the underlying reasons for these discrepancies in complication rates and patient-reported outcomes depending on insurance status including socioeconomic determinants of care.

REFERENCES:

1. Boyd LC, Greenfield JA, Ainapurapu SS, Skladman R, Skolnick G, Sundaramoorthi D, Sacks

JM. The Insurance Landscape for Implant- and Autologous-based Breast Reconstruction in the United States. Plast Reconstr Surg Glob Open. 2023 Feb 17;11(2):e4818. doi: 10.1097/GOX.0000000000004818. PMID: 36817274; PMCID: PMC9937099.
2. Restrepo DJ, Huayllani MT, Boczar D, Sisti A, Nguyen MT, Cochuyt JJ, Spaulding AC, Rinker BD, Perdikis G, Forte AJ. Disparities in Access to Autologous Breast Reconstruction. Medicina (Kaunas). 2020 Jun 8;56(6):281. doi: 10.3390/medicina56060281. PMID: 32521732; PMCID: PMC7353892.

Abstract Presenter
Min Ji Kim

State-wide trends and payments for microsurgical lymphedema procedures in patients undergoing mastectomy from 2016-2020

Abstract Presenter
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BACKGROUND: Patients undergoing mastectomy may benefit from microsurgical techniques for lymphedema prevention, such as lymphatic microsurgical preventive healing approach (LYMPHA), or lymphedema treatment, such as lymphovenous bypass (LVB) and vascularized lymph node transfer (VLNT). Since these are relatively novel procedures with limited cost-effectiveness data and variable insurance coverage, we sought to elucidate trends and payments for microsurgical lymphedema procedures at a state-wide level.

METHODS: We queried the Massachusetts all-payer claims database for patients undergoing mastectomy for a predisposition to or diagnosis of breast cancer between 2016 and 2020. Among those, we identified patients with claims for LYMPHA, LVB, and/or VLNT. Using previously described billing codes [1], we identified patients with claims for LYMPHA or LVB (CPT code: 38308) and VLNT (CPT: 38999, 15756, 15758) on the same date of service as mastectomy (synchronous) or after mastectomy (asynchronous). We quantified annual trends in the use of microsurgical lymphedema interventions and their associated payer and out-of-pocket patient costs, comparing privately- and publicly-insured patients.

RESULTS: A total of 8099 patients had mastectomy claims between 2016-2020. Of these, 77 (1.0%) unique patients had claims for LYMPHA, LVB, and/or VLNT. The relative proportion of total lymphedema procedure claims per the number of mastectomy claims per year increased over time (2016: 0.3%, n = 5; 2017: 0.9%, n = 15; 2018: 1.1%, n = 19; 2019: 1.2%, n = 21; 2020: 2.6%, n = 38). Regarding LVB or LYMPHA (n = 27), 21 (77.8%) procedures were synchronous and 6 (22.2%) procedures were asynchronous. Regarding VLNT (n = 69), 39 (56.5%) procedures

were synchronous and 30 (43.5%) were asynchronous. Of those who underwent any lymphedema procedure, 25% (n = 19) were publicly insured and 75% (n = 58) were privately insured. Mean out-of-pocket patient costs for LVB or LYMPHA were $471 (public) and $1110 (private) when synchronous and $0 (public) and $580 (private) when asynchronous. Mean payer costs for LVB or LYMPHA were $206 (public) and $290 (private) when synchronous and $562 (public) and $790 (private) when asynchronous. Mean out-of-pocket patient costs for VLNT were $15637 (public) and $4326 (private) when synchronous and $0 (public) and $6957 (private) when asynchronous. Mean payer costs for VLNT were $3410 (public) and $6426 (private) when synchronous and $3020 (public) and $8593 (private) when asynchronous.

CONCLUSION: Physiologic lymphedema procedures have increased over time in the state of Massachusetts and nationwide. There is considerable variability in both payer and out-of-pockets patient costs, for both synchronous and asynchronous procedures. Costs tended to be higher for privately insured patients. More cost-effectiveness studies and greater standardization in the care pathways and billing practices for microsurgical lymphedema procedures are needed.

1. Johnson AR, Asban A, Granoff MD, et al. Is Immediate Lymphatic Reconstruction Cost-effective?. Ann Surg. 2021;274(6):e581-e588. doi:10.1097/SLA.0000000000003746

Effect of pedicle type on breast reduction aesthetic outcomes: a photographic analysis

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PURPOSE: While many surgeons prefer one pedicle type for breast reductions, there is no evidence for the optimal pedicle type or which is best suited for certain patients. Here, we utilize photographic analysis to examine the impact of pedicle type on aesthetic outcomes after reduction mammaplasty.

METHODS: Preoperative and postoperative photographs (average 4.25 months postoperatively) were taken from 100 randomized patients from 6 surgeons at a single institution. Clinical data was extracted retrospectively from the patient's medical record. 10 non-experts (medical students) rated photographs in a blinded review using the 13-item Validated Breast

Aesthetic Scale, which includes ratings regarding breast and nipple areolar complex (NAC) position, shape, and symmetry. Mean scores were calculated and patients were stratified by pedicle type. Univariate analysis was performed.

RESULTS: 60 breast reductions were performed using an inferior pedicle and 40 using a superior or superomedial pedicle. Inferior pedicle patients were more likely to be obese (p=0.0222), have greater ptosis (p=0.0014), poor skin quality (p=0.0167), and a greater volume of tissue resected (p=0.0024). Clinical outcomes were similar across groups. Breast position was rated more favorably in the superior pedicle group (p=0.035). Scar appearance, NAC projection, and NAC shape were rated higher in the inferior pedicle group (p=0.0325, p=0.0184, and p=0.0708, respectively).

CONCLUSION: Pedicle type was not associated with complication rate. Inferior pedicles were used more frequently for more obese patients and larger breast volumes. Superior pedicles were associated with better breast position while inferior pedicles were associated with better NAC position and shape.

Social Factors Influencing High-Risk Patients in Choosing to Undergo Prophylactic Mastectomy

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BACKGROUND: In the United States, breast cancer accounts for more than 1 in 7 cancer diagnoses, with genetic predisposition being a well-known risk factor. While some patients elect to undergo prophylactic mastectomy, there is a lack of insight into the factors influencing the decision to undergo prophylactic intervention. The objective of our study is to better understand the timing and social factors influencing decision to pursue prophylactic mastectomy with or without reconstruction in patients with a genetic predisposition for breast cancer.

METHODS: This study is a retrospective review of patients diagnosed with genetic predisposition for breast cancer from August 2016 to December 2020. The electronic medical record was used to collect information regarding patient demographics, oncologic, and surgical history. Patients were separated into categories based on whether they underwent prophylactic surgical intervention and if this was followed by reconstructive surgery. Diagnosis, oncologic surgery, and reconstruction dates were all noted. Descriptive statistics were conducted to understand social factors and simple t-tests were used to compare time to surgical intervention among groups.

RESULTS: 255 patients with genetic predisposition for breast cancer were included. Of these, 56 patients (22.0%) underwent prophylactic mastectomy; 74.5% of these patients underwent subsequent post-mastectomy reconstruction. 98% of prophylactic mastectomy patients were Caucasian, as were all patients undergoing post-mastectomy reconstruction. All patients were female with an average age of 44 years (SD 15.7) at the time of high-risk diagnosis. The greatest percent of patients had a BRCA2 mutation (33.7%) followed by BRCA1 (25.8%), CHEK2 (20.6%), and ATM (12.7%). However, 74.6% of people undergoing prophylactic mastectomy had a BRCA1 or 2 mutation. Median time from diagnosis of genetic predisposition to time of mastectomy was 1.2 years (range 0.07-6.5 years). Among patients undergoing reconstruction, 82% of patients underwent immediate reconstruction, with 87% of patients having an implant-based breast reconstruction. When comparing patients with and without reconstructive surgery, there was no significant difference in time from diagnosis to time to mastectomy ($p>0.05$). The most common social factor impacting the patient's decision to undergo prophylactic surgery was having a family member with a cancer diagnosis (54.7%). Other social factors that patients noted during their clinic visits were a personal cancer diagnosis (27.5%), most commonly ovarian or thyroid, immediate family member death (6.8%), and pregnancy or completion of childbearing years (3.2%).

CONCLUSION: Through this study we found that women most commonly elect to undergo prophylactic surgery within two years of their own diagnosis, and that the factor most commonly influencing this decision is cancer diagnosis in a family member. A better understanding of time from diagnosis to surgery and the social factors that may influence a high-risk patient's decision to undergo prophylactic surgery will further inform patient counseling and shared decision-making during preoperative reconstructive consultations.

DIEP Flap Salvage of Infected Tissue Expanders

Abstract Presenter
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PURPOSE: Tissue expander-based breast reconstruction is associated with high rates of infectious complications. This often leads to tissue expander explant and subsequent delays in receipt of definitive breast reconstruction and adjuvant therapy. As such, our aim was to describe and validate a novel strategy to salvage infected tissue expanders and complete definitive reconstruction in a single stage.

METHODS: In this IRB-approved study, six patients were included who underwent a single-stage surgery in which DIEP flaps were used to salvage actively infected tissue expanders. This technique involved maintaining patients with subclinical tissue expander infections on oral antibiotics until the day of their DIEP flap surgery, at which time tissue expander explant was performed in conjunction with a subtotal capsulectomy, debridement, intra-operative cultures, and immediate DIEP flap reconstruction. Postoperatively, patients were maintained on 1-2 weeks of oral antibiotics tailored to culture data. Demographic, oncologic, and reconstruction characteristics were collected for all patients. The primary outcome of interest was postoperative complications after conversion to DIEP flap.

RESULTS: Six patients with culture-proven tissue expander (TE) infections underwent TE explant and DIEP flap reconstruction in a single stage in accordance with our protocol. Four patients (66.7%) had infected pre-pectoral tissue expanders and two (33.3%) had infected partial submuscular expanders. ADM was used in every case. Four patients (66.7%) required outpatient aspiration and cultures prior to their DIEP flap surgeries. An average of 38.8 days (SD = 20.4) elapsed from documented infection to definitive free flap surgery. Intra-operative cultures grew Staph aureus (33.3%), Staph epidermidis (33.3%), Enterobacter cloacae (16.7%), and mixed gram-positive organisms (16.7%). Mean post-op length of stay was 3 days. Within this cohort, no post-operative complications were noted within a 90-day period, including surgical site infections requiring PO or IV antibiotics, seroma, hematoma, microvascular complications, partial flap losses, reoperations, or returns to the operating room (0%).

CONCLUSIONS: Our data suggests that actively infected tissue expanders may be salvaged with free flap breast reconstruction in a single surgery, with low incidence of post-operative complications including surgical site infection. This treatment strategy provides a significant opportunity to reduce costs, number of surgeries, and dissatisfaction after staged breast reconstruction complicated by tissue expander-related infection.

Optimizing Breast Reconstruction Outcomes in the Setting of Radiation Therapy: A Retrospective Cohort Study

Abstract Presenter
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Background: Breast reconstruction is a vital aspect of breast cancer treatment, providing significant improvements to quality of life for patients who have undergone mastectomy. While postmastectomy radiation therapy (PMRT) also plays a pivotal role in treatment for many patients, its benefits often come at the cost of compromising breast reconstruction outcomes. As such, identifying approaches that optimize reconstructive outcomes is of particular importance in

this population.

METHODS: We conducted a retrospective chart review of consecutive patients who underwent postmastectomy breast reconstruction at a single institution. Eligible patients were those who received PMRT, and data collected included patient demographics, comorbidities, operative details, and postoperative complications. The primary outcomes assessed were mastectomy skin flap necrosis (MSFN) and reconstruction failure, defined as the removal of the tissue expander or implant due to any complication. Reconstruction failure specifically due to infection was also collected.

RESULTS: Among the 684 patients initially identified, 156 met the inclusion criteria for the study. Skin-sparing mastectomies were the most common approach used in this cohort (57%), followed by nipple-sparing mastectomies (41%) and skin-reducing mastectomies (2%). The majority of patients underwent prepectoral reconstruction (70%) compared to subpectoral (30%). Mastectomy approach and reconstruction plane were not associated with reconstructive outcomes, whereas comorbidities were significantly associated with complications. Specifically, BMI was associated with an increased incidence of MSFN ($p=0.026$), while diabetes was associated and positively correlated with both MSFN ($p=0.007$, $r=0.260$) and any-cause reconstruction failure ($p=0.043$, $r=0.186$). Smoking was also associated and positively correlated with higher rates of any-cause ($p=0.043$, $r=0.186$) and infection-specific ($p=0.031$, $r=0.219$) reconstruction failure. Furthermore, MSFN was positively correlated with any-cause ($r=0.340$) and infection-specific ($r=0.222$) reconstruction failure.

CONCLUSION: Operative decisions including type of mastectomy and plane of reconstruction did not significantly impact MSFN or reconstruction failure; whereas BMI, diabetes, and smoking were all significantly associated with complications. Our findings highlight the importance of identifying and addressing modifiable risk factors in the preoperative setting in order to optimize reconstruction outcomes in patients receiving PMRT.

Comparison of Cost of Care and Surgical Outcomes between Subpectoral and Prepectoral Breast Reconstruction

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PURPOSE: Prepectoral breast reconstruction has seen a resurgence in recent years, in contrast to the more common subpectoral implant placement. Whereas differences in clinical outcomes

have been well studied, there is a paucity of data surrounding the economic burden of each respective modality throughout their episode of care (EOC). Here, we compare direct costs of subpectoral and prepectoral IBBR and discern their respective price drivers to better understand their relative financial impact.

METHODS: A retrospective chart review and analysis of specific cost data provided by institutional finance department of patients who underwent implant-based BR was conducted to evaluate differences in costs of episode of care (EOC). Multivariable regression analysis and one-way sensitivity analysis were conducted to determine key price drivers for each reconstructive plane. Statistical analyses were conducted with t-tests, Poisson distribution comparisons and Chi-Square/Fisher Exact Tests.

RESULTS: Two hundred and eleven patients (320 breasts) undergoing IBBR with subpectoral (n = 126, 60%) or prepectoral (n = 85, 40%) placement were studied over their entire EOC. The mean follow-up period was 2.29 ± 1.37 years for the subpectoral cohort and 1.32 ± 0.89 years for the prepectoral cohort ($p < 0.001$). The subpectoral cohort had a higher rate of aesthetic concerns for asymmetry (2% vs 9%, $p = 0.012$) and animation deformity (4% to 0%, $p = 0.045$), but a lower rate of implant rippling (3% to 13%, $p < 0.001$). However, ultimately these did not lead to a difference in revisional surgery rates. Both cohorts had similar rates of complications with a major complication rate of 14% among the subpectoral group and 21% among the prepectoral group ($p = 0.093$). The average cost of IBBR with subpectoral placement ($15,042.28 ± 6,425.65) was not significantly different than that with prepectoral placement ($15,914.15 ± 6,379.91, $p = 0.333$), although there were more postoperative clinical visits among the subpectoral cohort (19.77 ± 10.26 vs 16.02 ± 9.21, $p = 0.006$). ADM, when used, engendered a higher cost burden to the prepectoral cohort ($4,929.72 ± 2,499.12 vs $7,287.83 ± 3,447.88, $p < 0.001$). There were no differences in operative costs from complications and revisions for aesthetical concerns. The cost difference was sustained after subgroup analysis by laterality, ADM use, staging of operation and presence/absence of a major complication, all of which were found to be significant cost drivers for the IBBR EOC.

CONCLUSION: Subpectoral and prepectoral IBBR have a similar complication profile and rate of revisional surgery. Importantly, they incur similar costs throughout their EOC. ADM use disproportionately costs more for patients undergoing prepectoral placement of the implant due to requiring increased coverage.

A Novel Ratio for Optimizing Tissue Expander Fill and Minimizing Nipple Areolar Complex Complications in Prepectoral Breast Reconstruction

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PURPOSE: Nipple areolar complex (NAC) viability remains a significant concern following prepectoral tissue expander reconstruction. This study assesses the characteristics contributing to NAC necrosis and identifies strategies for mitigating this risk.

METHODS: A chart review of all consecutive, prepectoral tissue expander reconstructions performed between March 2017 and July 2022 at a single center was conducted. Patients from a total of 5 distinct breast surgeons and 5 plastic surgeons were included. Demographics, mastectomy weight, intraoperative TE fill, and complications were extracted for all patients. A ratio of intraoperative TE fill to mastectomy weight (TEF/MW) was constructed to quantify "deadspace" in the breast pocket, with higher values signifying less deadspace due to a higher TE fill to pocket ratio. Partial NAC necrosis was defined as any thickness of skin loss including part of the NAC, while total NAC necrosis was defined as full-thickness skin loss involving the entirety of the NAC. The Youden method was used for predicting optimal cut off. A $p<0.05$ was considered statistically significant.

RESULTS: A total of 184 patients (292 breasts) were included, with an average follow up time of 27 months. Women were on average 53 years old, non-smoker (99%), non-diabetic (91%), and had a body mass index (BMI) of 28 kg/m2. All reconstructions were performed immediately after prophylactic mastectomies in 33% and therapeutic mastectomies in 67% of cases. The majority of mastectomies were skin sparing (61%), followed by nipple sparing (24%), simple (12%) and other (3%). Seventy-one (24%) breasts were radiated (77% adjuvant, 20% prior radiation, 3% both), and 89 (48%) patients received chemotherapy (19% adjuvant, 4% neoadjuvant, 1% both). Median mastectomy weight was 551 grams, average intraoperative TE fill was 194 ± 163 cc, and average final TE fill was 416 ± 159 cc.
Partial NAC necrosis occurred in 8 (3%) breasts and there were zero instances of complete NAC necrosis. Partial NAC necrosis was associated with lower BMI (21 vs. 28 kg/m2, $p<0.001$) and lower mastectomy weight (360 g vs. 675 g, $p = 0.04$). Although partial NAC necrosis was not related to intraoperative TE fill, it was associated with less deadspace in the breast pocket (0.68 TEF/MW vs. 0.38 TEF/MW, $p=0.04$). Optimal intraoperative TE fill to mastectomy weight ratio for avoiding partial NAC necrosis was 0.31. In multivariable models controlling for age, BMI, mastectomy weight, radiation, and soft tissue support, partial NAC necrosis was associated with lower BMI. For every 1-point increase in BMI, the odds of partial NAC necrosis decreased by 0.67 (95% CI [0.42-1.0], $p=0.05$).

CONCLUSION: In this study, lower BMI individuals were predisposed to having partial NAC necrosis following prepectoral TE reconstruction. Managing intraoperative TE fill is a difficult clinical challenge as there are competing forces including the dual goals of expediting the expansion process and minimizing deadspace weighed against the deleterious effects of

increased tension and pressure and mastectomy flaps. Potential strategies for mitigating the risk of partial NAC necrosis include optimizing the intraoperative TE fill to mastectomy ratio to one-third.

Prophylactic Negative Pressure Wound Therapy for Closed Abdominal Donor Site Incisions in Autologous Breast Reconstruction: Systematic Review and Meta-analysis

Abstract Presenter
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BACKGROUND: Closed-incision negative pressure wound therapy (ciNPWT) has shown promise in reducing wound complications in many types of surgical procedures.^1-4 Its application allows for exudate management and tension offloading from the wound edges.^5 As a result, it may reduce wound complications at the donor site in autologous breast reconstruction (AR). The purpose of this systematic review and meta-analysis is to assess the efficacy of prophylactic ciNPWT versus conventional dressings on abdominal donor site complications in AR.

METHODS: This systematic review was reported according to PRISMA guidelines. PubMed and EMBASE were searched in January 2023 to identify all studies which compared the efficacy of ciNPWT to conventional dressings on abdominal donor site complications in autologous reconstruction. There were no restrictions on the date range inquiry. Included studies were published from 2020 to 2022. Data collected included: rates of total wound complications, wound dehiscence, infection, seroma, and length of hospital stay.

RESULTS: A total of 202 articles were screened and eight studies (1,009 patients) met the inclusion criteria. ciNPWT was associated with a significantly lower rate of wound dehiscence (OR, 0.53; 95% confidence interval, 0.33-0.85; p=0.0085, I^2=0%). There was no significant difference in the rate of total wound complications (OR, 0.63; 95% confidence interval, 0.35-1.14; p=0.12, I^2=69%), donor site infection (OR, 0.91; 95% confidence interval, 0.42-1.50; p=0.47, I^2=13%), seroma (OR, 0.74; 95% confidence interval, 0.22-2.49; p=0.63, I^2=57%), or length of hospital stay (SMD, 0.089; 95% confidence interval, -0.13-0.35; p=0.37).

CONCLUSIONS: The prophylactic use of ciNPWT on the abdominal donor site for AR is associated with decreased rates of wound dehiscence compared to conventional dressings. No significant difference was detected in rates of total wound complications, infection, seroma, and length of hospital stay.

REFERENCES:
1. Xie W, Dai L, Qi Y, Jiang X. Negative pressure wound therapy compared with conventional wound dressings for closed incisions in orthopaedic trauma surgery: A meta-analysis. Int Wound J. 2022;19(6):1319-1328. doi:10.1111/IWJ.13726
2. Guo C, Cheng T, Li J. Prophylactic negative pressure wound therapy for closed laparotomy incisions after ventral hernia repair: A systematic review and meta-analysis. Int J Surg. 2022;97. doi:10.1016/J.IJSU.2021.106216
3. Boll G, Callas P, Bertges DJ. Meta-analysis of prophylactic closed-incision negative pressure wound therapy for vascular surgery groin wounds. J Vasc Surg. 2022;75(6):2086-2093.e9. doi:10.1016/J.JVS.2021.12.070
4. Sahebally SM, McKevitt K, Stephens I, et al. Negative Pressure Wound Therapy for Closed Laparotomy Incisions in General and Colorectal Surgery: A Systematic Review and Meta-analysis. JAMA Surg. 2018;153(11). doi:10.1001/JAMASURG.2018.3467
5. Lalezari S, Lee CJ, Borovikova AA, et al. Deconstructing negative pressure wound therapy. Int Wound J. 2017;14(4):649-657. doi:10.1111/IWJ.12658

Addressing Rising Healthcare Costs with Innovation: A Six-Year Institutional Experience in DIEP Flap Reconstruction

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BACKGROUND: Rising healthcare costs pose significant concerns for physicians and patients. At baseline, DIEP flaps are a lengthy and expensive process for women seeking breast reconstruction. Access to care has only worsened with recent CMS policy changes and growing gaps in coverage. Despite these challenges, we can evolve our practices to deliver efficient, safe and cost-effective care. Deliberate practice and process analysis have been shown to improve efficiency and complication rates. This study will evaluate its utility in reducing cost, thereby providing greater access to care for women.

METHODS: Authors retrospectively reviewed all patients who underwent bilateral DIEP flap reconstruction before, during and after process analysis during a 72-month period. Total Cost was broken down into Fixed Direct, Fixed Indirect and Variable Direct Costs. Individual products and services that were evaluated during an episode include: OR Services, MedSurg Supplies, Anesthesia, Labs, Radiology, Therapy, Pharmacy, Room and Board, Respiratory and Blood. A risk-adjusted logistic regressions analysis was used to determine the impact of the

process analysis on cost, operative time and length of stay.

RESULTS: During the 72-month period (April 2015 to May 2021), the senior authors performed bilateral DIEP flaps in 375 patients (750 total flaps) with an average follow-up of 12 months. Length of stay in the process analysis group was decreased by .84 days ($p<.001$) with an average Room and Board savings of $1,755.16 ($p<.001$). Operative time in the process analysis group was decreased by 2 hours and 13 minutes ($p<.001$) with an average MedSurg Supplies savings of $440.71 ($p<.001$). There were no statistically significant differences among Radiology, Blood, Lab or Pharmacy costs. Therapy costs increased in the process analysis group by $166.63 ($p<.001$). OR Services and Anesthesia costs increased each year with no differences between groups; however, total cost was less in the process analysis group, with an average savings of $3,881.07 ($p<.001$) per episode.

CONCLUSION: Deliberate practice and process analysis are highly associated with safe, improved and cost-effective outcomes. While this analysis is from the hospital's perspective, the decreased hospital stay and cost per episode have clear and significant benefits when translated to the patient.

CITATIONS:
Haddock, Nicholas T. MD*; Tycher, John T. BS; Teotia, Sumeet S. MD. Deliberate Practice and Process Analysis in DIEP Flap Breast Reconstruction: An Immediate and Sustained Decrease in Morbidity and Operative Time. Plastic and Reconstructive Surgery ():10.1097/PRS.0000000000010379, March 08, 2023. | DOI: 10.1097/PRS.0000000000010379

The Impact of the Schnur Sliding Scale on Adolescents: A Retrospective Cohort Study

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The Schnur sliding scale (SSS) is used by many third-party payors to classify reduction mammaplasties as either cosmetic (below the SSS) or reconstructive (above the SSS). Although the SSS was developed using an adult cohort, it is applied to adolescent macromastia patients for whom there has been no validation of its medical utility. This study aims to compare the physical and psychosocial impact of reduction mammaplasty in adolescents above and below the SSS.

Health-related quality of life surveys were administered to patients, 12 to 21 years old, undergoing reduction mammaplasty for macromastia. Surveys included Short Form-36v2 (SF-36), the Rosenberg Self-Esteem Scale (RSES), and the Breast-Related Symptoms Questionnaire

(BRSQ). Age and BMI data were collected, and SSS values were determined for each patient. Paired t-tests compared preoperative and postoperative survey scores. Linear regression models, adjusted for BMI, evaluated the impact of undergoing resection greater than or less than the SSS on postoperative survey scores.

The average mass of resected tissue fell below the SSS for 39 patients and above the SSS for 255 patients. Groups featured no difference in mean age or BMI. Both groups had significant postoperative survey score improvements on the RSES, BRSQ, and in 7/8 SF-36 domains: physical functioning, role physical, bodily pain, vitality, social functioning, role emotional, and mental health ($P < .05$, all). Patients with resected tissue above the SSS had significant postoperative survey score improvement in one additional SF-36 domain (i.e., 8/8 SF-36 domains): general health ($P < .05$). Postoperatively, both groups scored comparably on all study measures ($P > .05$, all).

Adolescents undergoing reduction mammaplasty above and below the SSS experienced comparable physical and psychosocial benefits. These findings underscore the need for third-party payers to broaden coverage for adolescent reduction mammaplasty, as the common reimbursement cutoff has minimal impact on overall postoperative benefit.

Predicting Postoperative Satisfaction with Breasts Using Preoperative Factors: How Important are Preoperative BREAST-Q Scores?

Abstract Presenter
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PURPOSE: There is a significant gap in managing patient expectations in breast reconstruction. The ability to predict patients' postoperative quality of life using preoperative factors and BREAST-Q scores may allow surgeons to assess patient satisfaction prior to surgery and tailor patient care. However, preoperative BREAST-Q scores are not routinely collected, compared to postoperative scores. The aim of this study is to examine whether different preoperative factors can predict patient satisfaction at 1-year follow up and to quantify the importance of preoperative scores in this prediction model.

METHODS: A retrospective analysis of patients who underwent breast reconstruction and completed the BREAST-Q Satisfaction with Breasts at 1-year follow-up between January 2017-

December 2021 was included. Preoperative Satisfaction with Breasts score, demographics, and clinical factors were collected. Two multiple linear regression models were fit, one which included preoperative Satisfaction with Breasts (Model 1) and the other which did not (Model 2). For model 1, multiple imputation was used to account for the missing preoperative scores. These models were compared using a likelihood ratio test to assess whether the model with preoperative Satisfaction with Breasts score was a better fit.

RESULTS: A total of 2,324 breast reconstruction patients were included in the analysis. Of these, 1,545 (66%) and 779 (34%) underwent implant-based and autologous-based reconstruction, respectively. Model 1 showed that increased preoperative score (Beta=0.08; 95% CI: 0.03, 0.14; p-value=0.005), autologous reconstruction (Beta=6.1; 95% CI: 3.7, 8.4; p<0.001), and mastectomy weight less than 400 grams (versus 400-799 gm; Beta=3.2; 95% CI: 0.5, 6.0; p=0.021) were associated with increased Satisfaction with Breasts at 1-year follow-up. A history of psychiatric diagnoses (Beta=-3.8; 95% CI: -5.6, -2.0; p<0.001), neoadjuvant radiation (Beta=-5.0; 95% CI: -8.3, -1.7; p=0.003), and increased BMI (Beta=-0.21; 95% CI: -0.43, 0.00; p=0.053) were associated with decreased 1-year Satisfaction with Breasts. After removing the preoperative score variable in Model 2, autologous reconstruction, mastectomy weight < 400 gm (vs. 400-799 gm), BMI, history of psychiatric diagnoses, and radiation remained significantly associated with the postoperative Satisfaction with Breasts. The comparison between Model 1 and Model 2 showed that including preoperative scores significantly improves model fit (Test Statistic=7.47; p=0.008).

CONCLUSION: Surgeons can predict patients' postoperative Satisfaction with Breasts using certain preoperative factors, such as, preoperative score, reconstruction type, BMI, history of psychiatric diagnoses, receipt of radiation, and mastectomy weight. These factors may help surgeons manage patient expectations even prior to breast reconstruction. Furthermore, we strongly encourage surgeons to routinely collect preoperative BREAST-Q's Satisfaction with Breasts as the preoperative scores are important in predicting postoperative patient satisfaction.

Who's Got More Feeling? A Longitudinal Comparative Analysis of Sensory Return Between Patients with Implant-based vs. Autologous Breast Reconstruction

Abstract Presenter
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INTRODUCTION: Breast anesthesia is a common complaint following mastectomy and reconstruction due to the necessary disruption of sensory nerves. Furthermore, the process of nerve regeneration is slow, causing some patients to experience suboptimal sensation years after the initial reconstruction. The aim of this study is to longitudinally evaluate and compare return in sensation between implant-based and autologous reconstructions, particularly at 2 or more years postoperatively.

METHODS: This is a prospective study of all patients who underwent mastectomy and either immediate alloplastic reconstruction with implants or autologous reconstruction with neurotized deep inferior epigastric perforator (DIEP) flaps. All patients were prospectively identified and followed longitudinally. Neurosensory testing was performed in 9 breast regions using a pressure-specified sensory device to determine 1-point static cutaneous thresholds at preoperative and postoperative time intervals. Values were scaled on a 0-100 point range such that higher values indicate increased sensitivity.

RESULTS: A total of 234 patients (709 breasts) were included in the study, of which 130 patients (418 breasts) were in the DIEP cohort and 104 patients (291 breasts) were in the implant cohort. The two cohorts had comparable sensitivity measurements at preoperative baseline (85.9 for DIEP vs 81.7 for implants, $p = 0.15$). At less than 1 year postoperatively, the DIEP cohort had significantly better sensory return compared to the implant cohort (38.1 for DIEP vs 30.9 for implants, $p = 0.018$). This trend continued between 1 to 2 years postoperatively (48.3 for DIEP vs 33.1 for implants, $p = 0.005$). Between 2 to 4 years postoperatively, sensory return returned to comparable levels between the two cohorts (49.9 for DIEP vs 49.6 for implants, $p = 0.97$). At more than 4 years postoperatively, patients in the DIEP cohort ultimately had better sensory recovery compared to the implant cohort (62.2 for DIEP vs 48.7 for implants, $p = 0.004$).

CONCLUSIONS: On a longitudinal scale, neurotized autologous reconstruction confers superior sensory recovery compared to implant-based breast reconstruction. The difference in sensation is most pronounced in the first 2 years postoperatively and at more than 4 years postoperatively. Further prospective studies are warranted to elucidate the exact sensory recovery trajectory in both the postoperative short term and long run.

Air versus Saline: A Propensity Score-Matched Analysis on the Effect of Tissue Expander Fill on Complications in Immediate Breast Reconstruction

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PURPOSE: Tissue expander-based breast reconstruction is associated with high incidences of infectious and ischemic complications. Tissue expander characteristics, such as fill medium and volume, may influence risk of post-operative complications given their implications for the pressure exerted on mastectomy skin flaps. Our aim was to evaluate the influence of initial fill medium (air versus saline) on complications in immediate breast reconstruction within a propensity score-matched cohort.

METHODS: In this IRB-approved retrospective study, patients undergoing immediate tissue expander-based breast reconstruction with initial intra-operative fill with air were propensity score matched 1:2 to those with an initial fill of saline based on patient and tissue expander characteristics. The primary outcome of interest was the incidence of post-operative tissue expander-related complications, including mastectomy skin flap necrosis, based on the type of initial tissue expander fill (air versus saline). Secondary outcomes included predictors of ischemic complications across all studied variables, as determined by multivariate logistic regression.

RESULTS: A total of 584 patients were included in the study. Of these patients, 130 (22.2%) had initial tissue expander fill with air, 377 (64.6%) had initial fill with saline, and 77 (13.2%) had 0 cc of initial fill. After multivariate adjustment, higher intra-operative fill volume was the only variable associated with increased risk of mastectomy skin flap necrosis [Regression Coefficient (RC) 14.3; p=0.049]. Initial fill with air was not associated with risk of skin necrosis (RC 0.68; p=0.29). Propensity-score matching was then conducted among 360 patients (Air: 120 patients, Saline: 240 patients). After propensity score matching, there were no significant differences in the incidences of mastectomy skin flap necrosis, extrusion, reoperation, or readmission between the air and saline cohorts (all p>0.05). However, initial fill with air was associated with lower incidence of infection requiring oral antibiotics (p=0.003), seroma (p=0.004), and nipple necrosis (p=0.03).

CONCLUSIONS: In a propensity score-matched cohort, initial tissue expander fill with air was associated with a lower incidence of complications, including ischemic complications after nipple-sparing mastectomy. High initial intra-operative fill volume was independently associated with risk of mastectomy skin flap necrosis. Initial fill with air and lower intra-operative fill volumes may be strategies to reduce risk of ischemic complications among high-risk patients.

Reconstruction Complications Following Mastectomy With Immediate Reconstruction In Patients With History of Mantle Radiation or Prior Whole-Breast Radiation

Abstract Presenter

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PURPOSE: Mantle field radiation was traditionally used to treat Hodgkin's lymphoma. These patients may require future mastectomy for breast cancer, in part due to the increased risk of breast cancer after mantle radiation and/or genetic mutations. We describe outcomes after mastectomy and immediate breast reconstruction (IBR) for patients with prior mantle radiation or prior whole breast irradiation (WBI).

METHODS: A retrospective review of patients with prior radiation undergoing mastectomy and IBR from 2010-2020 was performed. Two groups were identified: prior mantle radiation and prior WBI. Demographics, co-morbidities, mastectomy and reconstruction details, and post-operative complications were recorded. Major complications were defined as requiring debridement in clinic, intravenous antibiotics, or re-operation.

RESULTS: We identified 13 patients (25 breasts) with prior mantle radiation and 86 patients with unilateral WBI; all underwent subsequent mastectomy with IBR. Within the mantle cohort median age was 42.9 (IQR: 40.1, 48.7) and BMI was 23.7 (IQR: 21.7, 24.9). These were significantly lower than the prior WBI group, with a median age of 58.0 (IQR: 50.1, 63.9, $P < .001$) and BMI of 26.6 (IQR: 23.9, 30.2, $P = .016$).

Within the mantle radiation cohort, nipple-sparing mastectomy (19 breasts, 76%) with tissue expander/implant reconstruction (21 breasts, 84%) was the most common approach. Average tissue expander fill was 348 cc (SD: 127 cc), and average implant size was 430 cc (SD: 84 cc). The only autologous reconstruction performed was one patient who underwent bilateral deep inferior epigastric flaps. Fat grafting at the final stage of reconstruction (76%) and use of acellular dermal matrices at some point in reconstruction (84%) were both common. None in the mantle cohort underwent re-radiation. Nipple-sparing mastectomy was more frequent within the mantle group compared to the WBI group (36 breasts, 42%, $P = .018$). Otherwise, no significant differences were seen in reconstruction characteristics.

Major complications were observed in 2 breasts with prior mantle radiation (8%) and 18 breasts with prior WBI (21%) ($P = .235$). The mantle major complications were both flap necrosis debrided in the operating room, and neither required conversion to another type of reconstruction. In the prior WBI group, two major complications required conversion to

autologous reconstruction and five failed reconstruction requiring flat closure.

On univariate analysis of the combined cohorts, higher BMI was the only factor associated with higher risk of major complications (OR 1.54, 95% CI 1.005-2.41, P = .047). There was no significant difference in major complications between the prior mantle and prior WBI groups on univariate analysis (OR 0.33, 95% CI 0.05-1.26, P = .1553). Higher BMI was no longer a significant risk factor on multivariate analysis (OR 1.44, CI 0.92-2.28, P = .11).

CONCLUSION: Although a sizeable minority of patients experience major complications, our findings suggest that IBR may be feasible in select patients after previous mantle field radiation or WBI.

Safety profiles of immediate versus delayed deep inferior epigastric perforator flap breast reconstruction

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BACKGROUND: Deep inferior epigastric perforator (DIEP) flap reconstruction may occur immediately after mastectomy procedures or be delayed and performed during a separate operation. This study sought to differentiate population characteristics of patients who undergo immediate versus delayed DIEP flap breast reconstruction and assess the safety profiles of these surgeries.

METHODS: This retrospective study included patients who underwent DIEP breast reconstruction between January 2016 and July 2022 at a tertiary-care, academic institution. Demographics and outcomes were compared using two-sample t-test or Chi-square analysis.

RESULTS: Of the 669 patients included, 274 (41.0%) patients received immediate and 395 (59.0%) received delayed DIEP flap breast reconstruction. Overall, median age was 51 (IQR: 45, 58) years old and median BMI was 29.0 (IQR: 25.8, 32.3). Age, BMI, history of diabetes or tobacco use, intraoperative complications, readmission and reoperation rate were not significantly different between cohorts. However, immediate DIEP flap breast reconstructions had higher rates of overall postoperative complications (18% vs 12%, p=0.029) driven by higher

rates of hematoma formation (4.4% vs 1.8%, p<0.001) compared to delayed DIEP flap breast reconstruction.

CONCLUSIONS: Immediate DIEP flap breast reconstruction was associated with higher rates of postoperative complications. Although breast reconstruction at time of mastectomy offers reduced cost, shorter overall recovery time, and fewer events requiring general anesthesia for patients, our findings contribute to evaluation of surgical candidacy for immediate versus delayed DIEP breast reconstruction.

Breast implant associated biofilms: a systematic review

Abstract Presenter
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INTRODUCTION: Breast implant associated biofilm formation leads to postoperative complications like infections, re-operations, and possibly malignancy. Biofilms are difficult to treat given the resultant matrix often being impenetrable to antimicrobial agents and limited intrinsic blood flow to the implant. There is no consensus among surgeons regarding the best protocol for preventing breast implant associated biofilm, and no high quality systematic reviews in the last 5 years to our knowledge. The purpose of this study was to review current literature related to breast implants and biofilms given the popularity of this topic in recent literature.

METHOD: A systematic review was performed per PRISMA guidelines. PubMed was queried for records from 1/2015 to 7/2022 related to biofilms and breast implants. Excluded articles included: ones that did not address biofilms in the context of breast implants, single case reports, reviews, replies, or commentaries.

RESULTS: Of the 83 available articles, 51 met the inclusion criteria. The overarching themes included mechanism of biofilm formation, intraoperative prophylactic METHODS: against biofilms, role of implant type of biofilm formation, and the relationship between biofilms and malignancy. S. aureus and S. epidermidis were identified as the most common causative agents of persistent infections in breast implants. Survey studies revealed chlorhexidine to be the most common skin antiseptic, with one in vitro study finding it to be more effective in preventing capsular contracture than povidone-iodine. However, povidone-iodine was identified in several studies as an effective breast pocket irrigation in reducing bacterial contamination and capsular contracture. Plasma activation was also identified as an effective inhibitor of bacterial growth when combined with antibacterial irrigants. Several studies conflicted on whether hypochlorous acid containing irrigants were superior to povidone-iodine. Many in vitro studies identified

greater biofilm loads on textured implants, contrasting with studies identifying breast implant texture as protective against capsular contracture as many studies identified biofilms as a likely contributor to capsular contracture through chronic inflammation. One prospective study using patient data found no relationship between implant texture and breast implant illness. The "no-touch" technique when inserting an implant was robustly present in the literature as a mechanism of infection prophylaxis. For two-stage implant-based reconstruction, delaying expander inflation until 6 weeks postoperatively was shown to decrease biofilm formation. Novel capsular contraction treatment shown to be effective included capsulectomy followed by antibiotic-impregnated mesh or even open capsulotomy over capsulectomy. Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) was also discussed at large in these studies and remains a key area of study in plastic surgery. Basic science and retrospective clinical studies pointed to a possible infectious contributing cause to BIA-ALCL development.

CONCLUSION: Recent contributions to the literature about biofilms and breast implant revolve around mechanism of biofilm formation, intraoperative prophylactic METHODS: against biofilms, role of implant type of biofilm formation, and the relationship between biofilms and malignancy. Conflicting theories remain regarding the relationship between implant texture, ALCL, biofilm formation, and capsular contracture. Further research is needed to better elucidate these concepts and inform recommendations to prioritize patient safety.

SAS—Subareolar Sealant: Reduces Infection and Hospitalization in Prosthetic Reconstruction after Nipple-Sparing Mastectomy

Abstract Presenter
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INTRODUCTION: Nipple-sparing mastectomy (NSM) is aesthetically superior to skin-sparing only mastectomy or reconstructed nipples. However, NSM partially preserves nipple ducts which are remaining communications between the environment and breast pocket that can potentially allow bacteria transfer and compromise the prosthesis, particularly if in a pre-pectoral position. Frequently used acellular dermal matrix (ADM) or external nipple adhesives may serve as subareolar "barriers" to reduce through-duct bacteria penetration but can serve as costly and/or temporary solutions. We propose: SAS-Subareolar Sealant. SAS involves the application of a synthetic sealant on the nipple undersurface prior to implant placement as the sole or adjunctive protection from nipple-derived contamination.

METHODS: All patients undergoing immediate breast reconstruction with pre-pectoral implants (tissue expanders or permanent implants) after NSM by the senior author between April 2013 to January 2021, were included in this study. Cohorts were stratified into breasts that received SAS and No-SAS. SAS first involves application of a synthetic sealant to the

undersurface of spared nipples after mastectomy. Subsequently, ADM was anchored to the mastectomy flap covering the undersurface of the nipple and incision line.

Complications that occurred within 30 days were analyzed using a Generalized Estimating Equation (GEE) logistic regression model to account for repeating patient sides (e.g., breasts). Minor complications included "at least one minor complication," erythema, extra-antibiotics, flap necrosis, nipple necrosis, and seroma. Major complications involved "at least one major complication," such as capsular contracture, dehiscence, infection, hospitalization, implant loss, necrosis requiring surgery, and surgery for any complications.

RESULTS: The study investigated 77 breasts that received prepectoral prosthetic breast reconstruction. SAS was applied in 70 of 77 breasts. We found that No-SAS was 10.4-fold more likely to result in infection ($p = 0.032$) and 17.3-fold more likely to require post-operative re-hospitalization ($p = 0.018$). No-SAS also resulted in significantly more 'at least one minor complication' ($p < 0.001$), erythema ($p < 0.001$), capsular contracture ($p = 0.033$), and necrosis requiring surgical debridement ($p < 0.001$). However, No-SAS was associated with less rates of dehiscence than SAS ($p < 0.001$). After analyzing the initial outcomes, the No-ASA approach was discontinued to favor SAS technique.

CONCLUSION: SAS RESULTS in lower infection and post-operative hospitalization rates, and reduces minor complications, such as erythema. SAS also reduced major complications, such the need for an additional surgery and capsular contracture. We believe that SAS provides an internal barrier against the environment and the flora residing within severed ducts, resulting in markedly reduced post-operative complications.

Preoperative Breast Satisfaction Association with Major Complications after Breast Reconstruction

Abstract Presenter
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PURPOSE: Psychological factors may be associated with postoperative complications following breast reconstruction [1]. Despite significant research investigating surgical factors associated with postoperative outcomes, there is a paucity of data concerning patient-reported factors [2]. This study aimed to determine the association between preoperative BREAST-Q and postoperative complications after breast reconstruction surgery.

METHODS: A mixed method, prospective-retrospective, study of 122 breast cancer patients undergoing breast reconstruction from January 2016 to May 2022 was approved at The Ottawa Hospital. All patients completed the BREAST-Q; patient demographics, surgical characteristics, and postoperative complications were recorded. The association of the preoperative BREAST-Q

domain of patient-reported satisfaction and well-being and postoperative complications was analyzed using multivariable logistic regression. P values < 0.05 were considered statistically significant.

RESULTS: On univariate analysis, patients who reported lower preoperative breast satisfaction with how they appeared in the mirror were significantly more likely to develop a major complication postoperatively (p=0.0122). There was no significant association between preoperative satisfaction scores and minor complications. On multivariable logistic regression analysis, after controlling for age, body mass index, and use of radiotherapy, patients who reported lower preoperative breast satisfaction had an increased risk for major wound complications requiring unplanned OR take-back (p=0.02477).

CONCLUSIONS: Lower patient-reported preoperative breast satisfaction was associated with an increased risk of major wound complications and unplanned OR take-back. Preoperative psychological and physical well-being factors were not predictors of major complications postoperatively. These findings support existing data that preoperative patient-reported body image satisfaction may predict surgical outcomes. Our study highlights preoperative breast satisfaction as a key preoperative target that may optimize breast reconstruction outcomes.

REFERENCES:

[1] Lewis, H. C., Hart, A. L., Fobare, A., Styblo, T. M., & Losken, A. (2022). Preoperative Body Image Factors Are Associated with Complications after Breast Reconstruction. Plastic and reconstructive surgery, 149(3), 568–577. https://doi.org/10.1097/PRS.0000000000008825
[2] Lewis-Smith, H., Diedrichs, P. C., Rumsey, N., & Harcourt, D. (2018). Efficacy of psychosocial and physical activity-based interventions to improve body image among women treated for breast cancer: A systematic review. Psycho-Oncology (Chichester, England), 27(12), 2687–2699. https://doi.org/10.1002/pon.4870

Breastfeeding Counseling Practices among American Society of Plastic Surgeons (ASPS) Members

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BACKGROUND: Breastfeeding is known to have numerous physical as well as mental health benefits for both infant and mother. Conversely, the inability to breastfeed is associated with

increased maternal anxiety and may play a role in post-partum depression.1 Any surgery to the breast can theoretically adversely affect future lactation either via mechanical disruption/resection of glandular tissue and ducts or pressure-related atrophy. Some publications have argued that certain breast surgeries do not significantly impair breastfeeding, but more recent literature has challenged these notions.2 Conversely, plastic surgeon preoperative counseling practices regarding lactation after breast surgery have not yet been studied. We surveyed members of ASPS to elucidate breastfeeding counseling practices among plastic surgeons in patients consulting about breast surgery.

METHODS: A 25-question survey was distributed to 6,000 ASPS members from November 2021 to January 2022. It included questions on breastfeeding counseling practices, personal breastfeeding experiences, demographics, surgical training, and length in practice. Data analysis included descriptive statistics, independent t-tests, analysis of variance (ANOVA) tests, and Fisher Exact tests.

RESULTS: 146 respondents were included. 90.7% of respondents believe that breast surgery can affect future lactation. While 96.6% of respondents routinely discuss possible postoperative challenges with breastfeeding, 39.3% differentiate between inclusive and exclusive breastfeeding, 22.2% discuss potential emotional consequences, and only 12.8% discuss the need for galactagogues or labor-intensive ancillary activities to induce lactation. When performing immediate reconstruction, 62.1% of respondents believe plastic surgeons are responsible to counsel on breastfeeding risk in case of lumpectomy and 33.6% in case of mastectomy. Only 64% of respondents reported breastfeeding impairment counseling prior to female-to-male top surgery. There was no difference in responses between respondent gender or personal/spouse history of breastfeeding. Those whose practice constituted >50% breast surgery rated a higher risk of lactation impairment with breast augmentation mastopexy using a subglandular ($p=.020$) or dual plane/submuscular implant ($p=.005$), and breast reduction ($p=.015$), compared to those with a <50% breast surgery practice. Significantly more respondents who had been in practice <15 years believed that breast surgery can affect lactation compared to those who had completed training ≥ 15 years ago (96% vs 84%, $p= 0.05$).

CONCLUSIONS: Most plastic surgeons believe breast surgery can affect lactation and counsel patients as such. However, the potential deleterious mental health consequences of challenged lactation after breast surgery appears under-recognized and thus under-counseled. Plastic surgeons, especially those whose practice constitutes <50% breast surgery, may be underestimating the breastfeeding impairment risks. Prior to reconstruction post lumpectomy or mastectomy, many plastic surgeons rely on the oncological surgeon to counsel on breastfeeding impairment risk. Similarly, preoperative counseling in the top surgery population may be inadequate. Our findings highlight a potential need for increased education and improved preoperative breastfeeding counseling protocols for plastic surgeons.

REFERENCES

1. Pope CJ, Mazmanian D. Breastfeeding and Postpartum Depression: An Overview and Methodological Recommendations for Future Research. Depress Res Treat. 2016;2016:4765310. doi:10.1155/2016/4765310
2. Kraut RY, Brown E, Korownyk C, et al. The impact of breast reduction surgery on

breastfeeding: Systematic review of observational studies. PLoS One. 2017;12(10):e0186591. doi:10.1371/journal.pone.0186591

Surgical Technique Selection in the Management of Pediatric Gynecomastia

Abstract Presenter
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PURPOSE: Pediatric gynecomastia is a common condition which causes significant psychosocial distress for the adolescent male. A wide variety of procedures have been described to treat gynecomastia, however, a paucity of literature exists regarding technique selection for adolescent gynecomastia especially in relation to the severity of deformity. This retrospective review aims to identify patient factors associated with surgical technique selection and establish an algorithm for the surgical management of pediatric gynecomastia.

Study Design: A retrospective analysis was performed of all pediatric gynecomastia surgeries performed by a single surgeon from 2012-2022. Charts were analyzed for patient and operative demographics, endocrinologic comorbidities, complications, and outcomes. Data was analyzed using odds ratio and logistic regression analysis.

RESULTS: Forty-two surgically-managed gynecomastia patients under the age of 18 were identified for analysis. Patient average age at surgery was 16.3 years old with mean BMI of 27. Most patients were overweight or obese (54.8%) with Simon Grade III gynecomastia (35.7%). Endocrinologic assessment demonstrated the majority (81.0%) of patients had gynecomastia of idiopathic origin.

In regard to surgical management, four main surgical techniques were utilized: inferior periareolar mastectomy (IPM) (n=20, 47.6%), superior pedicled periareolar reduction (SPPR) (n=7, 16.7%), transverse mastectomy with free nipple grafting (TMFNG) (n=12, 28.6%) and transverse mastectomy with inferior pedicle (TMIP) (n=3, 7.1%).

IPM was primarily used for grade 1 and 2a patients with anatomically appropriate sternal notch to nipple (SNN) distances (mean 19.8cm). SPPR was utilized in grade 2a and 2b gynecomastia, also for patients with anatomically appropriate SNN distances (mean: 18.35cm). TMFNG was used for grade 3 deformities with mean SNN of 25.9cm. The few cases with TMIP were used in grade 2b and 3 deformities with mean SNN 26.2cm. Progression from IPM to SPPR and TMIP/TMFNG techniques was positively correlated with both increasing Simon grade and breast excision weight, respectively.

Odds ratio analysis revealed that obese patients (BMI >30) were statistically significantly more likely to require mastectomy with free nipple grafting (OR 19.5, p =.0005, 95% CI: 1.29-4.65) as were patients with Simon grade 2b or 3 gynecomastia (OR 62.3, p=0.0007, 95% CI: 3.64-104.41). Multivariate logistic regression further supported that SSN> 23.5cm, resection weight >180g, and Simon 3 grade gynecomastia were associated with free nipple grafting technique ($p < 0.05$).

CONCLUSION: Pediatric gynecomastia is an increasingly common diagnosis with a wide array of surgical treatment modalities. We propose an algorithm to help guide the extent of skin excision and scarring required to achieve aesthetic RESULTS. More severe cases may benefit from techniques often reserved for the adult gynecomastia population, such as transverse mastectomy with free nipple grafting. However, alternatives such as periareolar skin reduction can be considered in patients with good skin quality and mild skin excess to limit the scarring and potential nipple hypopigmentation associated with the transverse mastectomy and free nipple graft technique.

Fulminant Mammogenesis: Review of a Rare Developmental Disorder of the Breast with Two Case Reports and Guidance on Diagnosis and Management

Abstract Presenter
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A rare subset of rapid breast enlargement typically occurring close to menarche has appeared in case reports since 1669 using inconsistent nomenclature: virginal hypertrophy, virginal mammary hypertrophy, virginal breast hypertrophy, juvenile mammary hypertrophy, juvenile hypertrophy of the breast, virginal macromastia, juvenile gigantomastia, puberty-induced gigantomastia, and gigantomastia of puberty. This investigation aimed to review the current literature regarding this condition, specify the phenotype, and contribute two recent cases to clarify the presentation and management of this rare but potentially illuminating form of abnormal breast growth. A more appropriate name for this condition is also proposed to better reflect presentation and pathophysiology.

A literature review was performed by searching for the above terms in PubMed. Many case reports which describe "virginal breast hypertrophy" simply feature patients with prodigious breast growth that share few other features with a more severe condition that often goes by the same name. To distinguish the condition in focus, we established the following criteria: breasts grow rapidly over weeks to months, are disproportionate in size or distorted, and are accompanied by signs of skin compromise. For cases that fit these criteria, information was

collected on timing of onset, growth patterns, exam findings, laboratory studies, associated conditions, imaging, histopathology, treatment, and outcomes. Two additional cases are presented, and a more appropriate name is proposed.

An age range of 8 to 16 years old is mentioned frequently in the literature, but our review revealed a range of 10 to 24 years old. Patients often experience 3-6 months of rapid enlargement followed by slowed, continued growth into adulthood. On exam, one or both breasts are enlarged, disproportionate, distorted in shape, and possibly erythematous. The skin envelope is tight with areas feeling firm or almost ballotable. Laboratory studies are almost always normal. Despite characteristic imaging findings, histopathology ultimately distinguishes this condition from fibroepithelial tumors and normal hypertrophy. Biopsies and surgical specimens commonly reveal epithelial, myoepithelial, and ductal proliferation along with ductal dilatation, PASH, and minimal adipose tissue. No formal treatment guidelines exist, but the literature features four options: watchful waiting, non-operative medical therapy (e.g., tamoxifen), surgery (e.g., reduction mammaplasty or mastectomy), or a combination of non-operative and surgical management. Neither reduction nor mastectomy prevent recurrence, and this is especially true for patients who have not completed puberty. Clinicians must counsel peri-pubertal patients that the condition often recurs following surgery, and adjuvant tamoxifen or a repeat procedure may be necessary. The risk profile differs from that of a typical reduction, and there must be frank acknowledgment of suboptimal shape/texture outcomes. Given the draconian growth regardless of ultimate size, a better term is Fulminant Mammogenesis (FM). This name removes charged language such as "virginal" that unnecessarily implicates sexual activity status.

As a term, FM is inclusive of all demographic BACKGROUNDs and specifies a non-malignant diagnosis of sudden, severe mammary development. Review of the literature and presentation of two additional patients clarifies the criteria for FM, aids in its management, and suggests that evincing its pathophysiology may be instrumental in understanding normal postnatal breast development.

Two-Stage Breast Reconstruction with Tissue Expanders for Congenital Breast Asymmetry: A Single Institution Experience

Abstract Presenter
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PURPOSE: Congenital breast asymmetry has significant adverse psychosocial sequelae on young women. As patients mature, the discrepancy in breast asymmetry may increase leading to even greater adverse effects on social functioning and emotional well-being. Autologous and implant-based techniques have been reported for correcting such asymmetry after breast maturity, however, little literature exists on the use of 2-stage breast reconstruction with tissue expander (TE) placement prior to breast maturity. TE placement allows for serial tissue expansion of the affected breast as the contralateral unaffected breast develops. In this abstract, we describe use of tissue expanders to maintain breast symmetry during breast development, prior to definitive reconstruction after breast maturation.

METHODS: This study analyzed patients with congenital breast asymmetry who completed 2-stage breast reconstruction at a single institution from January 2000 to November 2022. Patients' medical and demographic information, TE and implant surgical information, complications, and satisfaction were analyzed.

RESULTS: Thirty-one patients, ranging in ages from 11 to 31 years old, completed 2-stage breast reconstruction for congenital breast asymmetry. Sixteen (51.6%) were diagnosed with Poland syndrome, 10 (32.3%) with tuberous breast deformity, 2 (6.5%) with congenital breast hypoplasia, 2 (6.5%) with pectus excavatum, and 1 (3.2%) with anterior thoracic hypoplasia. Twenty-nine patients (93.5%) had a unilateral condition, with the right breast (51.7%) being more commonly affected than the left breast (48.3%). The majority of patients had anatomic nipple position (N=29, 93.5%) and at least some portion of the pectoral muscle present (N=22, 71%). Tissue expanders were placed through an inframammary fold incision in 90.3% of the patients (N=28), and the most common TE size used ranged from 451-550 cc (N=12, 38.7%). TEs remained in place for a median 325 days (63-2400 days), had a median final fill of 520 cc, and remained in place after final fill to implant placement for a median 153 days (27-1602 days). Most patients received a breast implant ranging from 350-450 cc (N=12, 38.7%). During implant placement, 2 patients (6.5%) received ipsilateral fat grafting, 15 patients (48.4%) received contralateral mastopexy, and 5 patients (16.1%) had an ipsilateral latissimus dorsi flap harvested to reconstruct the chest wall and anterior axillary fold. Nineteen patients (61.3%) had initial clinic presentation at age <18, 14 patients (45.2%) had a TE placed at age <18, and 9 patients (29%) had a breast implant placed at age <18. Four patients (12.9%) experienced TE ruptures prior to implant placement, and 2 patients (6.5%) had an infection post-implant placement. After 2-stage reconstruction, 5 patients (16.1%) had persistent asymmetry requiring surgical intervention, and 29 patients (93.5%) reported satisfaction with their final reconstruction in a postoperative clinic visit with their surgeon.

CONCLUSION: This study demonstrates 2-stage breast reconstruction is a viable option for patients with congenital breast asymmetry who present prior to completion of breast maturity. This approach facilitates maintenance of breast symmetry during the process of breast maturation through performance of intermittent, serial tissue expansion. Patient satisfaction was high and complication rates were similar to those who undergo other forms of reconstruction for congenital breast asymmetry.

Acetylsalicylic Acid Dosage and Duration Effects on Deep Inferior Epigastric Perforator (DIEP) Flap Breast Reconstruction

Abstract Presenter
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BACKGROUND: The deep inferior epigastric perforator (DIEP) flap has emerged as the gold standard for breast reconstruction following mastectomy.1 The employment of microvascular techniques causes endothelial trauma activating coagulation paths increasing microthrombosis risk.2,3 Multiple pharmacological agents have been investigated for thrombosis prevention in the setting of DIEP flaps with one of these agents being acetylsalicylic acid, or aspirin. Current literature evaluating postoperative aspirin in DIEP flaps varies on the dosage, duration, timing, and respective patient outcomes.2-5 The challenge of antithrombotic therapy exists in creating a balance between thrombosis prophylaxis and adverse bleeding events. In this study, we aim to identify relationships between the administration of aspirin at varying dosages and durations and postoperative outcomes in patients undergoing DIEP free flap breast reconstruction.

METHODS: With IRB approval, a retrospective chart review of 508 patients (843 flaps) who underwent DIEP flap breast reconstruction from January 2019-March 2022 at Atrium Health was completed. Patient demographics, medical history, operative course, and postoperative complications were collected.

RESULTS: Patients were grouped by no aspirin, 81mg, or 325mg postoperative aspirin. The no aspirin group experienced no flap failures. There was no significant difference in flap failure incidence between the 81mg and 325mg groups (p=0.11). There was no significant difference in incidence of hematoma requiring return to OR when comparing the no aspirin group to patients taking 81mg or 325mg (p=0.09). Additionally, no difference was found in hematoma incidence for the 81mg versus 325mg group (p=0.97).

CONCLUSION: No difference in hematomas requiring operative intervention or flap failures was found in regards to postoperative aspirin use. There was also no difference in hematoma incidence with 81mg compared to 325mg of aspirin.

REFERENCES:

1. Costanzo, D., Klinger, M., Lisa, A., Maione, L., Battistini, A., & Vinci, V. (2020). The evolution of autologous breast reconstruction. Breast Journal, 26(11), 2223–2225. https://doi.org/10.1111/TBJ.14025
2. Tran, N. v., Buchel, E. W., & Convery, P. A. (2007). Microvascular complications of DIEP flaps. Plastic and Reconstructive Surgery, 119(5), 1397–1405.

https://doi.org/10.1097/01.PRS.0000256045.71765.96
3. Enajat, M., Aziz Mohammadi, M., Debeij, J., van der Hulst, R. R. W. J., & Mureau, M. A. M. (2014). Effect of acetylsalicylic acid on microvascular thrombosis in autologous breast reconstruction. Journal of Reconstructive Microsurgery, 30(1), 65–70. https://doi.org/10.1055/S-0033-1356553/ID/JR130093-33
4. Knackstedt, R., Djohan, R., & Gatherwright, J. (2019). Thromboprophylaxis in breast microvascular reconstruction: a review of the literature. European Journal of Plastic Surgery, 42(4), 317–324. https://doi.org/10.1007/S00238-019-01510-4
5. Halle, M., Docherty Skogh, A. C., Friberg, A., & Edsander-Nord, Å. (2016). Breast free flap complications related to haematoma formation – do the risks of multiple antithrombotics outweigh the benefits today? Journal of Plastic Surgery and Hand Surgery, 50(4), 197–201. https://doi.org/10.3109/2000656X.2016.1151435

Stunted Sensitivity: Measuring the Negative Effects of Chemotherapy and Radiation on Breast Sensation after Mastectomy and Reconstruction

Abstract Presenter
Grant Black

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PURPOSE: Loss of breast sensation following mastectomy is a well-defined phenomenon. Sensory nerves exhibit slow and variable recovery; prior studies have identified that return to sensation is affected by mastectomy technique and reconstruction type, among other factors. However, chemotherapy and radiation have been less studied with respect to their impact on neural regeneration, both in autologous and alloplastic reconstruction.

METHODS: Women undergoing mastectomies with immediate reconstruction via neurotized deep inferior epigastric perforator (DIEP) flaps or alloplastic reconstruction with tissue expanders were identified and followed prospectively. Neurosensory testing was performed in 9 breast regions using a pressure-specified sensory device to determine 1-point static cutaneous thresholds. Patients were stratified by preoperative or postoperative exposure to chemotherapy and/or radiation therapy, and Student's t-tests were performed between groups both preoperatively and at set intervals for three years following mastectomy to measure differences in sensation.

RESULTS: 233 patients underwent neurosensory testing before or after mastectomy with reconstruction. Some patients underwent testing at multiple timepoints, accounting for a total of 770 measured breasts; 132 patients received DIEP flap reconstruction, and 101 patients received

tissue expander-based reconstruction. Of the patients that received DIEP flap reconstruction, 31 did so in a delayed fashion, at a median of 12 months after mastectomy. 64 breasts were exposed to pre-mastectomy radiation therapy, and 178 to post-mastectomy radiation therapy. 174 breasts received pre-mastectomy chemotherapy, and 188 received post-mastectomy chemotherapy. Patients undergoing autologous reconstruction were more likely to receive postoperative chemotherapy; there were no other significant differences across groups regarding adjuvant treatment. Preoperatively, patients that received radiation therapy had significantly worse sensation before mastectomy ($p<0.001$), though this difference resolved by one year postoperatively. Conversely, patients that received postoperative radiation did have significantly worse sensation at one year postoperatively, regardless of reconstructive group ($p<0.01$). With regard to chemotherapy, there was no difference in preoperative sensation between groups exposed to preoperative chemotherapy. However, at one year postoperatively, patients that underwent either preoperative or postoperative chemotherapy had reduced sensation compared to their untreated counterparts ($p<0.01$). At three years after mastectomy, only the DIEP patients that received preoperative chemotherapy had reduced sensation; all other DIEP patients (postoperative chemotherapy, preoperative/postoperative radiation) and all tissue expander patients had no differences in sensation.

CONCLUSIONS: Breast sensation following mastectomy with autologous or alloplastic reconstruction is negatively influenced by radiation and chemotherapy. While the negative impact is noticeable at one year after mastectomy, it is mostly resolved by three years after, suggesting that chemotherapy and radiation slow down the speed of nerve recovery without affecting the overall recovery potential. Identifying these risk factors allows providers to better set expectations with patients when discussing reconstruction options. More follow-up must be done to understand the long-term implications of adjuvant cancer treatment on breast sensation.

Alpha Defensin-1 Level Correlates with Peri-Prosthetic Infection Severity following Implant-Based Breast Reconstruction

Abstract Presenter
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BACKGROUND: Accurate diagnosis of peri-prosthetic infections following breast reconstruction is imperative to reduce morbidity. Alpha-defensin-1 (AD-1) is an antimicrobial peptide released by neutrophils that targets metabolically active microbes in the setting of ongoing infection. We previously demonstrated superior sensitivity and specificity of AD-1 in the identification of peri-prosthetic breast infection when compared to standard bacterial culture. This study evaluates the relationship between quantitative AD-1 levels and infection severity in patients with suspected peri-prosthetic infection. We hypothesize that levels of AD-1 within peri-implant fluid samples correlate with degree of infection.

METHODS: A retrospective review of a prospective database was conducted of patients with prior breast implant reconstruction undergoing surgery for suspected infection between June 2018 and June 2019. Peri-prosthetic fluid was sampled, and AD-1 levels were sent for quantitative analysis. Each patient was assigned an infection severity, as previously described by Spear et al (2004). Analysis was conducted to evaluate odds of clinical outcomes and management, by breast, with increasing AD-1 levels. The correlation between AD-1 levels and systemic markers of infection was studied. Ordinal logistic regression was performed to evaluate the correlation between infection severity and AD-1 level.

RESULTS: Twenty-nine patients met inclusion criteria (nine=bilateral breast surgery) resulting in a total of 38 breasts. Mean age was 56.7+/-13.9 years. Fifteen breasts (38.4%) were found to have peri-prosthetic infection diagnosed intraoperatively. Breasts found to be infected intraoperatively had significantly higher quantitative AD-1 levels (3.9 vs 0.14, $p<0.01$). Increasing quantitative AD-1 demonstrated significantly greater odds of erythema (OR 2.98, [1.53-5.82], p=0.01), purulence (OR 2.84, [1.51-5.35], p=0.01), fever (OR 1.84, [1.15-2.93], p=0.01), threatened exposure (OR 2.97, [1.48-5.95], $p<0.01$), and implant exposure (OR 1.79, [1.04-3.08], p=0.04). A sub-group analysis was performed to determine the distribution of AD-1 levels based on clinical signs or symptoms. Interestingly, the range of quantitative AD-1 level was widely distributed in breasts with erythema (median=3.79, IQR 0.12-5.83, min=0.05) (Figure 1), whereas variance in AD-1 was minimal for breasts with purulence (median=4.10, IQR 3.0-5.7, min=2.7). Increasing AD-1 increased odds of requiring oral antibiotics (OR 2.96, [1.53-5.73], p=0.01), IV antibiotics (OR 2.02, [1.1-3.71], p=0.02), washout ($p<0.01$), and explant (OR 2.48, [1.47-4.2], $p<0.01$). Increasing AD-1 positively correlated with WBC count (β=1.8 cells/microliter, $p<0.01$), and lactate (β=0.19 meq/liter, $p<0.04$). Ordinal logistic regression analysis demonstrated that quantitative AD-1 level was an independent predictor of infection severity (χ^2=22.77, $p<0.01$). AD-1 level was a significant predictor of infection severity (Wald=22.77, $p<0.01$), with higher levels associated with greater infection severity. The parameter estimate for AD-1 suggests that the average infection score increased by 1.20 (95% CI [0.73, 1.78]) for every one-unit increase in AD-1.

CONCLUSION: AD-1 levels correlate with infection severity, highlighting its potential as an indicator of patient prognosis in intermediate infections, when clinical exam may only demonstrate an erythematous breast. Accurate and rapid classification of infection severity is imperative, as a growing cohort of plastic surgeons now attempt to manage mild infections or threatened exposure without exclusive implant removal. While further evaluation is warranted, AD-1 may have utility in novel implant salvage algorithms following breast reconstruction.

Medial Pedicle Wise-Pattern Breast Reduction for Gigantomastia: A Single-Center Retrospective Review

Abstract Presenter
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INTRODUCTION: Gigantomastia is a disease characterized by excess breast growth resulting in back pain, postural imbalance, intertrigo, and psychosocial disablement. There are multiple surgical techniques utilized in breast reduction surgery, with free nipple grafting (FNG) often being the technique of choice in large reductions. Here, we provide evidence that medial pedicle wise-pattern technique (MPWP) is also a safe surgical technique for treating gigantomastia and has strengths over FNG and other reduction techniques.

METHODS: We reviewed our institution's electronic medical record system between February 2020 to February 2023 to identify women diagnosed with gigantomastia whom underwent a bilateral reduction with greater than 1,500 grams resected in at least one breast. We analyzed patient comorbidities, operative variables, and outcomes such as wound complications, need for revisions, and loss of nipple areolar complex (NAC) sensitivity. A multinomial logistical regression was utilized to identify associations between variables.

RESULTS: There were 31 patients diagnosed with gigantomastia who underwent bilateral mammaplasty. The average patient age and total bilateral resection weight was 39 years and 3828 grams. The patient average BMI was 40 kg/m2 with the most common comorbidities being hypertension (38%), diabetes mellitus (16%), and hyperlipidemia (10%). 26% of patients were either current or former cigarette users.

Medial pedicle with wise pattern skin reduction was the most common surgical technique (65%) followed by inferior pedicle (16%), superior medial pedicle (10%), FNG (6%) and superior pedicle (3%). Postsurgical drains were commonly used (94%). The most common complications were sensation loss to the NAC (16%) and minor wound dehiscence (16%). In total, 23% of all patients had decreased or complete loss of sensation to the NAC. All complications were treated out-patient and no patients required reoperation.

A multinomial logistical regression found that reduction technique was not associated with increased odds of having a surgical complication (OR=0.75, p=0.273, CI=[0.44, 1.26]). Additionally, age, excision amount, use of postsurgical drains, and BMI were not associated with increased complications (p=0.29, p=0.55, p=0.74, p=0.41). Interestingly, rates of sensation loss to areola were higher in patients with higher BMIs; however, it was not statistically significant (p=0.051). Limitations of this study include a small sample size; however, gigantomastia is relatively rare condition.

CONCLUSIONS: The MPWP reduction technique is a viable option for the treatment of gigantomastia, with notable advantage of preserved nipple sensation. While FNG is the most commonly used technique for large breast reductions, it generally constitutes a loss of sensation to the NAC post-operatively. The majority of our patient population maintained full sensitivity to NAC after a MPWP reduction without experiencing an increase in other common surgical complications. Further research with a larger sample size is warranted, but the RESULTS demonstrate that a medial pedicle technique can be safely utilized in bilateral mammoplasties in patients with gigantomastia.

Effects of Breast Surgery on Interoceptive Awareness in Cis Women

Abstract Presenter
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INTRODUCTION: The driving force for many seeking plastic surgery is to feel more comfortable in their own body. Along with comfort comes satisfaction, improved self-awareness, and potential change in interoceptive awareness. Interoceptive awareness is defined as the conscious perception of one's body.1 While the ability to consciously perceive bodily signals can be influenced by many factors, sense of self and body image play a significant role.2 Studies have shown diminished interoceptive awareness in those with negative and distorted body images, but no research has assessed the impact of a change in body image (via plastic surgery) on interoceptive awareness.3 Therefore, the PURPOSE of this study is to investigate how interoceptive awareness changes after receiving breast surgery in cis-gendered women.

METHODS: To quantify interoceptive awareness, the Multidimensional Assessment of Interoceptive Awareness Version 2 (MAIA-2) was administered to women, 19 years or older, undergoing breast surgery at Nebraska Medicine and the University of Nebraska Medical Center.4 A baseline survey was administered preoperatively, with follow up surveys at one week, one month, and three months postoperatively. Data was collected from 16 women through 3 months post-operative, 7 women through 1 month, and 12 women through 1 week. Data was analyzed using a Wilcoxon signed ranks test to compare median baseline values of each of the 8 MAIA-2 subcategories with its follow up counterpart, as well as overall survey averages.

RESULTS: Using exact significance, significant increases were found at 3 months for "Not Worrying" ($p=0.046$) and "Emotional Awareness" ($p=0.004$). A significant decrease was found at 3 months for "Self-Regulation" ($p=0.021$). "Trust" showed significant increases at 1 week ($p=0.026$) and 1 month postoperative (0.038). Average scores encompassing all 8 subcategories were significantly increased at one week ($p=0.018$) and one month postoperative ($p=0.038$). There were no significant changes in the subcategories of "Noticing," "Not Distracting,"

"Attention Regulation," or "Body Listening."

CONCLUSION
From this study, it can be concluded that breast surgery has a positive impact on interoceptive awareness at one week and one month postoperative. These findings are clinically relevant in that they may offer providers an insight into the psychological outcomes of a breast procedure. A comprehensive understanding of the effects of a procedure enables providers to educate patients not only on anticipated physical RESULTS, but also on potential changes in sense of self--for which is the desire of surgery for many.

REFERENCES
1. Craig, A.D., How do you feel? Interoception: the sense of the physiological condition of the body. Nature Reviews Neuroscience, 2002. 3(8): p. 655-666.
2. Pollatos, O., et al., Reduced perception of bodily signals in anorexia nervosa. Eat Behav, 2008. 9(4): p. 381-8.
3. Brown, T.A., et al., Psychometric Evaluation and Norms for the Multidimensional Assessment of Interoceptive Awareness (MAIA) in a Clinical Eating Disorders Sample. Eur Eat Disord Rev, 2017. 25(5): p. 411-416.
4. Mehling, W.E., et al., The Multidimensional Assessment of Interoceptive Awareness, Version 2 (MAIA-2). PLOS ONE, 2018. 13(12): p. e0208034.

Optimizing Adipose Stem Cell Immunotherapy through Cell-Assisted Lipotransfer

Abstract Presenter
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INTRODUCTION: Breast reconstruction with autologous tissue, such as abdominal fat, has been used to restore form after multi-modal treatment including chemotherapy, surgical extirpation, and local tissue radiation.1 Nonetheless, little is known about the regenerative mechanism of fat when transferred from one part of the body to the chest wall for breast reconstruction. This is particularly pressing, given the rich proteins and progenitor cells, including adipose derived stem cells (ASCs), within the stromal vascular fraction (SVF or stromal vascular cells, SVCs) of fat. The PURPOSE of this work was to develop a model of engineered adipose tissue grafts supplemented with stromal or stem cells for soft tissue regeneration.

METHODS: Discarded lipoaspirate from a healthy female donor was processed according to clinical standard. Tissue scaffolds were then implanted on the dorsal flank of nude mice for 8

weeks. A 2 x 2 grid was devised on the flanks with 0.5mL of graft (or saline ASC control) in each square so that each animal contained all treatment and control scaffolds. Engineered grafts were supplemented with either culture expanded pure ASCs or admixed cells from the SVF (SVCs) from the same surgical procedure. Standard grafts and cell mixture without fat were used as controls. Graft retention was measured over time. At 8 weeks, animals were sacrificed, and tissue specimens were processed for volume, histology, and protein expression. Protein concentrations were measured using the Proteome Profiler Human XL Cytokine Array Kit. The images were analyzed using ImageJ software.

RESULTS: The ASC/saline control had dissipated over the 8-week study. The standard graft (controls) had 59.2% graft retention. Adipose scaffolds supplemented with pure ASCs and SVCs demonstrated higher volume retention at 8 weeks (76.6% vs. 77.3% respectively). Protein assessment in the tissue constructs at 8 weeks demonstrated variations in cytokine concentrations between cell-controls and engineered grafts. All grafts expressed comparable concentrations of markers of adipogenesis and functional adipose tissue (adiponectin, leptin) with minimal expression in the ASC controls. The SVF supplemented adipose scaffold cells had higher expressions of inflammatory markers such as C reactive protein and the ST2 signaling protein. Grafts engineered with pure ASCs demonstrated higher concentrations of remodeling proteins including hepatocyte growth factor, matrix metalloproteinase 9, and vascular endothelial growth factor. Of note, all grafts had comparable expression of CD31, a marker for neovascularization.

CONCLUSIONS: The model developed in this pilot study will set way for an optimal design in which cell-tissue specific scaffolds can target soft tissue fibrosis and radiation injury. We were able to identify differences in cytokine expression in the graft and the associated SVF, particularly in inflammation and wound healing. These secretomes may impact graft retention and fat necrosis in the clinical setting but more importantly allow for goal-directed graft engineering to target regeneration and repair radiation injury in comprehensive cancer treatment.

1. Hanson SE, Kapur SK, Garvey PB, et al. Oncologic Safety and Surveillance of Autologous Fat Grafting following Breast Conservation Therapy. Plast Reconstr Surg. 2020;146(2):215-225.

Disparities in Receipt of Regional Blocks Amongst Tissue Expander Patients at an Ambulatory Surgery Center

Abstract Presenter
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BACKGROUND: Locoregional anesthesia can reduce opioid consumption and post-discharge pain after breast reconstruction. The objective of this study was to describe trends in disparities amongst patients undergoing postmastectomy breast reconstruction with tissue expanders (TE).

METHODS: Our institutional database was used to retrospectively identify patients who underwent TE placement from 2017 to 2022. Patients were included if they had the aforementioned procedure and available data on receipt of regional anesthesia. Patient demographics were recorded and cases were grouped by receipt of regional block. Interpreters were used for all non-English speaking patients.

RESULTS: 4467 patients underwent breast reconstruction with a TE and all were offered a block as part of a standard mastectomy pain protocol; 85% accepted and 15% declined. White women were significantly more likely to receive regional anesthesia than not, with only 14% refusing. Black women and women identifying racially as "Other" were significantly more likely to decline regional anesthesia (20% of Black patients and 19% of "Other" patients). There was no difference in block receipt for Asian patients. A significantly larger proportion of Hispanic patients (8.8% vs. 12%, p=0.029), and patients whose primary language was not English (i.e., Spanish or Other) did not receive a block (1.2% vs. 3.0%, p<0.001 for native Spanish speakers; 1.8% vs. 3.1%, p=0.029 for other native languages). Alternatively, native English speakers were significantly more likely to receive a block (97% vs. 94%, p<0.001). There were also significant differences in block receipt and type of insurance; a larger proportion of patients with commercial insurance received a block (82% vs. 73%, p<0001), while a larger proportion of patients with Medicaid declined (5.4% vs. 11%, p<0.00). Other significant differences were found between the groups for median age, laterality, and median BMI. Using a logistic regression model, undergoing unilateral surgery reduced the odds of receiving regional anesthesia (odds ratio [OR], 0.73; 95% confidence interval [CI], 0.61-0.87; p<0.001), as did having Medicaid (compared to commercial insurance) (OR, 0.53; 95% CI, 0.39-0.72; p<0.001).

CONCLUSION: Effective pain management is crucial for the rehabilitation of patients after surgery. Given its benefits, the use of regional anesthesia in breast reconstruction is increasing. However, even at an institution with an established pathway for pain control, where all patients are offered blocks, we identified differences in the receipt of locoregional anesthesia in patients undergoing TE-based breast reconstruction. Our findings parallel those which exist in the literature highlighting disparities in regional block receipt amongst mastectomy patients.1,2 These differences justify future efforts to understand the underlying causes of these inequities so we may provide equal care to all breast reconstruction patients.

REFERENCES

1. Beletsky A, Burton BN, Finneran JJ, Alexander BS, Macias A, Gabriel RA. Association of race and ethnicity in the receipt of regional anesthesia following mastectomy. Region Anesth Pain M. Feb 2021;46(2):118-123. doi:10.1136/rapm-2020-101818

2. Mazzeffi MA, Keneally R, Teal C, et al. Racial Disparities in the Use of Peripheral Nerve Blocks for Postoperative Analgesia After Total Mastectomy: A Retrospective Cohort Study. Anesth Analg. Jul 2022;135(1):170-177. doi:10.1213/Ane.0000000000006058

Evaluation of the Impact of Physical Therapy on Patients with Macromastia Seeking Breast Reduction Surgery

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INTRODUCTION: Macromastia affects women's quality of life through back pain, neck pain, rashes, and discomfort with maneuvering daily living.[1] Conservative treatment includes weight loss, supportive bras, anti-inflammatory medication, and physical therapy (PT); however, these treatments rarely provide lasting relief.[1] Despite strong evidence that patients undergoing breast reduction improve in areas of physical, psychological and sexual wellbeing, insurance companies have continued to deny surgery even after patients have participated in various conservative treatments with no PT.[1'2] High quality literature on the efficacy of PT in patients with macromastia is lacking, but a small prior studies did not demonstrate PT to provide full permanent relief of the symptoms.[3] The PURPOSE of our study was to expand on the role of conservative treatment in macromastia by assessing the impact of PT versus surgery and characterize patient factors associated with progression from PT to surgery.

METHODS: We conducted a retrospective cohort study of patients diagnosed with macromastia who had an appointment with a plastic surgeon at University of Colorado Hospital from 2017 to 2020. Patient charts were reviewed and information was collected on patient-reported symptoms, patient characteristics, conservative treatments, physical therapy duration, and reported effectiveness. Whether patients ultimately progressed to surgical treatment was also collected. All patients were identified prior to chart review to minimize selection bias. Descriptive and bivariate statistical analysis was performed.

RESULTS: A total of 200 patients with macromastia met inclusion criteria. The most common symptom was back pain (N=190, 95.0%). A total of 175 (87.6%) patients had PT. Of those, only 10 (5%) patients reported partial relief, and 95 (47.5%) proceeded with surgery. The mean time from diagnosis to surgery was 640 days, and mean time from plastic surgery consult to surgery was 252 days. Patients with military health care plans waited less time to undergo a breast reduction after their initial consult (145 days) compared to private insurance (255 days, P=0.04) or Medicaid (274 days, P=0.03). Of patients that underwent PT, 92 (52.5%) participated in more than 12 weeks of PT, and only 10 (5.71%) of the patients reported partial relief. PT duration did not show a significant correlation with patients ultimately progressing to surgery (P=0.07).

CONCLUSION: Patients frequently undergo PT prior to breast reduction surgery despite few

experiencing significant relief and most eventually requiring definitive treatment with surgery. Conservative treatment with PT should be further studied and potentially reconsidered as an insurance company requirement prior to breast reduction. Future work by this group will focus on expanding the cohort of patients and gaining patient perspectives through a standardized survey on their symptomatic relief with PT and breast reduction.

REFERENCES:

1. Rawes CMA, Ngaage LM, Borrelli MR, Puthumana J, Slezak S, Rasko YM. Navigating the Insurance Landscape for Coverage of Reduction Mammaplasty. Plast Reconstr Surg. Nov 2020;146(5):539e-547e. doi:10.1097/prs.0000000000007241
2. Wang AT, Panayi AC, Fischer S, et al. Patient-reported Outcomes After Reduction Mammoplasty Using Breast-Q: A Systematic Review and Meta-analysis. Aesthet Surg J. Nov 22 2022;doi:10.1093/asj/sjac293
3. Collins ED, Kerrigan CL, Kim M, et al. The effectiveness of surgical and nonsurgical interventions in relieving the symptoms of macromastia. Plast Reconstr Surg. Apr 15 2002;109(5):1556-66. doi:10.1097/00006534-200204150-00011

Smooth versus Textured Tissue Expanders in Breast Reconstruction: A Systematic Review and Meta-Analysis

Abstract Presenter
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Two-stage tissue expansion has become the preferred technique for breast reconstruction. Smooth tissue expanders (STE) were introduced first, followed by textured tissue expanders (TTE), which were found to have lower complication rates and more satisfactory cosmetic outcomes than STEs. However, due to recent reports of breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) occurring in association with textured devices, many have reverted to using STEs.

Due to the increased hesitation and stigma associated with using textured devices and the increased use of STEs, we performed a systematic review and meta-analysis to evaluate if there were any significant differences in the complication profile of smooth vs. textured tissue expanders. 22 papers were included, with outcomes including the following: implant rupture, infection, seroma/hematoma, skin flap necrosis, dehiscence, explantation, tissue expander malposition, and capsular contracture. For the sixteen studies that included only a single arm of data on outcomes for either TTEs or STEs, we formed an aggregate of total events in these studies for each outcome to be included in our meta-analysis.

Our meta-analysis found a significantly greater risk of explantation and capsular contracture in STEs than TTEs [odds ratio (OR) = 1.73; 95% CI = 1.26 to 2.36; P = 0.0006] and [OR = 2.47; 95% CI = 1.27 to 4.81; P = 0.008], respectively. Our meta-analysis did not find any significant differences among all other measured outcomes. There was no significant difference in implant rupture between TTEs and STEs [OR = 1.43; 95% CI = 0.63 to 3.23; P = 0.39], infection risk between the two expander texture types [OR = 0.81; 95% CI = 0.36 to 1.81; P = 0.61], skin flap necrosis in STEs and TTEs [OR = 1.24; 95% CI = 0.62 to 2.49; P = 0.54], hematoma formation in STEs and TTEs [OR = 0.92; 95% CI = 0.48 to 1.79; P = 0.81], seroma formation between TTEs and STEs [OR = 1.79; 95% CI = 0.70 to 4.53; P = 0.22], wound dehiscence risk between TTEs and STEs [OR = 1.30; 95% CI = 0.51 to 3.30; P = 0.58], and in the risk of nipple necrosis when comparing TTEs and STEs [risk difference (RD) = 0.01; 95% CI = -0.04 to 0.07; P = 0.63].

In CONCLUSION, only the risk of explantation and capsular contracture were higher in the STE group than in the TTE group, which is consistent with previous studies. Surgeons involved in breast reconstruction should take into consideration the increased risks of capsular contracture and explantation when utilizing STEs, and compare that to the extremely rare, nonetheless potentially fatal, increased risk of BIA-ALCL with TTE use.

"Snow cone" Secondary Revision Technique after Autologous Breast Reconstruction following Skin-sparing Mastectomy

Abstract Presenter
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OBJECTIVE: The deep inferior epigastric artery perforator (DIEP) flap is the current gold standard for autologous breast reconstruction. One of the aesthetic issues after skin-sparing mastectomy (SSM) and immediate DIEP flap reconstruction is optimal shape and position of the skin paddle and the overlying skin envelope, as well as nipple-areola reconstruction. We present the "snow cone" secondary revision procedure which incorporates multiple elements into a single, simple procedure.

METHODS: This revision technique combines skin paddle reduction, nipple-areola reconstruction via a modified CV flap, and a vertical mastopexy (with optional horizontal component). The shape of the markings resemble a "snow cone," thereby giving the procedure its

name. Data about patients who have undergone the procedure was collected, which included demographic information (age, BMI, comorbidities, and smoking history), perioperative data (previous breast surgery, chemotherapy, radiation, length of stay, and length of follow-up), occurrence of minor complications (seroma, hematoma, or superficial infection), occurrence of major complications (fat necrosis, necrosis of reconstructed nipple-areola, or deep infection), and need for subsequent revision procedures.

RESULTS: Nine patients underwent the "snow cone" technique. In the cohort, the average age was 47 years old, and the average BMI was 27.9. Hypertension, hyperlipidemia, and autoimmune disease were the most common comorbidities (22.2%). Previous adjuvant chemotherapy had been undertaken by 7 patients (77.7%), and previous adjuvant radiation to the reconstructed breast by 4 patients (44.4%). All patients were discharged the day of the procedure. The average follow-up was 86 days. No patients experienced major complications, and only one (11%) experienced a minor complication (erythema that resolved with oral antibiotics). No additional revision procedures were needed in any patient.

CONCLUSION: The "snow cone" secondary revision technique is safe and effective, and should be considered in order to optimize aesthetics in patients who have undergone autologous breast reconstruction.

Breastoration: Unpacking the Correlation between Demographic Factors and Breast Reconstruction Rates

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PURPOSE: The psychosocial benefits of breast reconstruction for breast cancer patients are well documented, and yet not all patients have historically been afforded the option for reconstructive surgery. The 1998 Women's Health and Cancer Rights Act mandated insurance coverage of immediate post-mastectomy reconstruction for patients diagnosed with breast cancer, with the goal of improving access to reconstructive surgery for all patients. Despite this, analysis of trends in reconstruction following this law showed that only 42% of patients getting a mastectomy receive immediate reconstruction, with the likelihood lower for patients with Medicare and Medicaid compared to private insurance. Through this study we aim to assess

current disparities in reconstructive surgery rates and explore what barriers may still exist to receiving care.

MATERIALS AND METHODS: Retrospective review identified demographic, socioeconomic, and clinical data for patients undergoing mastectomy with immediate reconstruction at Weill Cornell Medicine and Columbia University Irving Medical Center from 2002 to 2019. The primary outcome was receiving reconstruction post-mastectomy. Multivariate logistic regression identified predictors of reconstruction among patients of varying sociodemographic factors.

RESULTS: Our cohort includes 6,122 patients diagnosed with breast cancer who underwent mastectomy, of which 3,737 (61.04%) underwent reconstruction and 2,385 (38.96%) did not. Of those receiving reconstruction, 2,840 (76%) identified as White, 414 (11%) identified as Black, 259 (6.9%) identified as AAPI, and 50 (1.3%) identified as other. Multivariate regression revealed that age 45 and above, having public insurance, advanced tumor staging, and identity as AA/PI were negative predictors for receiving post mastectomy reconstructive surgery ($p < 0.01$ for all factors). In contrast, receiving supplemental chemotherapy and being in the highest income quartile were associated with increased likelihood of obtaining reconstructive surgery.

CONCLUSIONS: Despite legislative changes to make reconstructive care more affordable and enhance communication to patients about reconstructive care options, our data indicates that not all groups are equally benefiting from improvements in access. Disparities in reconstructive surgery rates based on age, race, income, and cancer stage persist. This data emphasizes the need for further study aimed at mitigating barriers to care among these groups.

Microsurgical breast reconstruction for out-of-state patients: trends and payments in a state-wide claims database

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BACKGROUND: Access to healthcare services, especially specialized procedures like microsurgical breast reconstruction, may be limited by geography and contribute to inequity. Although insurers, including Medicaid, may cover out-of-state services if otherwise not readily available in a patient's home state [1], little is known regarding the trends, patient populations, and payments for microsurgical breast reconstruction for out-of-state patients.

METHODS: We queried the Massachusetts all-payer claims database for patients who underwent mastectomy followed by microsurgical breast reconstruction (CPT: 19364 and S2068) from 2016 to 2020 and used zip code data to identify patients who resided in Massachusetts

versus out-of-state. Insurance type (private vs. public) was compared between in-state and out-of-state patients using Chi-square analysis. We compared payer reimbursements for microsurgical breast reconstruction as well as out-of-pocket patient (OOP) costs between out-of-state and in-state patients, normalizing bilateral procedures to unilateral procedures.

RESULTS: A total of 433 patients underwent microsurgical breast reconstruction after mastectomy, of which 365 (84.3%) resided in Massachusetts and 68 (15.7%) resided out-of-state. In total, 370 patients (85.5%) were privately insured, and 63 (14.5%) were publicly insured. Out-of-state status was associated with having private insurance (97.1% vs. 83.2%, $p = 0.006$). The 2 patients (2.9%) who were out-of-state and publicly insured were beneficiaries of Medicare Supplemental Policy ("Medigap") and Medicaid Managed Care Organization. Of the out-of-state patients who were privately insured, 51 (75.0%) held preferred provider organization plans, 3 (4.4%) held point-of-service plans, and 10 (14.7%) held health maintenance organization plans. Mean overall physician payments (payer + OOP costs) were similar between in-state ($20,455) and out-of-state ($19,966) patients. Mean payer costs were $12,715 (in-state) and $17,880 (out-of-state). Mean OOP costs were $7740 (in-state) and $2086 (out-of-state).

CONCLUSIONS: Out-of-state patients who undergo microsurgical breast reconstruction in Massachusetts are more likely to be privately insured. Overall physician payments for microsurgical breast reconstruction are similar, regardless of a patient's home state; however, the share of cost may be higher for out-of-state payers. Public insurance policies for coverage of out-of-state procedures may contribute to disparities in access to microsurgical breast reconstruction.

1. Medicaid and CHIP Payment and Access Commission (MACPAC). Medicaid Payment Policy for Out-of-State Hospital Services. https://www.macpac.gov/wp-content/uploads/2020/01/Medicaid-Payment-Policy-for-Out-of-State-Hospital-Services.pdf. Published January 2020. Accessed March 4, 2023.

How Are You "Feeling"?: The Impact of Patient Comorbidities on Breast Sensation after Mastectomy with Deep Inferior Epigastric Flap Reconstruction

Abstract Presenter
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PURPOSE: In recent years, increasing emphasis has been placed on sensation recovery by women undergoing mastectomy and reconstruction. Given this trend, an increasing number of

studies have been conducted focusing on breast sensation restoration. These prior studies have found that mastectomy technique, reconstruction type, adjuvant irradiation, and reconstructive plane play significant factors in sensory return. However, at present, there is still a paucity in literature regarding the impact of patient comorbidities and demographics on neural regeneration. Additionally, most literature on return to sensation focuses on patients who undergo implant-based reconstructions opposed to autologous tissue reconstructions.

METHODS: Women undergoing mastectomies with immediate deep inferior epigastric perforator (DIEP) flap reconstruction were identified and followed prospectively. Preoperatively and at predetermined postoperative timepoints, neurosensory testing was performed in 9 breast regions using a pressure-specified sensory device to determine 1-point static cutaneous thresholds. Values were scaled on a 0-100 point range such that higher values indicate increased sensitivity. Unpaired t-tests and ANOVA with pairwise Bonferroni corrections were used to compare average sensation scores across groups stratified by patient comorbidities, using an alpha of 0.05.

RESULTS: 131 patients underwent neurosensory testing before or after mastectomy with either unilateral or bilateral DIEP flap reconstruction. Testing was conducted pre-operatively and at various time points post-reconstruction, stratified into <1 year, 1-2 years, 2-4 years, and 4+ years after mastectomy and reconstruction. Some patients underwent testing at multiple timepoints, accounting for a total of 418 measured breasts. Patients were stratified based on comorbidities including age, hypertension, tobacco use, alcohol use, and obesity (body mass index>30kg/m^2). At baseline, only the increased age (-0.32 sensation points/year) and the obesity (-9.24 points) groups had significant differences in breast sensation. At <1-year post-mastectomy, former (-9.99) and active (-23.2) tobacco use were significantly correlated with decreased breast sensation. At 1-2 years post-reconstruction, obesity (-16.93) and active tobacco use (-30.0.9) were found to be significant factors in sensation restoration. From 2 years after mastectomy onwards, none of the comorbidities were found to be significant predictors of breast sensation.

CONCLUSIONS: The importance of breast sensation cannot be overstated as it plays an integral role in a woman's physical and psychological wellbeing. Although comorbidities such as BMI, hypertension, and smoking play impactful roles in other components of reconstruction such as necrosis and wound healing, the comorbidities evaluated in this study did not significantly impact breast sensation long-term. Smoking status, BMI, and age significantly impacted breast sensation in the first 2 years post-reconstruction. However, these differences subsided from 2 years onwards. Our RESULTS can help guide pre-operative patient counseling on reconstruction after mastectomy and suggest that regenerative capabilities of breast sensory nerves may be largely independent of patient characteristics and comorbidities.

Prospective Evaluation of Patient Reported Outcomes in Women Undergoing All Types of Breast Cancer Procedures: A One Year Follow Up

Abstract Presenter
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PURPOSE: With advances in oncologic as well as reconstructive procedures for breast cancer, patients are faced with several options for surgical treatment of early-stage breast cancer (1, 2). Understanding the impact these procedures have on patient reported outcomes (PROS) is the ultimate determinant of long-term health and satisfaction. Ultimately, this information can be used to guide surgical decision making and improve patient care and quality of life.

METHODS/MATERIALS: This is a prospective longitudinal study of PROS in women with a new breast cancer diagnosis at a quaternary cancer center from April 2017 to June 2022. Women who established their surgical plan were consented and given a demographic survey as well as pre-operative and post-operative year 1 BREAST-Q© lumpectomy (L), mastectomy (M), or mastectomy with reconstruction (BR). Regression models were used to understand individual relationships between demographics and change score (from pre- to post-op) for each BREAST-Q© module (breast satisfaction, psychosocial well-being, physical and sexual well-being).

RESULTS: 239 women completed pre- operative and post-operative surveys. Univariate analysis demonstrated that sexual well-being scores are affected by age ($p \leq 0.038$), breast satisfaction scores are affected by procedure type ($p \leq 0.033$), and physical well-being scores are affected by a previous history of radiation ($p \leq 0.033$) and a history of breast cancer ($p \leq 0.019$). In the multivariate regression analysis, breast satisfaction score was improved by an estimate of 17.1 points higher in bilateral BR compared to Lumpectomy ($p \leq 0.005$). There was no significant changes in scores for other procedures compared to Lumpectomy. For psychosocial well-being, unilateral Mastectomy without reconstruction reported an estimate of 11.2 points decrease in score compared to Lumpectomy ($p \leq 0.039$). Procedure type did not significantly impact physical or sexual well-being. Previous history of radiation negatively impacted change score for psychosocial and sexual well-being: previous history of radiation reported an estimate of 41.8 points decrease in psychosocial wellbeing score ($p \leq 0.000$) and 29.6 points decrease in sexual wellbeing score compared with those without a history of radiation ($p \leq 0.042$). The breast satisfaction score increased by 0.4 points for each increase in age ($p \leq 0.020$).

CONCLUSION: Women who are contemplating a mastectomy with reconstruction should consider bilateral procedures if they are interested in improving satisfaction with their outcome. For those women who need to have a mastectomy, this study supports that one's psychosocial well-being would be like lumpectomy if they were to have reconstruction and significantly lower than lumpectomy without reconstruction. Ultimately, women undergoing mastectomy should strongly consider reconstruction to improve their long-term health and well-being.

REFERENCE:

1. M. Riis: Modern surgical treatment of breast cancer. Annals of Medicine and Surgery, 2020-08-01, Volume 56, Pages 95-107
2. Jonczyk, M.M., Jean, J., Graham, R. et al. Surgical trends in breast cancer: a rise in novel operative treatment options over a 12 year analysis. Breast Cancer Res Treat 173, 267–274 (2019). https://doi-org.sladenlibrary.hfhs.org/10.1007/s10549-018-5018-1

Pre-operative Prospective Evaluation of Patient Reported Outcomes in Breast Cancer Women: How Connected Women Are to Their Breasts Can Dictate the Type of Procedure They Choose.

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PURPOSE: During the decision-making process of operable breast cancer, studies have shown that women will select the procedure that will optimize their quality of life (QOL) i,ii,iii. The PURPOSE of the study is to understand how baseline perceptions could influence procedure choice to guide women in this important decision and optimize post-operative patient reported outcomes (PROS).

METHODS/MATERIALS: This is a prospective longitudinal study of PROS in women undergoing breast cancer treatment at a quaternary cancer center from April 2017 to June 2022. New breast cancer cases undergo tumor board discussion and patients have same-day consultations with various specialties. Based on their procedure choice, women who agree to participate in the study complete pre- operative and post-operative Breast-Q© Lumpectomy (L), Mastectomy (M), or Reconstruction (R) modules and a demographic survey. For the PURPOSEs of analysis, procedure type was divided into L (lumpectomy), LOR (lumpectomy with oncoplastic reconstruction), BM (bilateral mastectomy), UM (unilateral mastectomy), BMR (bilateral mastectomy with reconstruction), UMR (unilateral mastectomy with reconstruction). Individual effects of pre-operative factors on procedure choice were assessed using ANOVA for continuous variables and chi-squared for categorical. Significant factors ($p \leq 0.05$) were added to a multinomial logistic regression model.

RESULTS: 437 women took pre-operative surveys (262 L, 23 LOR, 12 BM, 31 UM, 69 BMR, 40 UMR). Multivariate regressions demonstrated that compared to women undergoing Lumpectomy, pre-operative breast satisfaction scores are 14.7 points lower in lumpectomy with oncoplastic reconstruction ($p \leq 0.004$) and 11.6 points lower in bilateral mastectomy with

reconstruction ($p \leq 0.001$). Pre-operative psychosocial well-being scores are 9.1 point lower in lumpectomy with oncoplastic reconstruction ($p \leq 0.028$) and 7.2 points lower in unilateral mastectomy with reconstruction ($p \leq 0.036$). Pre-operative Physical chest well-being scores are 10.7 points lower in unilateral mastectomy ($p \leq 0.002$) and pre-operative sexual well-being scores are 13.1 points lower in lumpectomy with oncoplastic reconstruction ($p \leq 0.009$).

CONCLUSION: After ensuring optimal oncologic treatment, this data suggests that women with higher pre-operative QOL and satisfaction are more likely to choose less extensive operations to preserve their breasts whereas as women who reported lower baseline scores were more likely to choose more involved or invasive procedures. This data can be used to guide the decision making for women who are faced with multiple surgical options to treat their breast cancer.

REFERENCE:

i Van der Steeg AF, De Vries J, Roukema JA. The value of quality of life and health status measurements in the evaluation of the wellbeing of breast cancer survivors. Eur J Surg Oncol 2008; 34:1225–30.
ii Sackey H, Sandelin K, Frisell J, Wickman M, Brandberg Y. Ductal carcinoma in situ of the breast. Long-term follow-up of health-related quality of life, emotional reactions and body image. Eur J Surg Oncol 2010; 36:756–62.
iii De Gournay E, Bonnetain F, Tixier H, Loustalot C, Dabakuyo S, Cuisenier J. Evaluation of quality of life after breast reconstruction using an autologous latissimus dorsi myocutaneous flap. Eur J Surg Oncol 2010; 36:520–7.

Current Trends in Breast Cancer Treatment in Chinese and Chinese American Women: The Disparity between Mastectomy and Breast Reconstruction

Abstract Presenter
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BACKGROUND: Breast cancer screening and surgical interventions are often underutilized in the Chinese community. For both native Chinese (NC) and Chinese American (CA) patients, screening rates are well below medical recommendations, which places these patients at risk for late diagnoses and larger tumors. There is also a notable aversion to breast reconstruction following mastectomy. We investigated the role of sociodemographic and cultural barriers in breast treatment trends among Chinese breast cancer survivors.

METHODS: A literature search for full-text articles published between 2011 and 2021 was performed using PubMed, The Web of Science, and Embase. The articles that were selected contained information regarding Chinese individuals in the United States or China who had undergone breast cancer screening or diagnosis of breast cancer and received treatment with or without reconstructive surgery.

RESULTS: Both patient populations exhibited screening rates that were significantly lower than national recommendations. Of the CA patients, 25% reported never receiving a mammogram, while 450 million NC have been left unscreened despite the Chinese government's best efforts. Misinformation, cultural beliefs, and fear significantly contributed to diminished breast health care among CA and NC women. Fear of recurrence, breast value, community influence, and limited healthcare resources were found to be the primary drivers of low breast reconstruction uptake.

CONCLUSIONS: In both NC and CA women, it is clear that the quality of care and breast health information needs to be improved. The findings summarized in this review can guide such efforts.

Predictors for Prolonged TE-to-Implant Exchange During Implant-Based Breast Reconstruction: A Single Institution Experience

Abstract Presenter
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BACKGROUND: There are important considerations regarding the timing of TE-to-implant exchange. Once the decision is taken to replace the TE with a definitive implant, symmetrization of the contralateral side and nipple reconstruction can be performed to conclude the reconstructive process and decrease the psychological burden of the oncologic disease and treatment. There is limited evidence regarding the factors causing a prolonged time for tissue expander (TE) exchange into a definitive implant using two-stage implant-based breast reconstruction (IBBR). This study aimed to review our experience with IBBR, focusing on the time for TE-to-implant exchange and determining which factors cause a prolonged time for exchange.

METHODS: A retrospective review was performed to include women undergoing immediate two-stage IBBR with TEs after total mastectomy between January 2011 and May 2021.

Radiation to the expander is known to increase the time for exchange; therefore, reconstructions with irradiated TEs were excluded. Cases with prolonged time for TE-to-implant exchange were defined as those with a time for exchange longer than the 75th percentile of that of the overall study group. Multivariable logistic regression analysis was conducted to determine predictors associated with prolonged TE-to-implant exchange. Multivariable linear regression analysis was conducted to assess the role of early complications and time to conclude outpatient expansions on the time to achieve the expander-exchange.

RESULTS: We included 442 reconstructions in our analysis. The median age for our series was 51-years and the median body mass index was 26.43-kg/m2. The median time for TE-to-implant exchange was 155 days [IQR, 107-232]. Cases that had a prolonged time for TE-to-implant exchange were defined as those undergoing exchange on postoperative day 232 or afterward. Diabetes (OR 4.05, p = 0.006), neoadjuvant chemotherapy (OR 2.76, p = 0.006), an increased length of stay (OR 1.54, p = 0.013), and a lengthier time to complete outpatient expansions (OR 1.018, p <.001) were independently associated with increased odds of a prolonged time for TE-to-implant exchange. On the other hand, the use of two drains versus one (OR 0.4, p = 0.004) and adjuvant radiotherapy to the definitive implant (OR 0.21, p = 0.037) were independently associated with decreased odds of a prolonged TE-to-implant exchange. Multivariable linear regression analysis confirmed the time to complete outpatient expansions to be a significant predictor for the time for TE-to-implant exchange after adjusting for the rate of 30-day periprosthetic infection-related TE explantations and rate of wound disruption-related TE explantations. The time to complete outpatient expansions was positively associated with the time for TE-to-implant exchange in our different models.

CONCLUSION: As evident from our analysis, the time for exchange is highly heterogeneous among patients. Although several factors affect the timing for TE-to-implant exchange, efforts must be directed to finalize outpatient expansions as soon as possible to expedite the transition into a definitive implant.

Fluid Aspiration in Patients with Seroma Following Implant-based Breast Reconstruction

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INTRODUCTION: The goal of this study is to investigate, whether aspiration in patients with fluid collection following implant-based breast reconstruction decreases complication and infection rates.

METHODS: A cohort of 74 patients seen at our institution between 2013 and 2020, who received either tissue expander or implant-based breast reconstruction, and who had fluid identified on ultrasound were analyzed. Patients were divided into groups based on whether the fluid was aspirated, and for sub-analysis, they were further stratified by the number of aspirations they received (i.e., those who received 1-3 aspirations vs. those who received greater than 3). Patient demographics, surgical characteristics, and complications were analyzed using summary statistics, binomial logistic regression, and two-sample z-tests of proportions.

RESULTS: Except for a significantly higher rate of postoperative radiotherapy in patients who had fluid aspirated vs. those who did not (p-value = 0.0322), there were no statistically significant differences in the basic demographic and surgical characteristics of these two groups.

Comparing between patients who had fluid aspirated vs. those who did not, there were significant differences in the overall complication rate (p-value < 0.0001), the infection rate (p-value < 0.001), and the implant explantation rate (p-value = 0.0174). Furthermore, secondary analysis revealed that there were no significant differences between patients who were aspirated only 1-3 times vs. those who received more than 3 aspirations (p-values > 0.05)

CONCLUSIONS: The higher rates of complications in patients who underwent fluid aspiration suggest that aspiration of excess fluid does not attenuate the risk of complications such as infection or need for explantation. This finding runs counter to the common wisdom that aspiration of seromas is a necessary preventative measure to reduce infections and other complications. Future analysis will focus on the relationship among the type of reconstruction, the total volume of fluid aspirated, and the complications profile.

Muscle Sparing Latissimus Dorsi (MSLD) Myocutaneous Flaps with Extended Transversely Oriented Skin Paddles for Breast Reconstruction: a 15-year Retrospective Review Highlighting Technique Refinement

Abstract Presenter
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INTRODUCTION: Latissimus dorsi (LD) myocutaneous flaps are often used for breast reconstruction. Full muscle harvest creates a bulky pedicle with a limited arc of rotation. Thoracodorsal artery perforator (TAP) flaps were introduced 3 decades ago as an alternative to avoid muscle harvest. However, TAP flaps are technically challenging and pose a greater risk for

flap failure. Muscle-sparing latissimus dorsi (MSLD) myocutaneous flaps offer a safer option and are able to carry extended transversely oriented skin paddles reliably.

PURPOSE: We have performed MSLD flaps for over 15 years. Some technique modifications have been implemented: more liberal use of ICG imaging, harvesting a 5 cm anterior latissimus muscle strip, and dissection of the pedicle with doppler probe guidance. We wanted to ascertain how these modifications impacted our RESULTS.

METHODS: We retrospectively reviewed all patients in our practice who underwent MSLD flaps between March 2008 and February 2023 with at least 2 weeks of follow-up. We grouped our patients into two cohorts; 2008-2016 and 2017-2023. We compared the outcomes of the two cohorts. The demographic data and procedure details were tabulated. Patients were categorized as having the procedure for immediate reconstruction, delayed reconstruction, or salvage following failed reconstruction. Cases where indocyanine green (ICG) imaging was used to confirm flap perfusion were identified. Subsequent and ancillary procedures (i.e., fat grafting, vascularized lymph node transfer, and breast reconstruction revisions) were recorded. Post-operative complications and eventual outcomes were evaluated clinically and with photographs.

RESULTS: 619 breasts were reconstructed using MSLD flaps (398 patients). Patients ranged in age between 30 and 82 years. The majority of procedures were performed between the years 2017-2023 (75%). ICG imaging was used more frequently during this period (85.2%) compared to cases done between 2008-2016 (57.8%). Before 2016, MSLD flaps were used more frequently for salvage following failed breast reconstruction. In later years, MSLD flaps were more evenly distributed among immediate, delayed, and salvage type breast reconstructions. Notably, after 2016, there was a significant reduction in the rate of complications from 32% to 20% ($p<0.01$).

CONCLUSIONS:
Our retrospective review demonstrated that complication rates have declined in the past 15 years. Presumably, the technique refinements have contributed to the improvement in outcomes. ICG imaging was used not only to ascertain the viability of flaps but also to debride zones of low perfusion, thus hopefully preventing fat necrosis. Furthermore, ICG imaging demonstrated that a 5 cm anterior muscle harvest, which tapers proximally to an even narrower width, can reliably carry the transversely oriented extended skin paddles. Patient satisfaction and photographic documentation have encouraged us to apply this technique widely. MSLD flaps with extended transversely oriented skin paddles can be safely and reliably used for breast reconstruction when autologous reconstruction is required or preferred.

Effects of Marijuana Use in Elective Breast Surgery: A Retrospective Analysis

Abstract Presenter
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BACKGROUND: Marijuana is the most prevalent recreational drug used in the United States and is available for medicinal prescription in 37 states. Health impact of marijuana has been examined in anesthetic and psychiatric disciplines but has not been investigated in association with surgical outcomes.

METHODS: A retrospective chart review was performed for patients who received a breast reduction from 2013-2022. Data collection included demographics, comorbidities, perioperative data, outcomes, and chart documentation of regular marijuana use. Patients were considered to have peri-operative marijuana use if regular use was clinically documented within a year of surgery. Exclusion criteria included history of breast cancer, oncoplastic reduction, or tobacco use. Statistical analysis included descriptive statistics, t-tests, and Chi-squared analysis.

RESULTS: 413 patients were identified who underwent breast reductions over the 9-year period. 53 (12.8%) had regular marijuana use clinically documented within a year of surgery. Patients with documented regular marijuana use had higher rates of complex wound development post-operatively ($p=0.0025$) and higher pooled complication rate ($p=0.033$) than patients who did not have documented use. There was no difference in average age, BMI, or resection weight between the two cohorts. However, there was no difference between cohorts for individual complications of OR return, infection, or seroma needing drainage.

CONCLUSIONS: Patients with regular marijuana use documented within a year had a higher pooled complication rate post-operatively and were more likely to develop a complex wound. With increasingly widespread use, further research is needed to elucidate the relationship between perioperative marijuana use and surgical outcomes.

Obesity and Taxanes are Independent Risk Factors for Postmastectomy Lymphedema: A TriNetX Based Analysis.

Abstract Presenter
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INTRODUCTION: Postmastectomy lymphedema is the most common cause of secondary lymphedema in the developed world, and it has a significant negative impact on patients' quality of life.

OBJECTIVES: The OBJECTIVE of this study is to define the relationship between BMI and postmastectomy lymphedema, so we can have a better understanding of the disease which could improve the current clinical practice.

METHODS: This study was conducted with anonymized data accessed via the TriNetX platform. All data collection, processing, and transmission were done in compliance with data protection laws applicable to the contributing HCOs. Analysis is performed at HCO with only aggregated RESULTS being returned to the platform. We utilized ICD-10, CPT, and TNX-curated codes to build our cohorts. We compared mastectomy patients who are overweight, obese, or morbidly obese at the time of surgery with those who had a BMI that ranged from 18.5-24.9 kg/m2. The patients were stratified by WHO categories: underweight BMI< 18.5 kg/m2, normal weight BMI 18.5- 24.9, overweight BMI 25- 29.9, Class I obese BMI 30- 34.9, Class II obese BMI 35- 39.9, and obese class III BMI $\geq$ 40. The cohorts were matched by age, sex, race, axillary lymph node dissection, radiotherapy, chemotherapy, hypertension, diabetes mellitus, congestive heart failure, chronic kidney disease, cellulitis, type of mastectomy procedure, type of breast reconstruction. The outcome of interest was development of postmastectomy lymphedema in the first three years after mastectomy.

RESULTS: There were 111,619 mastectomy encounters in the TriNetX database from the year 2000 to 2019, of which, 27,423 patients had BMI index reported on the day of surgery (24.6% of all cases). The mean age at index was 57.3 years (SD 15.2), and 96% were females. The mean BMI for the cohort was 28.8 (SD 6.53). The incidence proportion of postmastectomy lymphedema was lowest in the underweight and normal weight patients (1.719% and 2.296, respectively), while it was the highest in class III obese cohort (5.144%), followed by class I obese (3.978%), class II obese (3.912%), and overweight cohort (3.175%).
After matching, there was an increased risk of postmastectomy lymphedema in overweight (RR 1.265, 95% CI 1.059- 1.513, P= 0.0096), class I obese (RR 1.674, 95% CI 1.399- 2.002, P< 0.0001), class II obese (RR 1.704, 95% CI 1.299- 2.234, P< 0.0001), and class III obese (RR 2.636, 95% CI 1.872- 3.714, P< 0.0001). There was no significant difference in the underweight cohort (RR 0.8, 95% CI 0.44- 1.456, P= 0.4631).
Subsequent analysis revealed increased risk of postmastectomy lymphedema in patients who received taxanes therapy (RR 3.385, 95% CI 3.212- 3.569, P< 0.0001). Hypertension was associated with increased risk of postmastectomy lymphedema (RR 1.36, 95% CI 1.26- 1.469, P< 0.0001). There was no increased risk of lymphedema in chronic kidney disease (RR 1.021, 95% CI 0.869- 1.2, P= 0.7985), or congestive heart failure (RR 1.229, 95% CI 0.997- 1.515, P= 0.0503).

CONCLUSION: Obesity and taxanes are independent risk factors for postmastectomy lymphedema. Therefore, weight reduction interventions should be the focus of future research.

The Role of Thromboelastography In Microsurgical Breast Reconstruction In the Post-COVID Era

Abstract Presenter
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BACKGROUND: Viscoelastic thromboelastography has previously been described as a helpful adjunct in assessing and managing coagulation status in microsurgical breast reconstruction. Prothrombotic effects of the coronavirus as well as the vaccine have been reported in the literature. This study sought to examine any trends in coagulation status pre- and post- COVID-19.

METHODS: A retrospective chart review was conducted all consecutive abdominal free flap breast reconstructions performed during the coronavirus pandemic (February 2020 to October 2021) by a single surgeon; the demographics and coagulation parameters of the pandemic group were then compared against a previously established and published group of consecutive patients collected in 2017. Patient demographics, medical history, clinical, and operative details were documented. Thrombocyte counts, prothrombin time (PT), activated partial thromboplastin time (aPTT), and various TEG parameters were gathered for preoperative, intraoperative, and postoperative time points.

RESULTS: 28 patients (50 free flaps) in the post-coronavirus time period were compared with 100 patients (172 free flaps) in the pre-coronavirus time period. The post COVID-19 cohort had a statistically higher BMI (29.0 ± 4.5 versus 26.9 ± 4.6, p = 0.04) and diabetes rate (5% versus 18%, p = 0.03). Post-COVID-19 patients also had higher preoperative (10709 ± 2123 versus 9486 ± 1904), intraoperative (8042 ± 1568 versus 6929 ± 1664) and postoperative day 1 (10690 ± 2315 versus 8574 ± 1827) TEG-G values, which were not statistically significant once BMI was controlled for.
Post-COVID-19 had one incident of flap congestion secondary to venous mechanical obstruction; the flap was successfully salvaged, yielding a flap loss rate of 0 percent. The pre-COVID-19 had five thrombotic episodes in either artery or vein requiring operative takeback; three flaps were successfully salvaged, yielding a flap loss rate of 1.2 % (2/172 flaps). There was no DVT or PE in either group. Neither vaccination status nor history of COVID-19 infection were associated with increased coagulation or complications.

CONCLUSIONS: TEG remains a useful adjunct for monitoring coagulation status in

microsurgical breast reconstruction. There is an increase in TEG-G both intraoperatively and postoperatively in the post-COVID cohort which can be attributed to increased BMI. These early RESULTS suggest that post-COVID coagulation status does not result in increased flap complications when TEG monitoring is used with the author's previously established perioperative anticoagulation regimen.

Single versus Double Drainage for Immediate Two-Stage Implant-Based Breast Reconstruction: A Propensity Score-Matched Analysis

Abstract Presenter
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BACKGROUND: Reports evaluating plastic surgeons' practices indicate there are conflicting trends regarding the use of one or two drains for implant-based breast reconstruction (IBBR). Therefore, the aim of our study was to perform a matched cohort analysis to examine the postoperative outcomes and complications of immediate IBBR with TEs using two drains versus a single drain. We hypothesized two drains would generate a lower rate of seroma and a shorter time for drain removal compared to a single drain. Furthermore, we evaluated the risk factors associated with seroma formation after two-stage IBBR and we examined predictors associated with increased time for drain removal.

METHODS: A propensity score-matched analysis (nearest neighbor, 1:1 matching) of immediate reconstructions using two versus one drain was conducted. Female patients undergoing immediate two-stage IBBR with TEs between January 2011 and May 2021 were included. To obtain the propensity scores, a multivariable logistic regression model was performed with the number of drains (one drain versus two drains) established as the dependent variable. Reconstructions were matched on the following co-variables: BMI, mastectomy specimen weight, axillary lymph node surgery, TE surface, plane of reconstruction, use of ADM, SPY fluorescence imaging use, and intraoperative TE volume.

RESULTS: After matching using propensity scores, 192 reconstructions were included in the final analysis: 96 in each group. All demographic, oncologic, and surgical variables were comparable between groups. The rate of 30-day complications and overall complications during the first phase of IBBR were comparable between groups. The time for drain removal (13 days versus 13.5 days, p=0.594), time to initiate and finalize expansions, and time for TE-to-implant exchange were comparable between groups. Diabetes (OR 3.74, p=0.025) and an increased estimated blood loss (OR 1.004, p=0.01) were the only independent predictors for seroma

formation. On linear regression analysis, the mastectomy specimen weight (β=0.16, p=0.03) and using nerve blocks (β=0.144, p=0.04) were independent predictors for the duration of drains. Both factors were positively associated with the duration of drain removal.

CONCLUSION: In this matched cohort analysis evaluating the role of one versus two drains for two-stage IBBR we found a comparable rate of complications and surgical outcomes between the two cohorts. Using two drains for immediate IBBR needs to be tailored depending on intraoperative findings.

Comparative Analysis of Immediate and Late Breast Skin Sensitivity in Patients Undergoing Augmentation Mastoplasty Via Inframammary, Periareolar and Axillary approaches

Abstract Presenter
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BACKGROUND: Breast augmentation with silicone gel implants is the most prevalent procedure in aesthetic and reconstructive breast plastic surgery. Among the postoperative complications, deserves attention the sensibility changes in the breast and the areola complex regions. Some studies have reported the incidence
of changes in sensitivity after augmentation mammoplasty to be 30 to 60%1.
Despite the variable incidence, there are few recent studies related to real changes in the incidence of breast sensibility, and in most cases, there is no consensus
among the authors regarding later outcomes of these changes 2-4. Moreover, most METHODS use non-quantitative and subjective evaluation, resulting in controversial and inaccurate RESULTS1.

OBJECTIVE: The present study aims to prospectively
evaluate patients undergoing augmentation mammoplasty using the inframammary, periareolar and axillary approaches, and determine OBJECTIVEly the
sensory changes in the breast region and nipple-areola complex.

METHODS: Fifty one women were submitted to quantitative measures to assess the sensitivity of the breast preoperatively, 1 month and 1 year postoperatively, using the Pressure-Specified Sensory Device (PSSD) system5, comparing static and dynamic sensory thresholds in 9 different regions of the breast and nipple areola complex. Preoperative and postoperative questionnaires were used to evaluate patients' subjective observations on breast sensitivity.

RESULTS: In our series, we observed a reduction in sensitivity of the breasts and nipples statistically significant when preoperative sensory thresholds were compared with postoperative thresholds,
through all three approaches. There were significant differences in sensory RESULTS when we

compared the three different approaches, as well as when we compared the nine regions for each group through the study time period. The periareolar group had the highest sensitivity threshold average alteration after one year. The mammillary region was the only region in which there was no significant change in sensitivity testing 1 year after surgery in all three approaches.

CONCLUSION: This study demonstrated a different sensitivity reduction pattern in the breast region for each group, and the periareolar approach presents the highest potential for breast sensitivity alterations. These changes were mostly temporary and had partial recovery over a period of up to 1 year after surgery. There was some discrepancy between subjective and OBJECTIVE sensibility evaluation. The present study demonstrates sensitivity changes after breast augmentation mammoplasty, which further analysis can contribute with more enlightening information in the informed-consent process of surgery.

REFERENCES:

1. Pitanguy I, Vaena M, Radwanski HN. Relative implant volume and sensibility alterations after breast augmentation. Aesthetic Plast Surg. 2007;31:238-243.
2. Mofid MM, Klatsky SA, Singh NK. Nipple-areola complex sensitivity after primary breast augmentation: A comparison of periareolar and inframammary incision approaches. Plast Reconstr Surg. 2006;117:1694-1698.
3. Okwueze MI, Spear ME, Zwyghuizen AM, et al. Effect of augmentation mammaplasty on breast sensation. Plast Reconstr Surg. 2006;117(1):73-83; discussion 84-8.
4. Banbury J, Yetman R, Lucas A. Prospective analysis of the outcome of subpectoral breast augmentation: Sensory changes, muscle function, and body image. Plast Reconstr Surg. 2004;113:701-707; discussion 708-711.
5. Tassler PL, Dellon AL. Correlation of measurements of pressure perception using the pressure-specified sensory device with electrodiagnostic testing.J Occup Environ Med. 1995;37(7):862-6

Word of the Wise: A Propensity-Matched Comparative Analysis of Breast Reduction Incision Patterns on Clinical Outcomes and Quality of Life

Abstract Presenter
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PURPOSE: Breast reduction is a common plastic surgery procedure that provides an effective and safe option for treatment of functional complaints in addition to its aesthetic value. Historically, techniques and approaches evolved to meet reconstructive goals and enhance aesthetic RESULTS. Two widely used incision patterns in the United States include wise and vertical patterns. There remains a significant knowledge gap regarding differences in clinical and quality of life (QoL) outcomes following breast reduction and these patterns. The PURPOSE of this study is to assess and evaluate clinical and QoL outcomes between vertical and wise pattern breast reductions.

METHODS: A single center, two-surgeon, retrospective review from 2016 to 2022 was performed examining subjects who underwent breast reduction with either vertical or wise incision pattern. A propensity-scored match was performed based on age, body mass index (BMI), ptosis grade, and breast tissue removal. Patients with oncoplastic resection were excluded. Surgical outcomes and patient reported outcomes (BREAST-Q) were compared.

RESULTS: In total, forty-six subjects (23 per group) were identified. The mean age was 31 years and BMI of 26.3 kg/m2. Patients in each cohort were Caucasian (65.2%), African American (30.4%), or mixed (4.3%). Patients that underwent vertical incision were more likely to have the superomedial pedicle utilized (72.7% vs 52.2%;$p<0.05$) and a larger nipple diameter (42mm vs 40.9mm; $p<0.05$). There was no significant difference in ptosis - grade 2 (60.9% vs 65.2%; $p>0.05$), ptosis - grade 3 (21.7% vs 26.1%; $p<0.05$) or tissue removal – Left Breast (563.6 vs 492.7; $p>0.05$), Right Breast (531.6 vs 475.4; $p>0.05$) between vertical and wise technique, respectively. There were no differences in clinical outcomes, aesthetic outcomes, reoperations, readmissions, or emergency room visits ($p>0.05$). QoL analysis identified a significant improvement within both cohorts across domains: satisfaction with breast, psychosocial well-being, and physical well-being ($p<0.001$). However, patients with a wise pattern technique demonstrated a significant improvement in sexual well-being ($p = 0.002$).

CONCLUSION: Vertical and wise pattern breast reductions can be performed safely with minimal surgical complication rates and optimal aesthetic RESULTS. Our study demonstrated a significant QoL improvement following both techniques across multiple domains, however only the wise technique was associated with a significant increase in sexual well-being. This study provides further insight into two techniques utilized with breast reduction and gives plastic surgeons further knowledge to better counsel their patients.

Autologous Breast Augmentation In Post Explantation Mastopexy

Abstract Presenter
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BACKGROUND: In recent years, the cases of patients requesting the removal of breast implants, without replacement or placement of new implants, have increased. Simple removal of breast implants often leads to wide, deflated, and laterally displaced breasts that are notoriously difficult to reconstruct.
The different mastopexy techniques seek to remove excess skin in patients who require additional cosmetic treatment after implant removal.
The objective of this work is to present our experience in breast auto-augmentation with dermoglandular flaps in patients undergoing post-explantation Mastopexy; expose our surgical technique and the RESULTS obtained.

METHODS: Between March 2019 and March 2022, 50 women who underwent explantation of breast implants and subsequent mastopexy using glandular flaps were retrospectively evaluated. Circumvertical and in some cases inframammary approaches were used. Total or partial capsulectomy was performed depending on the case and the characteristics of the periprosthetic capsule. Lateral glandular flaps, superior pedicle flaps, and inferior pedicle flaps were used as autologous breast augmentation in mastopexy. Hemosuctor drainage was left in all patients. All procedures were performed by the authors. Peroperative and demographic variables were analyzed using univariate analysis. Mean follow-up of 12 months.

RESULTS: A total of 50 post breast implants removal mastopexies with auto-augmentation were performed using glandular flaps. Lateral triangular flaps were used in 40 (80%) of patients, superior pedicle flap in 5 (10%) and inferior pedicle flaps in 5 patients (10%). Lipotransference was not performed in any of the cases. Regarding complications, 1 (2%) patient presented postoperative hematoma, 1 (2%) patient presented seroma, 1 (2%) surgical wound dehiscence, and 1 (2%) required surgical revision due to recurrence of breast ptosis.

CONCLUSION: Autologous breast augmentation with dermoglandular flaps provides a reliable way to reorient breast volume and configure the anatomical shape of the breast in patients undergoing mastopexy after breast implant removal.

REFERENCES:

• Gurunluoglu R, Kubek E, Arton J. Dual pedicle mastopexy technique for reorientation of volume and shape after sub- glandular and submuscular breast implant removal. Eplasty 2013;13:e48.
• Gurunluoglu R, Shafighi M, Schwabegger A, Ninkovic M. Secondary breast reconstruction with deepithelialized free flaps from the lower abdomen for intractable capsular contracture and maintenance of breast volume. J Reconstr Microsurg. 2005;21:35–41.
• Hönig JF, Frey HP, Hasse FM, Hasselberg J. Inferior pedicle autoaugmentation mastopexy after breast implant removal. Aesthetic Plast Surg. 2010; 34:447–454.
• Tanna, N., Calobrace, M. B., Clemens, M. W., Hammond, D. C., Nahabedian, M. Y., Rohrich, R. J., ... & Perry, A. D. (2021). Not all breast explants are equal: contemporary strategies in breast explantation surgery. Plastic and reconstructive surgery, 147(4), 808-818.

• Avashia, Y. J., Rohrich, R. J., Gabriel, A., & Savetsky, I. L. (2020). Surgical management of the explant patient: an update on options for breast contouring and volume restoration. Plastic and Reconstructive Surgery, 146(5), 978-985.

Increasing Popularity of Tattoo-Only Nipple-Areola Complex Reconstruction: A 15-Year Retrospective Study

Abstract Presenter
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PURPOSE: Nipple and areolar complex (NAC) reconstruction has been shown to significantly improve patient satisfaction following breast reconstruction. A wide variety of techniques are used depending on patient and provider preference. These can be categorized into surgical reconstruction, tattooing, or a combination of the two. With recent advancements in medical tattooing, there has been a growing interest in tattoo-based METHODS of NAC reconstruction within the breast reconstruction literature. However, to date there are no studies that examine trends in choice of NAC reconstruction method over time. This study aims to quantify recent trends in NAC reconstruction, and explore possible driving factors.

METHODS: A retrospective review was conducted within the plastic surgery department of a single tertiary care hospital. Medical records of patients who underwent post-mastectomy breast reconstruction between January 2007 and December 2021 were reviewed, and those who had any type of NAC reconstruction were included. Demographic and breast reconstruction data were also collected. Patients were divided into three groups based on method of NAC reconstruction used: (1) surgical-only, (2) tattoo-only, and (3) both surgical and tattoo. Trends were assessed in each group using Poisson regression by the year. Associations between demographic variables, breast reconstruction factors, and NAC reconstruction were also assessed.

RESULTS: The study included 138 patients; 17.4% (n=24) of the cohort underwent surgical-only NAC reconstruction, 16.7% (n=23) underwent tattoo-only NAC reconstruction, and 65.9% (n=91) had both surgical and tattoo NAC reconstruction. The mean age was 48 years. Over the course of the 15-year study period, the number of patients receiving tattoo-only NAC reconstruction significantly increased (β=0.173, p<.0001), while the number of patients receiving surgical and tattoo NAC reconstruction significantly decreased (β= -0.064, p=0.007). There were no significant changes in surgical-only NAC reconstruction (β=0.013, p=0.563) or in the total number of patients receiving any type of NAC reconstruction (β=-0.013, p=0.503). Overall rates

of breast reconstruction significantly increased at this institution over the study period (β=0.062, p<0.0001). Breast reconstruction variables such as autologous vs. implant-based reconstruction, unilateral vs. bilateral, number of revisions, and use of radiation therapy were stable over time and were not significantly associated with NAC reconstruction method.

CONCLUSION: For many breast cancer patients, nipple-areola complex reconstruction is an important final step in the breast reconstruction process that improves satisfaction and quality of life. This study demonstrated a significant trend toward tattoo-only reconstruction and away from surgical-only reconstruction over the past 15 years, highlighting the importance of patient access to tattoo-based nipple reconstruction as part of comprehensive breast reconstruction care. In addition, the timing of the trend corresponds well with known advances in nipple tattooing technology and techniques, suggesting that increased tattoo quality could be contributing to these findings. Further study may illuminate additional reasons for this demonstrated increase in popularity of tattoo-based nipple-areola complex reconstruction.

A Comparison of Liposomal Bupivicaine and Ropivacaine in Reduction of Intraoperative Narcotic Use in Reduction Mammaplasty Patients

Abstract Presenter
Diana Yoon-Schwartz MD

BACKGROUND: Intraoperative fentanyl is one of the most frequently administered intraoperative narcotics and may increase the risk of perioperative complications including nausea, constipation, antiemetic use, and respiratory complications. We previously used liposomal bupivacaine to reduce intraoperative fentanyl use. However, it became unavailable for use in our institution and a substitution of plain Ropivacaine was utilized. Previous studies reviewed a significant reduction in intraoperative fentanyl use with liposomal bupivacaine. We wanted to see if there was a difference in intraoperative Fentanyl use between liposomal bupivacaine and Ropivacaine.

METHODS: A case matched review of 68 (34 in each group) reduction mammplasty patients was performed. We analyzed the total use of intraoperative fentanyl use in patients with intraoperative administration of liposomal bupivacaine vs. patients injected with Ropivacaine. All patients received IV Tylenol prior to reversal.

RESULTS: Intraoperative administration of liposomal bupivacaine vs. Ropivacaine showed no significant difference in intraoperative fentanyl use (P value 2.2608).
Ropivacaine is an amide local anesthetic with an action time longer that that of lidocaine.

CONCLUSIONS: Prior studies revealed that liposomal bupivacaine significantly reduces intraoperative fentanyl use. This recent reveals that Ropivacaine can be utilized as a substitute for liposomal bupivacaine where unavailable. Initial data reveal an increase in the use of postoperative oral narcotics in the Ropivacaine group vs. the liposomal bupivacaine group. This

may be due to the 3-6 hour duration of Ropivacaine vs. 24-72 hour druation of liposomal bupivacaine.

A Single Center Comparison of Surgical Outcomes Following Prepectoral and Subpectoral Implant-Based Breast Reconstruction.

BACKGROUND: Prepectoral implant placement continues to gain widespread acceptance as a safe and effective option for breast reconstruction. Recent advances in surgical techniques have stimulated renewed interest, including refinements in mastectomy procedures and the advent of mesh to improve lower pole shape and projection. It is also believed to mitigate the effects of radiation, including reconstructive failure and muscle fibrosis. Current literature demonstrates comparable rates of complications and revisional surgeries between prepectoral and subpectoral placement; however, these studies are often underpowered and lack long-term follow-up.

METHODS: We performed a retrospective cohort study of patients who underwent immediate two-staged tissue expander or direct-to-implant breast reconstruction with the use of acellular dermal matrix at a single center from January 2017 to March 2021. Cases were divided into prepectoral and subpectoral cohorts. Baseline patient characteristics were obtained. The primary outcomes were any postoperative complication and rate of secondary procedures. Secondary procedures were defined as fat grafting, breast mound revisions, and conversion to autologous flaps. Univariate and multivariable regression models were used to assess risk associations between the type of reconstruction and outcomes of interest. A subgroup analysis was performed to compare outcomes in those who received adjuvant radiation.

RESULTS
We identified 996 cases (570 females), of which 97% of patients completed reconstruction. These were divided into prepectoral (n=391) and subpectoral (n=605) cohorts. Mean follow-up was 24 and 14 months for two-stage tissue expander and direct-to-implant reconstruction, respectively. The prepectoral cohort underwent a higher rate of direct-to-implant reconstructions and had higher initial fill volumes at the time of tissue expander placement. The subpectoral group underwent a higher rate of prior breast surgeries and higher rate of expander to implant exchange. Univariate analysis demonstrated a higher rate of any complications ($p<0.001$) with prepectoral breast reconstruction, including both major ($p<0.001$) and minor ($p=0.02$) complications. Secondary procedures after implant exchange were overall higher in the subpectoral cohort (<p

CONCLUSION
This study evaluated surgical outcomes in patients undergoing either prepectoral or subpectoral breast reconstruction from a single center with long-term follow-up. Prepectoral placement was shown to have an inferior complication profile compared to subpectoral placement, with no difference in secondary procedures. These findings require validation with a well-designed randomized controlled trial to establish best practice for implant-based breast reconstruction. </p

Abstract Presenter

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Complications and survival outcomes in Oncoplastic Surgery versus Mastectomy: A National Database analysis

Abstract Presenter
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BACKGROUND:
Oncoplastic surgery (OPS) in breast cancer facilitates high-volume excision while optimizing the aesthetic result. These techniques are cost effective (1) and have improved patient satisfaction compared to other surgeries. The reported frequency of short-term complications associated with OPS is low , but there is little evidence that compares these findings to mastectomy. Our aim was to compare the frequency and risk factors of postoperative complications between OPS and mastectomy. As a secondary objective, we determined breast cancer-specific survival differences between both procedures.

MATERIALS AND METHODS: Patients with breast cancer were identified from the Surveillance, Epidemiology, and End RESULTS (SEER) Medicare Database from 2012 to 2017. We included females with stages I-II breast cancer who underwent oncoplastic surgery with radiotherapy and mastectomy without radiotherapy. Complications with ICD-9/10 and procedures with CPT (Computer Procedural Terminology) codes were obtained from the MEDPAR, outpatient, and NCH databases. Descriptive statistics were performed, chi-square and t-student tests were used for qualitative and quantitative analysis, respectively. Logistic regression analysis was used to assess risk factors for overall and individual complications.

RESULTS: Of 53,649 patients identified, 73.2% of patients were ≥65 years old (median:69,

range: 23-100). OPS and mastectomy were performed in 1,053 (2%) and 52,596 (98%) patients respectively. The majority of patients had invasive ductal carcinoma (73.3%), low-intermediate grade (67.4%), and HR+/HER2 negative (63.5%). 57.2% and 52.8% were diagnosed in stage I and II, respectively. OPS was performed more frequently in white race (89.4% vs 80.3%, $p<0.001$), married patients (59.5% vs. 50.9%, $p< 0.001$), low-intermediate histologic grade tumors (75.1% vs. 71.9%, $p=0.029$). Mastectomy was more commonly performed for triple-negative tumors (10.9% vs 6.8%, $p=0.001$), patients with poverty indicator ≥10% (52.1% vs 41.8%, $p<0.001$), and stage II (42.9% vs. 37.3%, $p<0.001$). Complications were reported in 2.1% patients, regardless of procedure type with no significant difference. (OPS 1.9% vs. mastectomy 2.1%, $p=0.64$). Similarly, no differences were found in seromas (0.6% vs. 0.3%, $p=0.052$), hematomas (0.9% vs. 1.0%, $p=92$), infection (0.3% vs. 0.7%, $p=0.11$), wound dehiscence (0.1% vs 0.2%, $p=0.35$), or microvascular complications (0% vs.0.1%, $p=0.39$). Multivariate analysis demonstrated that procedure type was not a risk factor for overall (OPS vs. mastectomy, OR=0.97, 95% CI:0.60-1.58, $p=0.90$) or individual complications. Independently to the stage, patients who underwent OPS had better breast cancer-specific survival (BCSS) with a median follow-up of 49 months compared to mastectomy at 5 years follow-up (Stage I:98.9% vs. 96.6% $p=0.006$; Stage II: 96.6% vs. 89.8%% $p<0.001$).

CONCLUSIONS: Oncoplastic surgery has demonstrated a low incidence of surgical short-term complications which are comparable to mastectomy in stages I-II breast cancer patients. Moreover, OPS has shown to favor BCSS over mastectomy independently to the stage at diagnosis. Further prospective studies are needed to assess whether this trend continues with locally advanced breast cancer and long-term oncologic outcomes.

REFERENCES

1) Chatterjee A, Asban A, Jonczyk M, Chen L, Czerniecki B, Fisher CS. A cost-utility analysis comparing large volume displacement oncoplastic surgery to mastectomy with free flap reconstruction in the treatment of breast cancer. Am J Surg. 2019 Sep;218(3):597-604.

Learning curve for robotic-assisted harvest of deep inferior epigastric perforator flap: Comparison between a general surgeon and a plastic surgeon performing the robotic dissection

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INTRODUCTION: The deep inferior epigastric perforator (DIEP) flap is the preferred method for autologous breast reconstruction following mastectomy, though it risks development of hernia, bulge, or decreased core strength.1 Robotic-assisted surgery began in the 1980s and has quickly evolved to become gold standard in many fields.2 Robotics have also begun to be utilized in plastic surgery. We are successfully performing robotic-assisted intracorporeal harvest of DIEP vessels to limit abdominal wall morbidity through smaller fascial incisions and preservation of motor nerves when compared to standard DIEP.3 Traditional DIEP flap reconstruction is already a demanding and time-consuming operation, and surgeons with limited robotic experience may initially be hesitant to attempt robotic harvest. This study shows the expected learning curve (LC) for surgeons interested in incorporating this into their practice and to compare the LC between a single general surgeon (GS) and plastic surgeon (PS).

METHODS: A retrospective cohort study was performed for patients who underwent robotic DIEP flap harvest from October 2021 through September 2022. We evaluated robotic pedicle dissection time (DT) and compared the times between a GS and PS. We calculated LC for each surgeon using the cumulative sum (CUSUM) method. CUSUM is the summation of differences between DT for each patient and the mean DT for all patients, CUSUM = ∑_(i=1)^n(xi-⎯(μ)). LC was identified as the peak of the CUSUM curve.

RESULTS: 44 flaps were performed during the collection period: 27 by the PS, 17 by the GS. There was no significant difference in DT between the GS (34.8 min) and PS (41.2 min) (p value=0.232), and while both surgeons saw a decrease in DT over time, the DT time for the GS decreased more quickly. Using the CUSUM method, we see the peak of the curve at patient 8 for the PS and the peak of the curve at patient 5 for the GS, after which cumulative DT decreased. There were no intraabdominal or pedicle injuries in any of these patients.

CONCLUSION: As robotic harvest of DIEP flaps becomes accepted, surgeons who wish to incorporate our technique into their practice can expect to have a consistent decrease in their DT after 10 cases. Plastic surgeons can safely and proficiently uptake the minimally invasive technique with a similar learning curve compared to robotic trained general surgeons.

REFERENCES

1. EA Bailey and SN Bishop. (2023). Minimally Invasive Surgery in Breast Reconstruction: The Past and Future. Breast Cancer Updates [Working Title]. Doi: 10.5772/intechopen.109503
2. G Garas and A Arora. Robotic Head and Neck Surgery: History, Technical Evolution and the Future. ORL 2018; 80(3-4):117-124. Doi: 10.1159/000489464
3. EA Bailey, B Chen, W Nelson, S Nosik, R Fortunato, A Moreira, D Murariu. Robotic versus Standard Harvest of Deep Inferior Epigastric Artery Perforator Flaps: Early Outcomes. PRS - Global Open 2022; 10(10S):p 64-65. Doi: 10.1097/01.GOX.0000898644.00762.77

Implementing Artificial Intelligence to Enhance Breast Reconstruction Outcomes: A Systematic Review

Abstract Presenter

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BACKGROUND: Artificial intelligence (AI) offers an approach to predictive outcomes using machine learning (ML) algorithms for pattern recognition1,2 and decision-making3,4 that can be used to prevent undesirable RESULTS.5 This systematic review aimed to evaluate the usefulness of AI in breast reconstruction.

METHODS: A systematic review was conducted in August 2022 following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The MEDLINE, EMBASE, SCOPUS, and Google Scholar online databases were queried to capture all publications studying the use of artificial intelligence in breast reconstruction.

RESULTS: After removing duplicates, 23 studies were full-text screened, with 12 fulfilling our inclusion and exclusion criteria. Almost all of these studies utilized ML as the AI technique implemented. The ML algorithms employed for predicting neuropathic pain, lymphedema diagnosis, microvascular abdominal flap failure, donor site complications related to muscle sparing Transverse Rectus Abdominis flap, surgical complications, financial toxicity, and patient-reported outcomes after breast surgery demonstrated that AI is a reliable tool for predicting patient RESULTS. Moreover, one study used Computer Vision technology to aid in the Deep Inferior Epigastric Perforator Artery flap design, significantly reducing the preoperative time compared to manual identification.

CONCLUSION: AI can benefit breast reconstruction surgery by optimizing preoperative patient counseling to predict potential adverse outcomes. This, in turn, enables timely interventions and reduces the post-operative burden, resulting in optimal outcomes and increased patient satisfaction.

REFERENCES

1. Badillo S, Banfai B, Birzele F, et al. An Introduction to Machine Learning. Clin Pharmacol Ther. Apr 2020;107(4):871-885. doi:10.1002/cpt.1796
2. Lou SJ, Hou MF, Chang HT, et al. Machine Learning Algorithms to Predict Recurrence within 10 Years after Breast Cancer Surgery: A Prospective Cohort Study. Cancers (Basel). Dec 17 2020;12(12)doi:10.3390/cancers12123817
3. Yin J, Ngiam KY, Teo HH. Role of Artificial Intelligence Applications in Real-Life Clinical Practice: Systematic Review. J Med Internet Res. Apr 22 2021;23(4):e25759. doi:10.2196/25759
4. Liang X, Yang X, Yin S, et al. Artificial intelligence in plastic surgery: applications and

challenges. Aesthetic Plastic Surgery. 2021;45(2):784-790.
5. Fu MR, Wang Y, Li C, et al. Machine learning for detection of lymphedema among breast cancer survivors. Mhealth. 2018;4:17. doi:10.21037/mhealth.2018.04.02

Soft Tissue Support in Prepectoral Tissue Expander Reconstruction: Do We Need It?

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PURPOSE: Preprectoral breast reconstruction has several proposed advantages including reduced pain, morbidity, and subsequent animation deformity. Adequate control of the mastectomy pocket with proper positioning of the breast prosthetic is essential in these cases. Soft tissue support (STS), such as acellularized dermal matrix (ADM), has contributed to the rise of prepectoral breast reconstruction by facilitating the ability to shape the prepectoral breast pocket. Its use, however, introduces added cost to the initial reconstruction and continual investigation of its utility and outcomes is warranted. This study assesses the impact of using STS in prepectoral breast reconstruction.

METHODS: A chart review of all consecutive, prepectoral tissue expander reconstructions performed between March 2017 and July 2022 at a single center was conducted. Patients from a total of 5 distinct breast surgeons and 5 plastic surgeons were included. Demographics, operative characteristics, and complications were extracted for all patients. Major complications were defined as any complication involving the breast that required readmission or reoperation while minor complications included any breast complication requiring outpatient antibiotics, procedures, or wound care. Multivariate logistic regression was used to predict complications while controlling for STS. A $p<0.05$ was considered statistically significant.

RESULTS: A total of 184 patients (292 breasts) were included. STS was used in 61 (21%) breasts. Type of STS included ADM (77%), ADM and vicryl mesh (3%), polydioxanone mesh (13%), and other (7%). On average, women were 53 years old, non-smoker (99%), non-diabetic (91%), and had a body mass index of 28. All breasts underwent immediate reconstruction following prophylactic mastectomies in 33% and therapeutic mastectomies in 67% of cases. The majority of mastectomies were skin sparing (61%), followed by nipple sparing (24%), simple

(12%) and other (3%). Seventy-one (24%) breasts were radiated (77% adjuvant, 20% prior radiation, 3% both), and 89 (48%) patients received chemotherapy (19% adjuvant, 4% neoadjuvant, 1% both). Average follow up was 27 months. Median mastectomy weight was 551 grams, average intraoperative TE fill was 194 ± 163 ccs, and average final TE fill was 416 ± 159 ccs; none of these differed by the use of STS. Major complications occurred in 61 (21%) breasts while minor complications occurred in 85 (29%) of breasts. On univariate analysis, STS was associated with fewer minor complications (15% vs. 33%, $p<0.01$). In multivariable models controlling for age, BMI, mastectomy weight, radiation, intraoperative TE fill, and soft tissue support, STS was associated with fewer minor complications (OR 0.36 [0.16-0.76], $p=0.01$) and a weak association with fewer seromas (0.40 [0.14-1.11], $p = 0.08$) and a lower rate of explantation (0.40 [0.13-1.02], $p = 0.08$).

CONCLUSION: In this study, STS use in prepectoral tissue expander reconstruction reduced postoperative complications in the immediate postoperative period. Further investigation is warranted to analyze overall costs and long-term reconstructive and aesthetic outcomes between these two cohorts.

Ketorolac Safety in Breast Free Flap Surgery: Clinical Bleeding Risk Not Increased

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BACKGROUND: Ketorolac is a well described adjunct in peri-operative pain control and enhanced recovery after surgery protocols. Ketorolac's mechanism of action functions as analgesic and platelet aggregation inhibitor. A recent study suggests ketorolac is not associated with increased hematoma risk in reconstructive breast procedures. However, only 11 patients underwent autologous reconstruction and the type of autologous reconstruction is not specified.1 An assessment of transverse rectus abdominus flaps from the year 2000 demonstrates no increased hematoma risk postoperatively, yet excludes deep inferior epigastric perforator (DIEP) flaps.2 Ketorolac is yet to become fully adopted in free tissue transfer surgery due to procedures involving large surface areas, extensive soft tissue undermining, and donor site morbidity. Complications related to ketorolac administration remain poorly described in breast free flap surgery. Our study aims to examine the impact of ketorolac on complications and free flap outcomes in DIEP based breast reconstruction.

METHODS: An IRB approved retrospective chart review was completed for 525 patients who

underwent DIEP free flap breast reconstruction from January 2019-March 2022. Patients were separated based on whether they received ketorolac perioperatively or not. Analysis was completed using Chi-Squared testing and multivariate regression.

RESULTS: We describe RESULTS from 525 patients, and 863 DIEP flaps for breast reconstruction. Peri-operatively 94 patients received ketorolac and 431 patients did not. Regarding patient demographics, the ketorolac group had an average age of 47.8 years, the non-ketorolac group averaged 51.4 years ($p< 0.05$).
The overall incidence of patients who received ketorolac and developed a clinical hematoma was 5.3% compared with 5.3% in the non-ketorolac group ($p > 0.05$). The incidence of hematoma requiring operative intervention was 4.3% in the ketorolac group compared with 2.6% in the non-ketorolac group ($p>0.05$).
There was a significantly higher rate of skin necrosis in the ketorolac group. The difference in rates of skin necrosis was no longer observed when controlling for smoking. No difference was observed in free flap failure rates. No difference was observed in fat necrosis, partial flap loss, microvascular complications and PE/DVT. Mean length of follow up of the ketorolac group was 265.6 days and the non-ketorolac group was 310.4 days.

CONCLUSION: No significant differences in bleeding complications were identified when comparing patients who received ketorolac and those who did not. This data set represents the largest analysis of ketorolac effects in breast free flap surgery to date. The concern for increased bleeding complications is not borne out in a large data set. There was no difference in overall free flap failure. Ketorolac should be integrated and thoughtfully used perioperatively in breast free flap reconstruction without concern for increased bleeding complications secondary to ketorolac administration.

REFERENCES:
1. Nguyen BN, Barta RJ, Stewart CE, Heinrich CA. Toradol following Breast Surgery: Is There an Increased Risk of Hematoma? Plast Reconstr Surg. 2018 Jun;141(6):814e-817e. doi: 10.1097/PRS.0000000000004361. PMID: 29750761.
2. Sharma S, Chang DW, Koutz C, Evans GR, Robb GL, Langstein HN, Kroll SS. Incidence of hematoma associated with ketorolac after TRAM flap breast reconstruction. Plast Reconstr Surg. 2001 Feb;107(2):352-5. doi: 10.1097/00006534-200102000-00009. PMID: 11214049.

Acellular Dermal Matrix Thickness and Outcomes in Prepectoral Implant-Based Breast Reconstruction

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PURPOSE: The introduction of acellular dermal matrix (ADM) revolutionized prepectoral breast reconstruction by providing a barrier of support between an implant and a relatively thin mastectomy flap. Despite its current widespread in breast cancer patients, previous studies have associated ADM with increased rates of various complications including seroma, infection, and reconstructive failure. Only two existing studies have previously evaluated the influence of ADM thickness on reconstructive outcomes, both of which have conflicting CONCLUSIONs regarding safety.1,2 The PURPOSE of this study is to evaluate whether ADM thickness has an impact on surgical outcomes of prepectoral implant-based breast reconstruction.

METHODS: The authors completed a retrospective review of breast reconstruction cases from six surgeons at a single institution over a five-year period from January 2017 to December 2022. Only patients that received prepectoral implant-based reconstruction with ADM were included for further analysis. Information including the number of stages and the timing of reconstruction was extracted from patient charts. The incidence of four separate complications (infection, wounds or dehiscence, seroma, hematoma) was determined, in addition to the rates of reoperation for a complication and implant removal.

RESULTS: A total of 547 patients received 849 prepectoral breast reconstructions. Of these patients, 281 received direct-to-implant (DTI) reconstruction (%) while the remaining 266 patients (%) underwent staged tissue expander (TE) reconstruction. Average patient age was 52.8 years and body mass index 26.9 kg/m2. Twenty percent of all patients (n=113) developed one of the evaluated complications, with 18% (n=97) requiring reoperation and 15.6% (n=80) necessitating operative implant removal. Patients with medium thickness ADM had significantly fewer complications than patients with either thick (29% vs 48%; $p<0.0004$) or extra-thick ADM (29% vs 54%; $p<0.0001$). Compared to extra-thick ADM specifically, patients that received medium thickness ADM had fewer infections, which approached significance (13% vs 20%; $p=0.0652$). Medium thickness ADM was also associated with significantly fewer incidences of wounds or dehiscence compared to both thick (14% vs 39%; $p<0.0001$) or extra-thick ADM (14% vs 43%; $p<0.0001$). DTI reconstruction had an impact on reconstructive outcomes only in the extra-thick ADM cohort, with patients that received DTI and extra-thick ADM having a significantly greater incidence of overall complications ($p<0.0069$), wounds ($p<0.0028$), and reoperation ($p<0.0221$) compared to patients that received staged TE reconstruction.

CONCLUSION: Patients that receive prepectoral implant-based breast reconstruction with medium thickness ADM may have fewer overall complications and incidence of wounds or dehiscence compared to patients that receive thicker ADM variations. Significant differences in the rate of complications for patients that received DTI versus staged TE expander reconstruction were only observed in patients with extra-thick ADM. Further prospective and randomized studies are warranted to definitively establish the relationship between ADM thickness and

reconstructive outcomes.

1. Rose JF, Zafar SN, Ellsworth Iv WA. Does acellular dermal matrix thickness affect complication rate in tissue expander-based breast reconstruction? Plast Surg Int. 2016;2867097.
2. Hong SE, Kim JH. The relationship of human acellular dermal matrix thickness on complication rate and patient-reported outcomes in implant-based immediate breast reconstruction. Gland Surg. 2021;10:90-100.

Immediate Pre-Pectoral Tissue Expander Breast Reconstruction in the Outpatient Setting – Is there a Difference in Patient Outcomes?

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BACKGROUND: Pre-pectoral breast reconstruction has led to lower post-operative pain scores and a trend towards earlier patient discharge.1,2 Additionally, since the rise of the COVID-19 pandemic in 2020, there has been a significant transition of mastectomies and alloplastic breast reconstruction to the outpatient setting.3 The goal of this study was to evaluate the feasibility and outcomes of outpatient pre-pectoral tissue expander reconstruction.

METHODS: A retrospective review was performed of all patients undergoing mastectomy with immediate pre-pectoral tissue expander reconstruction at a single institution from January 2018 to July 2022. Autologous reconstruction and direct-to-implant cases were excluded. Patient demographics, oncologic and reconstructive characteristics, and post-operative outcomes were recorded. Categorical variables were compared using Fisher exact tests and continuous variables were analyzed using Kruskal-Wallis and Wilcoxon rank-sum tests.

RESULTS: A total of 295 patients and 499 breast reconstructions were analyzed. Median follow-up time was 11 months (interquartile range 6.0-18.0). 259 patients (88%) were treated at the main inpatient hospital and 36 (12%) were treated at the outpatient surgery center, which has overnight observation capabilities. The two groups were not significantly different in BACKGROUND characteristics, comorbidity scores, or type of mastectomy received (skin-sparing, nipple-sparing, or modified radical). Rate of acellular dermal matrix use was higher in

the inpatient hospital group compared to the outpatient surgery center group (96% vs 86%, p=0.015). There was a significantly higher rate of same-day discharge among patients treated in the outpatient surgery center (8% vs 39%, p<0.001). Post-operative rates of chemotherapy and radiation therapy were comparable between the two groups. Major complications, including infection, hematoma, seroma, or mastectomy flap necrosis requiring readmission or return to the operating room, were similar between the inpatient hospital and surgery center groups (21% vs 19%, p=0.850). Subgroup analysis of patients treated during the COVID-19 pandemic (after March 2020) similarly revealed no significant difference in major complications between the inpatient hospital and surgery center groups (21.8% vs 17.3%, p=0.465). Median time to final implant placement was not significantly different between the two groups (5.0 months vs 4.0 months, p=0.181). Rate of revision surgery after implant exchange was similar in the two groups (17% vs 9%, p=0.213).

CONCLUSIONS: Patients undergoing immediate pre-pectoral breast reconstruction in the outpatient setting experience no significant difference in post-operative complications, time to final reconstruction, and number of revision procedures compared to patients treated in the inpatient setting. These findings support the safe transition of immediate pre-pectoral breast reconstruction to the outpatient setting.

REFERENCES

1. Walia GS, Aston J, Bello R, et al. Prepectoral Versus Subpectoral Tissue Expander Placement: A Clinical and Quality of Life Outcomes Study. Plast Reconstr Surg Glob Open. 2018;6(4). doi:10.1097/GOX.0000000000001731
2. Li Y, Xu G, Yu N, Huang J, Long X. Prepectoral versus subpectoral implant-based breast reconstruction: A meta-analysis. Ann Plast Surg. 2020;85(4):437-447. doi:10.1097/SAP.0000000000002190
3. Rubenstein RN, Stern CS, Plotsker EL, et al. Effects of COVID-19 on mastectomy and breast reconstruction rates: A national surgical sample. J Surg Oncol. 2022;126(2):205. doi:10.1002/JSO.26889

The effect of intraoperative antibiotic/antiseptic irrigation and immersion in prosthetic based breast reconstruction- a single center prospectively designed retrospective study

Abstract Presenter
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INTRODUCTION: Surgical site infection (SSI) is one of the leading causes for post-op complications in implant-based breast reconstruction. Currently there is no consensus on the appropriate prophylactic use of antibiotics and antiseptics in implant-based breast reconstruction. This study aims to investigate the effectiveness of intraoperative antibiotic/antiseptic irrigation and immersion in prosthetic-based breast reconstruction.

PATIENTS AND METHODS: A single-center prospectively designed retrospective study was

performed in the breast reconstruction department in Tianjin Medical University Cancer Institute and Hospital. Women were eligible for inclusion if they received prosthetic-based immediate or delayed breast reconstruction with or without bio-prosthetic matrix or synthetic mesh. Intravenous prophylactic cephazolin was administered 30 minutes prior to the operation, an additional bolus of intravenous cephazolin was administered at 3 hours after startup. Patients were excluded if preventative intravenous or oral antibiotics were given postop upon no suspicion or proof of infection. Three treatment groups were assigned for intraoperative antibiotic/antiseptic intervention. In group A, breast prosthetic was immersed with saline only, and breast pocket was irrigated with 10% povidone-iodine (PVI) followed by saline. In group B, breast prosthetic was immersed with cephazolin for 10 min and breast pocket was irrigated with 10% PVI followed by saline. In group C, breast prosthetic was immersed with cephazolin and breast pocket was irrigated with 10% PVI followed by cephazolin and afterwards saline. Clindamycin was used if patients were allergic to cephazolin. The primary outcome was SSI within 6 months post-op, and capsular contracture at least 12 months post-op. Breast-Q satisfaction questionnaires were regularly collected at 12-months post-op follow-up. Regression analysis was performed to identify risk factors associated with SSI.

RESULTS: From August 2018 to November 2021, 324 patients were included in the study (108 in each group). Patient demographics and treatment variables were not significantly different among the groups. The total complications were similar in each treatment group (23.1% vs. 18.5% vs. 25.0%, P=0.5). The occurrence of SSI was 8.3% (9/108), 6.5% (7/108), and 8.3% (9/108) in group A, B and C, respectively, and no significant difference was noted (P=0.83). Prosthetic explantation rate was also similar (1.9% vs. 0.0% vs. 4.6%, P=0.07). The rate of capsular contracture showed a higher percentage in group A, but the difference didn't reach significant level (10.4% vs. 4.6% vs. 8.7%, P=0.27). Breast-Q Questionnaire follow-up at 12-month post-op did not differ regarding patient reported satisfaction with implant and with breast. Multivariate analysis showed age, neoadjuvant chemotherapy, specific surgeon and mastectomy flap necrosis were risk factors associated with significant occurrence of surgical site infection.

CONCLUSION: Pocket irrigation with 10%PVI followed by saline was adequate in preventing SSI. Adding single cephazolin in prosthetic immersion might provide benefits in reducing the long-term capsular contracture. Patients with higher age and history of neoadjuvant chemotherapy should be notified of increased chances of SSI, while compulsory surgeon's training in both mastectomy and reconstruction were advocated to reduce severe post-op complications.

Investigating the microbiome in implant-based breast reconstruction: A novel technique to broaden our understanding of implant infections

Abstract Presenter
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INTRODUCTION: While infections in post-mastectomy breast reconstruction are prevalent and morbid, they remain poorly understood. Recently, with the evolution of microbiome science, studies have used 16S rRNA sequencing to examine and define the local breast microbiome, but this has not been investigated with respect to breast reconstruction and outcomes. Peri-expander fluid can be readily collected in patients with a dual port tissue expander, which could allow us to define the local microbiome at any given time point. This study aimed to determine the feasibility of obtaining microbiome data from peri-expander fluid.

METHODS: We designed a pilot study including patients who were scheduled to undergo mastectomy with two-stage implant-based reconstruction using dual port tissue expanders. The peri-expander fluid was obtained by accessing the aspiration port during standard post-operative visits, and this fluid was stored in a 1:1 ratio with DNA/RNA shield at -20 degrees Celsius. The microbiome of each sample was defined using 16S rRNA microbiome sequencing.

RESULTS: Five samples from four patients were sequenced to determine feasibility of obtaining microbiome data from the peri-expander aspirates. We were successful in obtaining microbiome data from all aspirates. Our RESULTS indicate that there are a large range of genera represented, but four genera appear to be the most pervasive: Burkholderia, Staphylococcus, Pseudomonas, and Streptococcus.

CONCLUSION: It is feasible to perform microbiome sequencing of peri-expander aspirates to define the local environment. Rather than focusing on eliminating certain bacteria with antibiotics, it may be more impactful to optimize the balance of the breast microbiome.

Are prophylactic post-operative antibiotics indicated for implant-based breast reconstruction?: A randomized-controlled pilot study

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INTRODUCTION: Implant infections are a significant cause of morbidity after mastectomy with tissue expander placement, with reported infection rates ranging from 5.8% to 28%. Many plastic surgeons opt to give post-operative prophylactic antibiotics to these patients, however there is inconclusive data regarding whether this practice leads to reduced infection rates.

METHODS: We designed a two-armed randomized-controlled trial in patients undergoing mastectomy with immediate tissue expander reconstruction. One cohort (24 hours) received standard pre-incision antibiotics and 24 hours of peri-operative antibiotics, while the other cohort (7 days) received the standard antibiotics and additionally seven days of post-operative antibiotics (cephalexin 500mg qid). Patients were followed for clinical signs of infection for at least ninety days. Data on infection rates and treatment types were collected and compared between cohorts.

RESULTS: Thirty-nine patients were enrolled in the study. Twenty patients (32 breasts) were randomized to receive 24 hours of antibiotics, while 19 patients (32 breasts) were randomized to receive seven days of antibiotics. Five breasts in the 24 hours cohort had any infection (15.6%), compared to 11 breasts (34.4%) in the seven days cohort (p=0.083). All breasts that were treated with intravenous antibiotics ultimately required re-operation with tissue expander removal, including four breasts in the 24 hours cohort (12.5%), compared to eight breasts (25%) in the seven days cohort (p=0.200). Mean time from tissue expander placement to removal was 51.80+/-45.01 days in the 24 hours cohort, compared to 79.70+/-69.80 days in the seven days cohort (p=0.441).

CONCLUSION: Within our small pilot study, we found no significant differences in infection rates between groups of patients who received 24 hours compared to seven days of prophylactic antibiotics. Interestingly, rather than seeing a protective effect from a longer course of antibiotics, there was a trend toward increased infection rates and more delayed infections in the group of patients receiving seven days of prophylactic antibiotics.

Conventional versus Robot-Assisted Implant-Based Breast Reconstruction: Reconstructive Outcome and Patient-reported Outcome Measures

Abstract Presenter
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BACKGROUND: This study compared conventional and robot-assisted mastectomy and breast reconstruction. To the best of our knowledge, this is the first study that reports the RESULTS of robot-assisted mastectomy and breast reconstruction and compares the patient-reported outcomes.

METHOD: A retrospective study included 473 breasts from 423 patients who underwent a conventional mastectomy and breast reconstruction and 164 breasts from 153 patients who underwent a robot-assisted mastectomy and breast reconstruction from July 2019 to October 2021. Demographic and oncologic data, reconstructive outcomes, and patient-reported outcomes

(BREAST-Q) were evaluated. The RESULTS of implant-based and autologous breast reconstruction were separately evaluated.

RESULTS: Skin necrosis requiring surgical debridement was significantly higher in the conventional group (8.0%) than that in the robot-assisted group (2.0%) in implant-based reconstruction ($p = 0.035$). At 6–12 months, a greater sexual well-being score in implant-based reconstruction and a greater physical well-being score in autologous breast reconstruction was observed in patients who underwent robot-assisted breast reconstruction than in those who underwent conventional breast reconstruction in the BREAST-Q questionnaire.

CONCLUSION: Robot-assisted mastectomy and breast reconstruction showed lower skin necrosis and better patient-reported outcomes (sexual well-being in implant, physical well-being in autologous). Therefore, this study found that robotic surgery could be a good option for mastectomy and breast reconstruction.

Investigating Same-Day Discharge For Postmastectomy Immediate Breast Reconstruction: A National Surgical Quality Improvement Program Study

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BACKGROUND: Commonly, patients reconstructed with tissue expanders immediately after mastectomy are admitted for monitoring after surgery. This approach offers direct post-operative monitoring and pain control, however, comes with unique risks such as hospital-acquired infection and psychosocial effects of admission. Same-day discharge may represent a reasonable approach in immediate breast reconstruction that could conserve resources, mitigate risk, and return the patient more quickly to their home environment to begin recovery.

METHODS: A retrospective review was conducted of patients who underwent tissue expander breast reconstruction between 2005 and 2019 identified in the NSQIP database. Patients were separated based on date of discharge. Demographic information, medical comorbidities, and outcomes were recorded. Statistical analysis was performed to identify factors associated with complications.

RESULTS: A total of 14,404 patients were included in this study, with 4538 bilateral and 9821 unilateral reconstructions. 1458 patients were discharged on the day of surgery (postoperative day 0), while 9,384 were discharged on postoperative day 1 and 3,562 were discharged on a later date. Discharge on postoperative day 2 was associated with unilateral reconstruction as well as more severe medical comorbidities.
Approximately 11% of patients had a complication from surgery. The most common complication was reoperation, occurring in approximately 7% of patients. Readmission occurred in 5% and infection in 4%. Complications for patients who were discharged postoperative day 2 or later were significantly higher at 17% when compared to same-day discharge (6%) or next day discharge (9%). The rate of infection was similar between same and next day patients (3.1 v 3.6%) though it was significantly higher in patients discharged at postoperative day 2 or later (5%). Rates of readmission and reoperation were significantly lower in patients discharged same day (2% and 3%) when compared to next-day discharge (5% and 6%) and later discharge (7% and 11%).
Factors besides day of discharge correlating with higher complication rates included hypertension, smoking, and diabetes.

CONCLUSIONS: Same-day discharge following tissue expander breast reconstruction was not associated with an increased risk of perioperative complications compared to next-day or later discharge. Though complications are higher in later-day discharge patients, this is likely confounding from prolonged hospital stays due to immediate complications, or due to their underlying medical complexity predisposing them to higher risk. For the otherwise healthy patient, discharge the day of surgery is a safe and cost effective option. Ultimately, the decision when to discharge should be discussed in the context of each individual case.

Breast Reduction With Total Superior Pedicle

Abstract Presenter
Rodrigo Escobar Jaramillo MD

INTRODUCTION: The excessive growth of the breasts (currently known as macromastia) proposes a health problem in women.1
Symptoms, such as chronic upper/lower back pain, neck pain, intertrigo, paresthesias, grooves in bra slots, and inability to do sports, are predominant.2

Several techniques have been developed for breast reduction, the inferior pedicle and free nipple graft have been favored as the first option in cases of displacement of the NAC from the sternal notch (SN) of 40 cm or more, along with the need for large volume resection.3

This is due to the apparent risk of partial or total necrosis, venous congestion, conical shape, and the impossibility of ascending the NAC.4

This study's objective is to present a different technique for long NAC ascending in patients with

macromastia using a total superior pedicle lifting approach from a vertical marking with horizontal modification, without injuring the dermis around the NAC.

METHODS: A single-center descriptive study was performed in Santiago de los Caballeros, Dominican Republic, from 2006 to 2022. A total pedicle lifting technique from a vertical marking with horizontal modification was performed on approximately 283 patients where 232 had a resection greater than or equal to 500 grams in one or both breasts with NAC descending lengths greater than 30cm.

RESULTS: All cases were resolved without presenting tissue damage or NAC necrosis. The average patient's age was 34.5, and surgery time was approximately 3 hours. Considering both breasts, the average tissue extracted in the population was 1441.4+589.6 grams (SD, 95 %) with a median of 121 1.5 grams

CONCLUSIONS: The total pedicle lifting approach is a safe and reproducible procedure, distinguished by the regard for the upper circulation of the breast.

1. Escobar, R, Merelo, C. (2023). Breast Reduction with Total Superior Pedicle. Plast Reconstr Surg Glob Open, 11. https://doi.org/10.1097/GOX.0000000000004735
2. Schnur PL, Schnur DP, Petty PM, et al. Reduction mammaplasty: an outcome study. Plast Reconstr Surg. 1997;100:875–883.
3. Hoppe IC, Patel PP, Singer-Granick CJ, et al. Virginal mammary hypertrophy: a meta-analysis and treatment algorithm. Plast Reconstr Surg. 2011;127:2224–2231.
4. Colohan SM, Massenburg BB, Gougoutas AJ. Breast reduction: surgical techniques with an emphasis on evidence-based practice and outcomes. Plast Reconstr Surg. 2020;146:339e–350e.
5. Cruz-Korchin N, Korchin L. Vertical versus wise pattern breast reduction: patient satisfaction, revision rates, and complications. Plast Reconstr Surg. 2003;112:1573–1578.

The safety of operating on breasts with a history of prior reduction mammoplasty: dynamic magnetic resonance imaging analysis of angiogenesis

Abstract Presenter
Joseph Park MD

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BACKGROUND: Vascularity of the nipple-areolar complex (NAC) is altered after reduction mammoplasty, which increases the risk of complications after repeat reduction mammoplasty or nipple-sparing mastectomy.

OBJECTIVES: To evaluate angiogenesis of the NAC via serial analysis of breast magnetic

resonance images (MRIs).

METHODS: Breast MRIs obtained after reduction mammoplasty were analyzed for 35 patients (39 breasts) using three-dimensional reconstructions of maximal intensity projection images. All veins terminating at the NAC were classified as internal mammary, anterior intercostal, or lateral thoracic in origin. The vein with the largest diameter was considered the dominant vein. Images were classified based on the time since reduction: <6 months, 6–12 months, 12–24 months, >2 years.

RESULTS: The average number of veins increased over time: 1.17 (<6 months), 1.56 (6–12 months), 1.64 (12–24 months), 1.73 (>2 years). Within 6 months, the pedicle was the only visible source of venous drainage. Veins from other sources began to appear at 6–12 months. In most patients, at least two veins were available after 1 year. After 1 year, the internal mammary vein was the most common dominant vein regardless of the pedicle used.

CONCLUSION: In the initial 6 months after reduction mammoplasty, the pedicle is the only source of venous drainage; however, additional sources are available after 1 year and internal thoracic vessels were the dominant source in most of the patients. Thus, repeat reduction mammoplasty or nipple-sparing mastectomy should be performed ≥1 year following the initial procedure. After 1 year, the superior or superomedial pedicle may represent the safest option when the previous pedicle is unknown.

1. Serletti JM, Reading G, Caldwell E, Wray RC. Long-term patient satisfaction following reduction mammoplasty. Ann Plast Surg. 1992;28(4):363–365. doi:10.1097/00000637-199204000-00011
2. Gonzalez MA, Glickman LT, Aladegbami B, Simpson RL. Quality of life after breast reduction surgery: A 10-year retrospective analysis using the breast Q questionnaire: Does breast size matter? Ann Plast Surg. 2012;69(4):361–363. doi:10.1097/SAP.0b013e31824a218a
3. Hallock GG, Cusenz BJ. Salvage of the congested nipple during reduction mammoplasty. Aesthet Plast Surg. 1986;10(1):143–145. doi:10.1007/BF01575284
4. Erba P, Rieger UM, Pierer G, Kalbermatten DF. Vacuum-assisted closure (VAC) for venous congestion of the nipple-areola complex. J Plast Reconstr Aesthet Surg. 2008;61(7):852–854. doi:10.1016/j.bjps.2007.10.080
5. Park JK, Myung Y. Treatment of delayed venous congestion of the nipple-areolar complex after reduction mammoplasty. Arch Aesthet Plast Surg. 2021;27(1):39–42. doi:10.14730/aaps.2020.02369

Robotic-Assisted Deep Inferior Epigastric Perforator Harvest for Breast Reconstruction: A Consecutive Case Series

Abstract Presenter
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BACKGROUND: Plastic surgery has expanded to include the use of robotic surgery as a useful adjunct in breast reconstructive surgery. In a traditional deep inferior epigastric perforator (DIEP) flap harvest for breast reconstruction, a long fascial incision is required, which can lead to considerable donor site morbidity. With a robotic approach, the vascular pedicle can be dissected in the sub-muscular plane, through an intra-abdominal approach, thereby significantly reducing the length of the fascial incision. A shorter fascial dissection should decrease the rates of post-operative abdominal site morbidity and lead to improved patient outcomes. The authors assess the safety, feasibility, and efficiency of robotic-assisted DIEP flaps.

METHODS: All consecutive cases of robotic-assisted DIEP flaps for breast reconstruction from June 2022 to February 2023 within a single health care system (Northwell Health) were reviewed. Patient demographics, surgical characteristics, and complications were assessed. The authors also provided insight regarding the training, credentialing, and implementation of a robotic breast program.

RESULTS: A total of 17 female patients underwent robotic-assisted DIEP harvest. Mean patient age at time of surgery was 50.1 years and mean BMI was 26.4 kg/m2. Of 17 patients, 10/17 were bilateral and 2/17 were unilateral robotic-assisted DIEP flap breast reconstructions. The remaining 5/17 were bilateral DIEP flap reconstructions but vascular anatomy allowed for only one hemi-abdominal flap harvest to be performed with robotic assistance. A total of 8/17 were performed immediately at the time of mastectomy. All patients had preoperative magnetic resonance angiography (MRA). Mean length of fascial incision was 3.7 cm. Mean time on the robotic console was 75.1 minutes. Mean length of hospital stay was 2.2 days. All flaps were harvested with robotic assistance, without conversion to open technique. No abdominal donor site postoperative complications were noted, including abdominal wall bulge, hernia, necrosis, or delayed healing.

CONCLUSION: In appropriately selected candidates, robotic-assisted harvest of the deep inferior epigastric perforator flap is a safe, reliable, and reproducible technique to attempt at decreasing rates of abdominal donor site morbidity.

Charting Outcomes: The Correlation Between Area of Deprivation Index and Disparities in Breast Reconstruction

Abstract Presenter

Hao Huang MD

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INTRODUCTION: Breast reconstruction is an important component of breast cancer treatment and recovery. However, disparities exist in the availability and accessibility of healthcare providers and institutions that offer reconstructive services. Past studies have characterized how race, ethnicity, socioeconomic status, insurance policy, and other demographic factors may individually influence access to reconstruction. The Area of Deprivation Index (ADI) is a composite measure that includes data on income, employment, health, education, and crime rates.(1) This value enables policymakers to assess the extent of socioeconomic deprivation within small geographic regions and identify areas that require targeted resource allocation.1 Our objective is to examine the correlation between ADI and the proportion of patients who undergo post-mastectomy reconstruction, as well as the length of time it takes for them to receive treatment. In addition, we aim to assess the utility of ADI as a surrogate for predicting access to reconstructive services.

METHODS: Retrospective review identified post-mastectomy patients at NYP-Cornell and Columbia between 1979 and 2019. The list of ADIs for New York City zones are obtained from the Center for Health Disparities Research website. Composite reconstruction rates and average time delay to reconstruction are calculated for each zip code within the NYP breast cancer database and matched with the corresponding district ADI. In general, higher ADI corresponds to increased resource deprivation. Pearson correlation formula is used to assess the dependency of the two measures. Python is used to plot the heatmaps showcasing the proportion of reconstruction, relative time lag, and ADI.

RESULTS: We found a negative correlation between the likelihood of undergoing reconstruction and the ADI of the patient's residential district ($R = -0.081$), and a positive correlation between the time delay to reconstruction and increased ADI ($R = 0.065$). The heatmap distribution corroborates the quantitative trends we observed on correlation analysis.

CONCLUSION: The Area of Deprivation Index may provide a preliminary indication of the accessibility of reconstructive services and the expected delay in physician consultation. To address disparities in post-mastectomy breast reconstruction, it is imperative to enhance patient awareness and education, particularly in regions with higher levels of socioeconomic deprivation. Legislative and patient advocacy initiatives should especially focus on areas facing geographic or financial limitations. Additionally, the ADI can aid in monitoring resource allocation and assessing the effectiveness of interventions aimed at promoting equitable access to breast reconstruction.

REFERENCES
1. Noble, M., Wright, G., Smith, G., & Dibben, C. (2006). Measuring Multiple Deprivation at the Small-Area Level. Environment and Planning A: Economy and Space, 38(1), 169–185. https://doi.org/10.1068/a37168

Endoscopy-assisted Extended Latissimus Dorsi Flap plus Lipofilling for scarless breast reconstruction

Abstract Presenter
Shinsuke Akita MD, PhD

BACKGROUND: Breast reconstruction using endoscopy-assisted latissimus dorsi (LD) flap leaves no scar on the back; however, the small amount of tissue obtained makes this procedure less practical1-4. This study aimed to propose and show a new technique of endoscopy-assisted extended LD (eeLD) flap plus lipofilling, which could secure a large breast volume.

METHODS: Lateral thoracic adipose tissues supplied by the thoracodorsal artery branches and the LD muscle were elevated as a single unit only through the mastectomy scar and three ports through the lateral chest5. Further, fat was simultaneously injected to support the volume and shape of the breast. Changes in the volume of the reconstructed breast over time were measured using three-dimensional stereophotogrammetry.

RESULTS: Overall, 15 breasts of 14 patients who underwent breast reconstruction using an eeLD flap exhibited no serious complications. On average, 281.9 ± 32.4 g of flap and 74.7 ± 19.4 ml of lipofilling were used. Within 8 weeks after the procedure, the volume of the reconstructed breast decreased to 69.5% ± 7.5% and then plateaued. Seven patients needed a subsequent session of lipofilling to acquire adequate breast volume and projection. Notably, according to the BREAST-Q back scores, patients who underwent eeLD flap were significantly more satisfied than those who underwent conventional LD musculocutaneous flap using a skin paddle on the back at the same institution (82.8 ± 9.2 vs. 62.6 ± 6.3, $P < 0.0001$).

CONCLUSION: Despite the limitations in volume, eeLD flap plus lipofilling is advantageous because it does not leave a noticeable donor site scar.

REFERENCES
1. Escandón JM, Nazerali R, Ciudad P, et al. Minimally invasive harvest of the latissimus dorsi flap for breast reconstruction: A systematic review. Int J Med Robot. 2022;18:e2446.
2. Cha Y, Lee S. Endoscopy-assisted latissimus dorsi muscle flap harvesting technique for immediate breast reconstruction. Ann Chir Plast Esthet. 2022. S0294-1260(22)00171-6.
3. Ahmed YS, Abd El Maksoud WM. Combined Endoscopy-Assisted Muscle-Sparing Latissimus Dorsi Flap Harvesting with Lipofilling Enhancement as a New Volume Replacement Technique in Breast Reconstruction. Breast J. 2022;7740439.
4. Winocour S, Tarassoli S, Chu CK, et al. Comparing Outcomes of Robotically Assisted

Latissimus Dorsi Harvest to the Traditional Open Approach in Breast Reconstruction. Liu J, Clemens MW, Selber JC. Plast Reconstr Surg. 2020; 146: 1221-12258.
5. Dast S, Havet E, Dessena L, et al. Anatomical basis of the extended TDAP flap: study of its territories of vascularization and its volume. Surg Radiol Anat. 2017; 39: 821-826.

Simultaneous aesthetic correction for the revision in case of late seroma formation

Abstract Presenter
Vladimir Safronov M.D., PhD

PURPOSE: to create the optimal algorithm of treatment of late seroma formation in breast revisional surgery

METHODS: Since December 2018 to October 2022 in Sechenov University clinic in Moscow, Russia 78 patients were diagnosed with late seroma formation after pervious breast augmentation procedure. The diagnostic algorithm included clinical evaluation of symptoms, magnetic resonance imaging with contrast, punction of seroma with ultrasound assistance, flow cytometry, immunohistochemistry performed for aspirated fluid. Surgical correction was performed after the diagnostic algorithm completed.

RESULTS: in 88.5% of cases (69 out of 78) unilateral seroma formation were discovered. All serums were defined as a late because their manifestation time was later than one year (from 1 year and a month to 18 years and 7 months). The etiology of seroma formation in most cases (73 of 78) was idiopathic, in 5 cases different kind of foreign bodies were discovered in the pocket of implants. Not a single capsular mass formation was discovered in this clinical seria. Most of the implants removed were textured (75 of 78), in 2 cases implants were silicone round with smooth surface and in one saline round with smooth surface. Beside for seroma symptoms most of the patients complained about various kind breast asymmetry, unsatisfactory breast shape, unpleasant areola size or nipple position, cleavage problems. Thus, the aesthetic goals were considered with correction of the late seroma. Correction of the late seroma and aesthetic improvement was performed as a one stage procedure, in most cases including implants replacement, capsulectomy, different kind of mastopexy, fat grafting.

CONCLUSION: Most of the patients with late seroma require simultaneous aesthetic correction. The diagnostic algorithm is applied in every case of late seroma to avoid rare and potentially malignant etiology of this complication. When diagnostic is complete, the simultaneous aesthetic correction is planned based on patient's complaints and aesthetic distortions present.
Secondary correction often requires correction of the asymmetry. Old capsule on the seroma side should be removed to avoid seroma recurrence. Asymmetry was the most common aesthetic complaint of the patients in this group. Correction of the asymmetry was performed with simultaneous mastopexy, fatgrafting, different volume implants was applied.

Algorithm for prevention and management of severe complications in direct-to-implant breast reconstruction: an 8-year review of Tianjin Implant-based Breast Reconstruction (TIMBRE) cohort

Abstract Presenter
Zhuming Yin MD

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INTRODUCTION: Direct-to-implant (DTI) breast reconstruction is a reasonable alternative to two-stage reconstruction for patients who desire aesthetic benefits, minimal morbidity, and a single-stage operation. However, Complications including infection and wound dehiscence are major concerns for DTI breast reconstruction. Therefore, we aimed to identify the risk factors associated with severe complications following DTI breast reconstruction and introduce an evidence-based algorithm for complication prevention and implant salvage.

METHODS: A retrospective study was performed using Tianjin Implant-based Breast Reconstruction (TIMBRE) cohort (Registration No.: ChiCTR2000035318), a prospectively maintained database of all female patients undergoing implant-based breast reconstruction at the largest breast cancer center in China. Women who underwent single-stage unilateral DTI breast reconstruction from January 1, 2014, to December 31, 2022, were included. A "severe" complication was defined as unplanned complications requiring re-hospitalization or re-operation. All complications occurring within 90 days of surgery were recorded to avoid underreporting. The risk factors associated with complications and prosthesis explantation were identified using multivariate logistic regression modeling and interaction analyses. A comparison of implant salvage rate was made between the regional perforator flap maneuver and non-flap METHODS.

RESULTS: Among 1027 patients enrolled, 90 experienced severe complications, 41 of which underwent prosthesis explantation, while 49 were successfully salvaged. Multivariate analysis demonstrated that patients with larger implant size ($p=0.003$), use of biological meshes ($p<0.001$), adjuvant radiotherapy ($p=0.047$), low plasma albumin ($p=0.013$), and elevated blood glucose ($p=0.006$) were significantly more likely to suffer complications. Adjuvant radiation (OR: 7.44; 95%CI, 1.49-37.18; $p=0.014$) and obesity (OR, 4.17; 95%CI, 1.17-14.88; $p = 0.028$) had significantly lower rates of implant salvage as well as surgical site infection (SSI) and wound dehiscence, while mastectomy skin flap necrosis was not associated with device explanation. There were no differences in complication and explantation rates between nipple-sparing and skin-sparing mastectomies. SSI and wound dehiscence were the primary factors associated with implant loss in DTIBR. Subgroup analysis indicated the combined impact of SSI and wound dehiscence added over fourteen-fold high risk of prosthesis explantation (Figure 1, relative excess risk of interaction, 14.75, 95%CI, 9.97-19.53). Regarding the patients with uninfected wound dehiscence or mastectomy flap necrosis, the regional perforator flap transfer

successfully salvaged 100% of breast implants (Figure 2, n=12). The rate of prosthesis salvage was significantly higher in flap group compared with the cases undergoing non-flap management (p=0.035).

CONCLUSION: Loss of an implant in direct-to-implant breast reconstruction is multifactorial. Larger implant size, adjuvant radiation therapy, diabetes, and malnutrition should be considered contraindications to the DTI approach. The combination of surgical site infection and wound dehiscence has a synergistic negative impact on reconstructive failure and portends a dismal outcome for implant salvage. Avoiding infection and restoring the skin defect by a vascularized perforator flap can limit the risks of reconstructive failure in patients suffering from wound dehiscence.

Intraoperative Hypothermia in Breast Reduction Surgery Predicts Postoperative Complications

Abstract Presenter
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PURPOSE: Intraoperative hypothermia has been studied and demonstrated to be a risk factor for impaired wound healing, increased hospital length of stay, and surgical site infection in other surgical specialties.1,2 Intraoperative hypothermia represents a potential modifiable risk factor in breast reduction surgery. This study examines the effect of intraoperative hypothermia on postoperative outcomes in breast reduction surgery.

METHODS: This was a retrospective review of consecutive patients undergoing bilateral breast reduction from 2015 to 2021. Patients were categorized into normothermic and hypothermic cohorts based on intraoperative measurements of core temperature, and hypothermia was defined as <35.5°C. Demographics, comorbidities, smoking status, ASA class, intraoperative warming devices, duration of hypothermia, type of pedicle used, weight of surgical specimens, surgical drains, and length of surgery were collected. The outcomes assessed were infection within 30 days, wound healing complications, hematoma, and seroma.

RESULTS: In the study population of 142 consecutive patients, 85 experienced intraoperative hypothermia and 57 were normothermic throughout surgery. The average age was 40.25, average BMI 31.65, 12.7% had Type 1 or Type 2 Diabetes, and 4.9% were current smokers. 73.9% (105) of patients underwent bilateral breast reduction with a superomedial pedicle, 22.5% (32) had an inferior pedicle, and 3.5% (5) had another type of pedicle. Over half (59.9%) of patients experienced intraoperative hypothermia. In the hypothermic group, a higher proportion of

patients had surgical site infections (18.8% versus 5.3%, $p<0.05$) and wound healing complications (61.2% versus 29.8%, $p<0.05$). Both groups had similar incidence of postoperative seroma (2% versus 0%) and hematoma (5.9% versus 3.5%). Further analysis demonstrated, intraoperative hypothermia predicted surgical site infection (OR 4.174, 95% CI: 1.156-15.064, $p<0.05$) and wound healing complications (OR 3.708, 95% CI: 1.812-7.585, $p<0.05$).

CONCLUSION: This study demonstrates that intraoperative hypothermia is a significant risk factor for postoperative infection and wound healing complications in breast reduction. Our RESULTS demonstrate that maintaining strict normothermia during breast reduction can improve patient outcomes by reducing the risk of postoperative infection and wound healing complications

REFERENCES:

1. Baucom RB, Phillips SE, Ehrenfeld JM, et al. Association of Perioperative Hypothermia During Colectomy With Surgical Site Infection. JAMA Surg. 2015;150(6):570-575. doi:10.1001/jamasurg.2015.77
2. Seamon MJ, Wobb J, Gaughan JP, Kulp H, Kamel I, Dempsey DT. The effects of intraoperative hypothermia on surgical site infection: an analysis of 524 trauma laparotomies. Ann Surg. 2012;255(4):789-795. doi:10.1097/SLA.0b013e31824b7e35

Is a Seroma the "Kiss of Death" in Prepectoral Tissue Expander Reconstruction?

Abstract Presenter
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PURPOSE: Seroma formation is a common complication following postmastectomy breast reconstruction. Often, seroma formation begets other complications such as infection, which can compromise the reconstruction. In this study, we investigated the association between seroma formation and other complications following prepectoral tissue expander (TE) reconstruction.

METHODS: All consecutive, prepectoral TE reconstructions performed between March 2017 and July 2022 at a single center were reviewed. Patients were cared for by five distinct breast surgeons and five plastic surgeons. Demographics, mastectomy weight, intraoperative TE fill,

and complications were extracted for all patients. A $p<0.05$ was considered statistically significant.

RESULTS: Prepectoral TE reconstruction was performed in 184 patients (292 breasts), who were followed for an average of 27 months. Women were, on average, 53 years old, non-smoker (99%), non-diabetic (91%), and had a body mass index (BMI) of 28. All breasts underwent immediate reconstruction following prophylactic mastectomies in 33% and therapeutic mastectomies in 67% of cases. The majority of mastectomies were skin sparing (61%), followed by nipple sparing (24%), simple (12%) and other (3%). Seventy-one (24%) breasts were radiated (77% adjuvant, 20% prior radiation, 3% both), and 89 (48%) patients received chemotherapy (19% adjuvant, 4% prior radiation, 1% both). Median mastectomy weight was 551 grams, average intraoperative TE fill was 194 ± 163 cc, and average final TE fill was 416 ± 159 cc. Seroma occurred in 45 (15%) breasts and was associated with higher body mass index (30 vs. 27 kg/m2, $p=0.011$) and higher mastectomy weight (814 vs. 640 grams, $p < 0.05$). In multivariable models controlling for age, BMI, mastectomy weight, radiation, and soft tissue support, seroma was not associated with any predictive variables.
Seroma was associated with postoperative infection (42% vs. 7%, $p < 0.001$), TE exposure (50% vs. 8%, $p <0.05$), and explantation (51% vs. 9%, $p < 0.001$). A temporal association was seen between seroma occurrence and the incidence of other complications: 25 (56%) seromas went on to develop other complications. Infection and implant explantation commonly followed seroma, occurring in 16 (36%) and 15 (33%) breasts with a prior seroma, respectively. These infections were managed successfully with antibiotics in 7 (44%) of breasts, but 9 (56%) required further surgical intervention, such as implant explantation or exchange.

CONCLUSIONS: This study examines the connection between seroma and other postoperative complications. Although causality cannot be determined, the data support the hypothesis of seroma being the "kiss of death" in patients undergoing prepectoral TE reconstruction, as over half of patients who developed a seroma went on to develop other related complications.

Safety and Feasibility of Prophylactic Lymphedema Procedures and Immediate Implant-Based Breast Reconstruction: An Analysis of The American College of Surgeons National surgical Quality Improvement Program (ACS-NSQIP)

Abstract Presenter
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BACKGROUND: A well-known post-operative complication of mastectomy with axillary lymph node dissection (ALND) with immediate implant-based breast reconstruction (IBR) is lymphedema of the upper extremity, or Breast-Cancer Related Lymphedema (BCRL). Standard practices include staging LVA at later date versus treatment only if patient becomes symptomatic. The aim of our study is to assess the trends, feasibility, and safety of prophylactic

lymphovenous anastomosis (LVA) at time of index mastectomy, ALND, and IBR.

METHODS: The 2015-2020 NSQIP database was reviewed to identify patients who underwent mastectomy, ALND, and IBR using pre-defined CPT codes for aforementioned procedures. Cohorts were separated into a treatment group, those who underwent mastectomy + ALND + IBR + LVA at the time of index operation, and a control group, those who underwent mastectomy + ALND + IBR alone. Patient demographics, comorbidities, surgical characteristics, and reconstruction type as well as 30-day complication rates, length of stay, and readmission/reoperation rates were collected and analyzed.

RESULTS: The NSQIP database identified 25,888 patients who underwent mastectomy and ALND with immediate IBR; of these, 151 prophylactic LVA's were performed the time of initial surgery (0.58%). Average age and BMI amongst treatment and control groups were 48.1 ± 11.2 years and 28.2 ± 6.4 kg/m2, and 50.7 ± 10.8 years and 27.9 ± 6.0 kg/m2, respectively. No significant differences were found amongst demographics or surgical characteristics between treatment and control groups. As expected, average operative times were longer with concomitant LVA (363 min vs 262 min, p-value <0.001). The most common complications amongst both treatment and control groups were superficial SSI (3.31%, 2.42% respectively), deep SSI (3.31%, 1.99% respectively), and wound dehiscence (2.65%, 1.12% respectively). Post operative length of stay was similar between groups at 1.7 ± 3.2 days for control group and 1.8 ± 1.4 days in treatment group (p-value 0.75). While readmission rates were slightly higher for the LVA group (7.28% versus 5.24%), this was not statistically significant and reoperation rates were slightly decreased compared to the control group at 7.95% and 8.56%, respectively.

CONCLUSION: The RESULTS of this study suggest that immediate LVA at time of index surgery is safe and feasible in the setting of mastectomy, ALNB, and immediate IBR without significant impact on complication profile, hospital length of stay, reoperation, or readmission. Limitations include low sample size of treatment group and the ability of NSQIP database to drive clinically insignificant variables to significance. Given the nature of NSQIP database, we were unable to elucidate the effectiveness of immediate LVA at prevention of BCAL however this will be a focus in future studies.

Finding the Right Fill: Determining the Ideal Tissue Expander Fill in Immediate Pre-Pectoral Breast Reconstruction

Abstract Presenter
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PURPOSE: While many factors in prepectoral breast reconstruction such as mastectomy weight and flap quality are out of the plastic surgeon's control, some factors such as intraoperative tissue expander (TE) fill can be optimized. This study analyzes the impact of intraoperative TE fill on postoperative complications and attempts to define an optimal fill volume.
METHODS: A chart review of all consecutive, prepectoral tissue expander reconstructions performed between March 2017 and July 2022 at a single center was conducted. Patients from a total of 5 distinct breast surgeons and 5 plastic surgeons were included. Demographics, mastectomy weight, intraoperative TE fill, and complications were extracted for all patients. A ratio of intraoperative TE fill to mastectomy weight (TEF/MW) was constructed to quantify "deadspace" in the breast pocket, with higher values signifying less deadspace. Major complications were defined as any complication that required readmission or reoperation while minor complications included any complication requiring outpatient antibiotics, procedures, or wound care. The Youden method was used for predicting optimal cut off, and $p<0.05$ was considered statistically significant.

RESULTS: A total of 184 patients (292 breasts) were included with a mean follow up period of 27 months. Patients were on average 53 years old, non-smoker (99%), non-diabetic (91%), and had a body mass index of 28. Immediate reconstructions were performed following prophylactic mastectomies in 33% and therapeutic mastectomies in 67% of cases. The majority of mastectomies were skin sparing (61%), followed by nipple sparing (24%), simple (12%) and other (3%). Seventy-one (24%) breasts were radiated (77% adjuvant, 20% prior radiation, 3% both), and 89 (48%) patients received chemotherapy (19% adjuvant, 4% neoadjuvant, 1% both). Median mastectomy weight was 551 grams, average intraoperative TE fill was 194 ± 163 cc, and average final TE fill was 416 ± 159 cc.
Major complications occurred in 61 (21%) breasts and were associated with higher intraoperative TE fill (277 cc vs. 174 cc, $p <0.001$) and less deadspace in the breast pocket (0.49 TEF/MW vs. 0.37 TEF/MW, $p <0.05$). In multivariable models controlling for age, BMI, diabetes, mastectomy weight, radiation, and soft tissue support, higher odds of major complication were observed: for every 10 cc increase in intraoperative TE fill, the odds increased by 1.03 (95% CI [1.01-1.05], $p=0.002$). Optimal intraoperative TE fill for avoiding major complications was 80 cc and optimal ratio was 0.09 TEF/MW.
Among major complications, explantation occurred in 44 (15%) breasts and was associated with higher intraoperative TE fill (271 cc vs. 182 cc, $p <0.001$) and less deadspace in the breast pocket (0.51 TEF/MW vs. 0.37 TEF/MW, $p <0.001$). Optimal intraoperative TE fill for avoiding explantation was 80 cc and optimal ratio was 0.12 TEF/MW. TE exchange occurred in 19 (7%) breasts and was associated with higher intraoperative TE fill (349 cc vs. 185 cc, $p <0.001$) and less deadspace in the breast pocket (0.7 TEF/MW vs. 0.37 TEF/MW, $p <0.05$).

CONCLUSIONS: In this study, higher intraoperative TE fill and less deadspace was associated with major postoperative complications, explantation, and need for TE exchange.

Drain Use And Complications After Breast Reduction in a Five Academic Institution Cohort

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BACKGROUND: Over 97,000 reduction mammaplasties were performed in the US exceeding all other body-contouring procedures combined. Several studies have suggested no significant difference in complications with or without intraoperative placement of drains but have been inadequately powered to assess individual outcomes such as seromas or wound dehiscence1-3. We aimed to assess whether use of drains was associated with a lower risk of complications after breast reduction in a multi-institutional cohort study.

METHODS: A retrospective cohort of 2488 breast reduction patients with and without drains was evaluated across five institutions. Demographic and peri-operative data were compared between groups. Univariate analysis of post-operative outcomes was performed and multivariate logistic regression of the impact of intra-operative drain placement and patient factors were evaluated.

RESULTS: Drains were used in 1163 patients (46.7%) and 1325 (53.3%) were performed without drains. Patient with higher BMI ($p<0.001$), greater pre-operative breast anthropometrics ($p<0.001$), higher mean resection weight ($p<0.001$) multiple medical comorbidities ($p<0.05$) and superior dermo-glandular pedicle ($p<0.001$) were less likely to have drains placed for surgery. The drain cohort were also more likely to have liposuction or other concomitant procedures and free nipple grafting ($p<0.05$). Despite these preoperative differences in the drain cohort, there was no significant difference in overall complication rate (30.7% vs 27.1%), wound dehiscence (12.3% vs 14.2%), seroma (1.8% vs 2.0%), hematoma (2.9 vs 3.7%), infection (9.7% vs 7.8%) or need for revision surgery (11% vs 10.2%). Drains were not significantly associated with any complications on logistic regression, but elevated BMI was significantly associated with overall complications, seroma and wound dehiscence (all $p<0.01$) while hematologic disease and black race were also associated with seroma ($p<0.01$).
Summary: Drain placement was not associated with improved outcomes after breast reduction surgery in a large multi-center retrospective cohort. Surgeons were more likely to use drains in patients with higher BMI, larger breasts and higher medical complexity with similar outcomes to the cohort without drains. Elevated BMI was the consistently associated with surgical complications.

1.Corion LU, Smeulders MJ, van Zuijlen PP, van der Horst CM. Draining after breast reduction: A randomised controlled inter-patient study. J Plast Reconstr Aesthet Surg. 2009;62:865–868.
2. Collis N, McGuiness CM, Batchelor AG. Drainage in breast reduction surgery: A prospective randomised intra-patient trial. Br J Plast Surg. 2005;58:286–289.
3. Wrye SW, Banducci DR, Mackay D, Graham WP, Hall WW. Routine drainage is not required in reduction mammaplasty. Plast Reconstr Surg. 2003;111:113–117.

The Importance of Continued Insurance Coverage for Perforator Flap Breast Reconstruction: A Study of Public Perspectives on a Woman's Flap Choice Related to Cost

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BACKGROUND: Recent discussions in medical billing have raised concerns about the potential loss of insurance coverage for deep inferior epigastric perforator (DIEP) flap breast reconstruction by December 31, 2024. These changes may require patients to pay out-of-pocket for this procedure. This survey aims to identify factors that would influence women's pREFERENCES regarding autologous breast reconstruction to better understand the possible consequences of these coverage changes.

METHODS: A survey was conducted among adult women in the United States via the Amazon Mechanical Turk crowdsourcing platform. Questions assessed demographic information and gauged patient pREFERENCES for breast reconstructive options, ultimately asking participants to choose between descriptions of DIEP and transverse rectus abdominis myocutaneous (TRAM) flap surgery. The Cochrane-Armitage test was used to assess trends in flap pREFERENCES with incremental increases in out-of-pocket payments.

RESULTS: Of 500 total responses, 485 were complete and correctly answered a question to verify adequate attention to the survey questions. The median (IQR) age of respondents was 26 (25, 39) years old. When presented with the advantages and disadvantages of DIEP versus TRAM flaps, 78% of respondents preferred DIEP flap reconstruction. When presented with the same choice, however with DIEP flaps being associated with an incrementally rising cost, an increasing proportion of the respondents favored the cheaper TRAM option with $10,000 out of pocket being the threshold where a majority of women who previously favored DIEP, changed their answer to TRAM ($p < 0.001$). Notably, a personal history of breast reconstruction was

significantly associated with a higher preference for DIEP, even with an associated out-of-pocket cost of $10,000 ($p = 0.04$). Additionally, respondents' education histories also affected preference for DIEP flaps. A significantly higher proportion of high school graduates (26%) preferred DIEP even with a $20,000 out-of-pocket payment compared to respondents with a bachelor's degree (3%) ($p = 0.003$).

CONCLUSION: Out-of-pocket cost can significantly influence women's choices for breast reconstruction. These findings encourage a reconsideration of newly proposed insurance practices that could potentially increase out-of-pocket costs associated with DIEP flaps, to prevent cost from decreasing equitable patient access to gold standard reconstructive options.

Oncoplastic Breast Reconstruction Outcomes and Patient Experience in BioZorb® Implantation: A Radiation Marker and Volume Replacement Modality in Breast Conserving Therapy for Breast Cancer

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BACKGROUND: BioZorb® three-dimensional bioabsorbable tissue marker was developed as a tool for radiotherapy to provide more consistent and accurate identification for surgical margins and more precise radiation fields in patients with breast cancer pursuing breast-conserving surgery (BCS). In women with small to medium breast volume, BCS can be challenging due to limited reconstructive options, often resulting in contour abnormalities and breast asymmetry due to the limited availability of breast tissue for sufficient local tissue rearrangement. The BioZorb® device allows for simultaneous volume displacement and replacement in the setting of BCS, which affords an added benefit of maintaining breast contour and symmetry.

METHODS: One hundred and nineteen women received the BioZorb® device following BCS between January 2016 to December 2020. Patient reported outcomes (PROs) were obtained from women ages 18 or older using the validated Breast-Q questionnaire. Outcomes focused on physical wellbeing, satisfaction with breasts, psychosocial wellbeing, and sexual wellbeing. Rasch analysis was used to generate a numerical score (maximum=100) for data analysis.

RESULTS: Of the 119 women, 32 completed surveys for PROs. 90.6% of these women had a bra cup size of D or less and received a Biozorb® implant ranging in size from 2x2 cm to 4x4 cm. Of the 32 women, no patients had post-operative infection or required implant removal

within 30 days of surgery. Breast-Q questionnaires demonstrated an average Rasch score of 83.2 for physical well-being, 78.2 for satisfaction with breasts, and 86.7 for psychosocial wellbeing. 40.6% of participants completed the sexual wellbeing section with an average score of 69.5. Breast size stratification demonstrated that for women with smaller breasts (Cup size A or B) Rasch score was 80.1 for physical wellbeing, 78.8 for satisfaction with breasts, and 84.2 for psychosocial wellbeing. In women with larger breasts (Cup size C or larger), Rasch score was 87.5 for physical wellbeing, 77.2 for satisfaction with breasts, and 89.9 for psychosocial wellbeing.

CONCLUSIONS: Based on PROs using the Breast-Q questionnaire, women who underwent BCS with Biozorb® placement not only benefitted from its ability to provide a marker for radiation, but were also content with their surgical outcomes, reporting excellent physical and psychosocial health, as well as breast satisfaction. Additionally, women with smaller breasts reported equally excellent outcomes compared to those women with medium or larger breasts. Based on the outcomes from this study, simultaneous volume displacement and replacement using the Biozorb® device in women with smaller breasts can result in favorable PROs.

A Multi-Decade, Multi-institutional Propensity Score Matched Analysis of Recurrence-Free Survival and Mortality in Post-mastectomy Patients with and without Immediate Breast Reconstruction

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INTRODUCTION: Post-mastectomy reconstruction has become the standard of care for breast cancer patients due to its positive impact on patient-reported quality of life, body image, psychological well-being, and physical comfort.1 Previous studies have reported disparities in healthcare outcomes among various racial and sociodemographic groups, which may be attributed to variances in medical service accessibility, physician education patterns, and patient awareness of reconstructive options.1,2 The effect of breast reconstruction on cancer-recurrence and fatalities remains ambiguous. Therefore, our objective was to examine how patient-specific factors and reconstruction status influence recurrence-free survival and mortality rates.

METHOD: Retrospective review identified post-mastectomy patients at NYP-Cornell and Columbia between 1979 and 2019. Patients were propensity score matched (1:1 nearest neighbor) based on age, race, marital status, smoking history, cancer staging, ER/PR/HER2 status, as well as treatment course (i.e., radiation, chemotherapy, immunotherapy, and hormone therapy). Cox proportional hazards model and log rank test were used for recurrence-free

survival analysis. Logistic regression was used to evaluate predictors of mortality.

RESULTS: We found 2385 pairs of matched patients who did and did not undergo post-mastectomy breast reconstruction. Reconstruction was correlated with a significantly lower risk of recurrence (OR 0.58, $p < 0.05$) and mortality (OR 0.38, $p < 0.05$) compared to mastectomy without reconstruction. For patients who had relapsed disease, completion of the reconstruction sequence was correlated with an earlier detection of cancer recurrence ($p < 0.05$). Stratified analysis of the reconstruction group alone did not reveal significant effects of median household income, insurance status, or surgical technique (i.e., implant vs. autologous) on survival or recurrence. Propensity score matching of pedicle and free flap patients (211 pairs) found no difference in the timeline of recurrence, but a significant mortality benefit for patients who undergo free flap reconstruction (OR 0.27, $p < 0.05$).

CONCLUSION: Patients who complete breast reconstruction may have better access to follow-up care, medical imaging and screening, and more opportunities for physician interface, which can lead to the earlier detection and treatment of cancer recurrence. However, patients who do not undergo reconstruction may have higher mortality rates due to factors such as delayed detection and treatment. This study may underscore the need for continued surveillance of patients who undergo mastectomy without reconstruction.

REFERENCES

1. Butler PD, Morris MP, Momoh AO. Persistent Disparities in Postmastectomy Breast Reconstruction and Strategies for Mitigation. Ann Surg Oncol. 2021 Oct;28(11):6099-6108. doi: 10.1245/s10434-021-10487-z. Epub 2021 Jul 21. PMID: 34287788.
2. Fu RH, Baser O, Li L, Kurlansky P, Means J, Rohde CH. The Effect of the Breast Cancer Provider Discussion Law on Breast Reconstruction Rates in New York State. Plast Reconstr Surg. 2019 Sep;144(3):560-568. doi: 10.1097/PRS.0000000000005904. PMID: 31461002.

The presence of staphylococcus and pseudomonas in the breast microbiome of post-mastectomy expander infection patients and the impact of prophylactic antibiotics

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INTRODUCTION: Post-mastectomy implant infections have been cited ranging from 2-28%, with Staphylococcus and Pseudomonas as the usual culprits.[1–3] Individuals each have a unique microbiome, or composition of internal microorganisms, that impacts their response to the

external environment,[4] but its role in breast infections is unknown. Often by the time of operative washout, clinical culture data is negative due to antibiotics. However, microbiome analysis of the breast would still show a signal and potentially before fulminant clinical infection. In a pilot study using 16s rRNA sequencing, we explore the breast microbiome in post-mastectomy tissue expander infection patients and the implications of prophylactic antibiotics.

METHODS: We designed a two-arm randomized-controlled trial for mastectomy patients undergoing two-stage implant-based reconstruction. Patients were randomized to 7 days of prophylactic post-operative antibiotics (Cohort A), versus only 24 hours of Cefazolin (Cohort B) at the time of surgery. Post-operatively the peri-prosthetic space was sampled via expander aspiration or drain output at 3 weeks. Microbial analysis was performed with 16S rRNA microbiome sequencing. The relative abundance percentages of pseudomonas and staphylococcus in each sample were recorded. Culture data was collected at the time of operative explantation.

RESULTS: Of the 39 enrolled patients, 19 patients (32 breasts) were in Cohort A and 20 (32 breasts) were in Cohort B. Expander removal due to infection was required in 7 breasts (22%) of Cohort A, compared to 5 breasts (15.6%) of cohort B (p=0.200). Of the 12 tissue expanders that were removed, 10 were the cancerous breast, while 2 were prophylactic. Negative cultures at the time of explant were seen in 3 of Cohort A (42%) compared to 1 (20%) in Cohort B (p=0.408). Of those that had positive cultures, Staphylococcus was present in 7(88%) compared with Pseudomonas in 2 (12%). The main cultured organism at time of explant was already abundantly present on the prior aspirate microbiome data in 50% of Cohort A compared to 100% of Cohort B explants (p=0.079). Mean time from mastectomy to second aspiration was 22.3 vs 21.2 days (p=0.860). Mean relative abundance of staphylococcus at this visit was 16.1% in Cohort A compared to 37.1% in Cohort B (p=0.356). Pseudomonas was 29.3% in A vs 17.3% in B (p=0.852). Time from mastectomy to explant was 92 days (cohort A) vs 63 days (Cohort B) p=0.426. Mean time from last aspiration to explantation was 70 days in Cohort A, compared to 42 days in Cohort B (p=0.432).

CONCLUSION: Prophylactic oral antibiotics did not significantly alter infection rates in post-mastectomy patients, however infections in this cohort had more negative operative cultures, delayed time to explantation, and lower correlation with aspirate microbiome data. Larger cohort samples are necessary to continue studying these variations but this may reflect changes to the balance of the microbiome seen with prolonged antibiotics, and provides novel insight into the larger impact of antibiotics in effacing potential markers for implant infections.

REFERENCES

1. Yamin F, Nouri A, McAuliffe P, et al. Routine Postoperative Antibiotics After Tissue Expander Placement Postmastectomy Does Not Improve Outcome. Ann Plast Surg. 07 01 2021;87(1s Suppl 1):S28-S30. doi:10.1097/SAP.0000000000002826
2. Phillips BT, Fourman MS, Bishawi M, et al. Are Prophylactic Postoperative Antibiotics Necessary for Immediate Breast Reconstruction? RESULTS of a Prospective Randomized Clinical Trial. J Am Coll Surg. 06 2016;222(6):1116-24. doi:10.1016/j.jamcollsurg.2016.02.018
3. Banuelos J, Abu-Ghname A, Asaad M, Vyas K, Sohail MR, Sharaf B. Microbiology of Implant-Based Breast Reconstruction Infections: A Systematic Review. Ann Plast Surg. Aug

2020;85(2):194-201. doi:10.1097/SAP.0000000000001974
4. Meng S, Chen B, Yang J, et al. Study of Microbiomes in Aseptically Collected Samples of Human Breast Tissue Using Needle Biopsy and the Potential Role of. Front Oncol. 2018;8:318. doi:10.3389/fonc.2018.00318

Immediate Discharge Following Mastectomy and Immediate Tissue Expander Reconstruction

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PURPOSE: Patients who undergo mastectomy with immediate tissue expander (TE) reconstruction are typically observed overnight for immediate post-operative complications and patient comfort.1 Changes within the US healthcare system including differential resource allocation, staffing shortages, and hampered bed utilization catalyzed necessary changes in patient management.2 Within, we compare the short-term outcomes of patients receiving same day mastectomy and tissue expander reconstruction for those discharged on postoperative day one versus those discharged immediately following surgery to explore the safety, efficacy, and potential impact on hospital processes.

MATERIALS AND METHODS: Institutional Board Review approval was obtained and a retrospective review of patients undergoing mastectomy with immediate TE reconstruction from March 2019 to March 2021 was performed. Patients were stratified into two cohorts; the first cohort was observed overnight (OBS) and underwent surgery from March 2019 to March 2020. Patients in cohort two were treated as outpatient surgery and discharged the same day (DC) of their surgery, and this occurred from April 2020 to March 2021. Both cohorts underwent the same enhanced recovery after surgery protocol.

Basic demographic information, and immediate post-operative complication rates were collected. Primary outcomes included rates of seroma, hematoma, infection, dehiscence, mastectomy flap necrosis and TE exposure, rupture, and leak. Secondary outcomes included ED visit, readmission rates, need for unplanned re-operation, and need for additional pain medications. Outcomes were tracked for 7 days following surgery. Statistical analysis was performed using chi-squared tests,

Fisher exact tests, and two-sample t-tests and significance determined by a $p<0.05$.

RESULTS: In total, 153 patients underwent 256 mastectomies with immediate TE reconstruction. All patients were female and mean age was 48 years old. The DC cohort contained 71 patients (125 mastectomies) and there were 82 Patients (131 mastectomies) within the OBS cohort. No differences were observed between groups for medical comorbidities, neoadjuvant chemotherapy/radiation, indication for mastectomy, mastectomy type, location of TE, or antibiotic on discharge.

On average the DC cohort had a lower BMI than the OBS group (mean ± SD; DC 26.8 kg/m2 ± 5.3 kg/m2, OBS 28.7 kg/m2 ± 6.1 kg/m2, $p = 0.05$), the DC cohort had higher rates of adjuvant chemotherapy (DC 40.1%, OBS 23.2%, $p=0.02$), and were more likely to undergo bilateral TE reconstruction (DC 76%, OBS 60%, $p=0.03$) than the OBS group. No differences were observed between cohorts in complication rates regarding primary or secondary outcomes.

CONCLUSION: These findings indicate that it is safe and effective within the immediate 7-day post-operative period to immediately discharge patients undergoing mastectomy with immediate TE reconstruction. There were no differences regarding rates of complications between the DC and OBS group. Patients may experience enhanced satisfaction with immediate recovery within their own homes and with their support groups.3 Additionally, alteration of patient management practices can have a profound impact on the operational flow within hospitals. A reduction in bed and staff utilization provides space for growth.

1. Perez-Alvarez IM, Bartholomew AJ, King CA, et al. Breast Surgery in the Time of Global Pandemic: Benefits of Same-Day Surgery for Breast Cancer Patients Undergoing Mastectomy with Immediate Reconstruction during COVID-19. Plast Reconstr Surg. Oct 2020;146(4):522e-523e. doi:10.1097/prs.0000000000007269
2. Impact of the COVID-19 Pandemic on the Hospital and Outpatient Clinician Workforce. . Assistant Secretary for Planning and Evaluation Office of Health Policy; 2022. Accessed May 3, 2022.
3. Ludwig K, Wexelman B, Chen S, et al. Home Recovery After Mastectomy: Review of Literature and Strategies for Implementation American Society of Breast Surgeons Working Group. Ann Surg Oncol. Sep 2022;29(9):5799-5808. doi:10.1245/s10434-022-11799-4

National Trends and Impact of Preoperative CT-Angiography on Autologous Breast Reconstruction

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PURPOSE: Prior studies investigating the impact of preoperative CT-angiography (pCTA) on outcomes for autologous breast reconstruction (ABR) have had conflicting RESULTS. Prior studies have largely been limited to single-center studies with limited sample size, which have contributed to the conflicting data. Larger, nationwide studies are needed to better understand the trends and outcomes associated with pCTA for ABRs.

METHODS AND MATERIALS: Using ICD/CPT codes, we identified patients who underwent ABR with and without pCTA between 2010-2021 in a national administrative claims database. Costs, length of hospital stay (LOS), and trends in usage of pCTA were evaluated. 90-day outcomes were assessed, including wound complications, infection, flap failure, and hematoma/seroma.

RESULTS: Of 15,997 ABR patients, 10,337 (64.6%) did not undergo pCTA and 5,660 (35.4%) underwent pCTA. Annual rate of pCTAs gradually increased from 29% in 2010 to 44% in 2021. Patients with pCTA observed higher median hospital costs and prolonged LOS. No difference in 90-day outcomes was observed in patients undergoing ABR with or without pCTA after adjusting for age, geographic region of residence, insurance plan, BMI and other co-morbidities in multivariable regression analysis.

CONCLUSION: The use of pCTA for ABRs has been gradually rising nationwide and is associated with higher costs and prolonged LOS. However, there appears to be no difference in 90-day outcomes for patients undergoing ABR with or without pCTA. Use of pCTA should be carefully considered to avoid unnecessary expense and risks for ABR patients.

The Safety of Combining Breast Reconstruction and Risk Reducing Gynecologic Surgeries: An Analysis of cases from the National Surgical Quality Improvement Program

INTRODUCTION: Patient's undergoing breast reconstruction may opt for extirpative gynecologic surgery for risk reducing PURPOSEs. The potential benefits of this include reduction of number of general anesthetic periods and total amount of time for recovery from repeated procedures as well as increased cost effectiveness. One prior concern raised is the potentially increased risk of complications from combining surgeries. Prior studies have had relatively small case numbers and mixed RESULTS with some finding no significant increase in complications while others have found increased complication rates. Large database studies are lacking with those that have been performed focusing specifically on oncologic breast surgery. In this study, we aim to examine the risks and benefits of breast reconstruction performed with or without concurrent gynecologic procedures.

METHODS: The National Surgical Quality Improvement Program database was queried for breast reconstruction CPT codes from 2010 to 2020. Abstracted cases were then stratified by those that were performed with or without concurrent risk reducing gynecologic procedures. Operative times between these groups were compared with T-Test analysis and complication rates were examined and compared using the Fisher exact test. All statistics were performed in

SPSS.

RESULTS: 60,029 cases were extracted for 7 plastic surgery CPT codes. Operative times differed significantly between cases with and without concurrent plastic surgery and gynecologic procedures with the combined cases taking significantly longer. Complications of superficial infection, dehiscence, pneumonia, bleeds requiring transfusion, deep vein thrombosis, and pulmonary embolism did not differ significantly between the groups with the exception of bleeds in the context of periprosthetic capsulectomy.

CONCLUSION: Combining plastic and gynecologic surgeries is safe with no greater complication rates associated. While performing these procedures concurrently does significantly increase operative time, the time required to perform these procedures on separate occasions is likely much greater. While it can be difficult to coordinate teams to perform these procedures concurrently, these patients gain the benefit of completing surgical treatment more expeditiously.

REFERENCES

1. Schrauder MG, Brunel-Geuder L, Häberle L, Wunderle M, Hoyer J, Csorba R, Reis A, Schulz-Wendtland R, Beckmann MW, Lux MP. Cost effectiveness of bilateral risk-reducing mastectomy and salpingo-oophorectomy. Eur J Med Res. 2019 Sep 14;24(1):32. doi: 10.1186/s40001-019-0391-8. PMID: 31521205; PMCID: PMC6744699.
2. Del Corral GA, Wes AM, Fischer JP, Serletti JM, Wu LC. Outcomes and Cost Analysis in High-Risk Patients Undergoing Simultaneous Free Flap Breast Reconstruction and Gynecologic Procedures. Ann Plast Surg. 2015 Nov;75(5):534-8. doi: 10.1097/SAP.0000000000000156. PMID: 24691318.
3. Tevis SE, Steiman JG, Neuman HB, Greenberg CC, Wilke LG. Postoperative complications in combined gynecologic, plastic, and breast surgery: An analysis from National Surgical Quality Improvement Program. Breast J. 2019 Nov;25(6):1111-1116. doi: 10.1111/tbj.13429. Epub 2019 Jul 6. PMID: 31280491; PMCID: PMC7192577.
4. Jayaraman AP, Boyd T, Hampton SN, Haddock NT, Teotia SS. The Impact of Combined Risk-Reducing Gynecological Surgeries on Outcomes in DIEP Flap and Tissue-Expander Breast Reconstruction. Plast Surg (Oakv). 2020 May;28(2):112-116. doi: 10.1177/2292550320925905. Epub 2020 May 22. PMID: 32596186; PMCID: PMC7298572.

The Effect of Perioperative Exercise on Post-operative Outcomes After Breast Surgery: A Review of the Current Literature

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BACKGROUND: Perioperative exercise after oncologic breast surgery confers several benefits including decreased pain intensity 1 and improved quality of life (QOL) 2, but the evidence for optimal timing and types of physical activity permitted following surgery is limited. Furthermore, understanding the impact of perioperative physical activity on post-surgical complications like seroma and hematoma helps to ensure the best possible patient outcomes. This review seeks to test the hypothesis that early exercise after breast surgery improves patient reported outcomes but increases rates of post-operative complications.

METHODS: A comprehensive literature review on PubMed identified articles related to the effects of exercise on post breast oncologic surgery recovery. Inclusion criteria were as follows: peer reviewed publications from 2011 to 2022, effects of exercise after breast surgery as the primary outcome, patient-reported and objective outcomes were included, studies were excluded if the main outcome was not exercise effect on patient outcomes. The data recorded included the number of patients in each study, experimental groups, exercise regimen, primary and secondary outcomes, the number of days to exercise after surgery, complications, quality of life measurements, study protocol, study RESULTS, and inclusion and exclusion criteria.

RESULTS: Out of 377 studies identified, 16 studies were included in the final analysis after applying selection criteria. All were level 1, randomized controlled trials. Four studies started exercise on postoperative day 1 (POD1). Single studies started exercise on POD 7-10, 3 weeks, 1-3 months and 5-6 months. The remaining studies used chemotherapy sessions (CS) as a timeline for exercise: 3 started within 6 months of CS, one during chemotherapy, one 3 days after the second CS, and one within 1-2 weeks of the first CS. Exercise regimens included shoulder and upper limb exercises, physiotherapy, walking, resistance training, aerobics, Pilates, yoga, and water exercises. Five studies found significant improvement in functional capacity, three studies showed improvement in pain, ten studies showed improvement in QOL measures. Only one study examined exercise's effect on seroma and hematoma development and found no significant difference in short-term or long-term complications.1

CONCLUSIONS: Perioperative exercise improves patient quality of life, post-operative pain, and functional capacity, although there is wide variability in the timing to start exercise after breast surgery. Effects of exercise on complications like seroma and hematoma were seldom studied, however the study reviewed in this paper suggests that it is safe to begin range of motion exercising on POD1. Further research is needed to better understand the effects of the timing of exercise on post-surgical complications and to define best practices.

REFERENCES:

1. Klein, Ifat, et al. "A Pilot Study Evaluating the Effect of Early Physical Therapy on Pain and Disabilities after Breast Cancer Surgery: Prospective Randomized Control Trail." The Breast, vol. 59, 2021, pp. 286–293., https://doi.org/10.1016/j.breast.2021.07.013.

2. Tehreem, Fatima, et al. "Effectiveness of Preoperative Stretchings on Postoperative Shoulder Function in Patients Undergoing Mastectomy." Journal of the Pakistan Medical Association, vol. 72, no. 4, 2022, pp. 625–628., https://doi.org/10.47391/jpma.0475.

Comparing the use of acellular dermal matrix with surgical mesh in immediate prepectoral breast reconstruction

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INTRODUCTION: Acellular dermal matrices (ADMs) have been routinely used in breast reconstruction for soft tissue reinforcement. However, the risk profile, including seromas, infection, and red breast syndrome, as well as cost has made surgeons look for other options. We aimed to determine if surgical mesh is a comparable alternative to ADM in breast reconstruction.

METHODS: A retrospective cohort study was performed to assess consecutive patients who underwent immediate pre-pectoral implant-based breast reconstruction with either ADM (AlloDerm) or surgical mesh (GalaFLEX) implant wrap between 2021 and 2022. Patients were asked to complete the BREAST-Q questionnaire to evaluate satisfaction and quality of life. Descriptive statistics were conducted for sociodemographic and oncologic risk factors and complications of the surgery. Multivariable logistic regression analyses were also performed. A loose age-matched subsample was created for sub-analysis.

RESULTS: 66 patients (123 breasts) were included in this study. 88 breasts had ADM used and 35 breasts had GalaFLEX. The average age in the study was 52±13years, and the average BMI was 26.6±5.7kg/m2. The overall complication rate was 28.5%. Patients who had GalaFLEX did not have higher odds of developing complications compared to ADM (OR 1.49 [0.60 – 3.71], p = 0.39). The BREAST-Q scores were similar between the two groups: satisfaction with breasts (p = 0.86), psychosocial wellbeing (p = 0.11), sexual wellbeing (p = 0.38), and physical wellbeing of the chest (p = 0.59).

CONCLUSIONS:
Given its lower cost and comparable surgical and patient reported outcomes, GalaFLEX is a safe and reliable option for immediate breast reconstruction.

Surgimend vs. Alloderm in Immediate Implant Based Prepectoral Breast Reconstruction: A Single Surgeon's Experience

Abstract Presenter
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Abstract Co-Author
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PURPOSE: Breast cancer is the second most common cancer among women in the United States, with 254,744 new cases in women each year [1], many of whom undergo mastectomies as a result. Currently, the most common METHOD of breast reconstruction is implants. Many plastic surgeons use Acellular Dermal Matrices (ADM) during implant-based breast reconstruction. This allows for the stabilization and definition of the borders of the breast implant under the pectoralis major. Its use has also allowed for direct implant and nipple-sparing mastectomies with reconstruction. More recently, the use of ADMs has transformed the dominant breast reconstruction technique from subpectoral to prepectoral [2], providing patients with better post-operative pain control, lower analgesic requirements, and less animation deformity.
The most common ADM is Alloderm (LifeCell Corp., Branchburg, N.J.), which is derived from human cadaveric dermis. Many studies have examined the complications and the benefits of Alloderm use in breast reconstruction. Fewer studies have looked at the other ADMs and even fewer have compared different ADMs. We wanted to compare the outcomes of Alloderm with Surgimend, especially given the price difference between the two ADMs (Surgimend $22/cm2 vs. Alloderm $30/cm2) [3].
Given the increasing trend towards prepectoral breast reconstruction, our study attempts to retrospectively examine and compare the outcomes and complications of Alloderm and Surgimend in prepectoral breast reconstruction from a single surgeon who transitioned from Alloderm to Surgimend. Factors compared included infection, seroma/hematoma, nipple or skin necrosis, and any other post-operative complications.

METHODS: Electronic medical records of patients aged 18–85 years old who underwent unilateral or bilateral, immediate prepectoral implant-based breast reconstruction from June 2020 through July 2022 at our institution were retrospectively reviewed. Patients with subpectoral implant placement, delayed reconstruction, or patients who had their reconstruction done by another surgeon were excluded from the study. Data on patient demographics such as age, BMI, comorbidities, and substance use were recorded. The study also noted whether patients received pre- or postoperative chemotherapy or radiotherapy. Postoperative complications consisted of seroma, hematoma, infection, skin/nipple necrosis, capsular contracture, infection, and implant failure. Infection was divided into minor and major infection, in which major infections resulted in hospitalization or explantation. T-test and Chi-square test of independence were used to determine significance.

RESULTS: A total of 131 reconstructions (75 patients) were included (44.27% Alloderm and 55.73% Surgimend). Characteristics of both groups were similar, though patients in the

Alloderm group were more likely to have hyperlipidemia (22.41% Alloderm vs. 8.22% Surgimend, p=0.022). For Alloderm vs. Surgimend, the rate of hematoma (3.45% vs. 2.74%, p=0.81), seroma (15.52% vs. 26.03%, p=0.14), skin/nipple necrosis (6.90% vs. 12.33%, p=0.30), explantation (18.97% vs. 15.07%, p=0.55), infection (18.97% vs. 15.07%, p=0.55), capsular contracture (6.90% vs. 4.11%, p=0.43), and failed reconstruction (6.90% vs. 4.11%, p=0.48) were not statistically significant.

CONCLUSIONS: Our study found that in prepectoral implant-based reconstruction, there are no differences in surgical complications between Alloderm and Surgimend, demonstrating that the outcomes associated with the use of Surgimend is equivalent to the use of Alloderm in pre-pectoral immediate breast implant-based reconstruction.

REFERENCES

1. U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2020 submission data (1999-2018): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, released in June 2021.
2. Gui GaT, F. J. . 'Meshed Enhanced Hammock' or 'Tent': A New Patient Centred Pre-Pectoral One-Stage Immediate Breast Reconstruction Technique for Varying Ptosis. Annals of Plastic and Reconstructive Surgery. 2019;3(1):4.
3. Butterfield JL. 440 Consecutive immediate, implant-based, single-surgeon breast reconstructions in 281 patients: a comparison of early outcomes and costs between SurgiMend fetal bovine and AlloDerm human cadaveric acellular dermal matrices. Plast Reconstr Surg. 2013;131(5):940-951.

The Korean Breast Implant Registry (K-BIR) : Small but Essential Step for Patient Safety

Abstract Presenter
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BACKGROUND: With the first Korean case of breast implant-associated anaplastic large cell lymphoma(BIA-ALCL) reported in 2019, the Korean Breast Implant Registry(K-BIR) was initiated as a pilot registry in April 2020, a cooperative effort of the Korean Society of Plastic and Reconstructive Surgeons, and the Korean Ministry of Food and Drug Safety. After modification based on feedback from participating surgeons, a trial version was launched in January 2022. This is an analysis of the findings and lessons learned during the 2022 trial K-BIR.

METHODS: The pilot K-BIR dataset was modified using the modified Delphi process with the

participation of the Korean Academic Association of Aesthetic and Reconstructive Breast Surgery, and implemented into a new electronic data collection form. This included patient data(age, gender, height, weight, chemotherapy, radiotherapy), surgical details(operation date, incision, procedure type, reason for revision, plane, fat graft, simultaneous mastopexy, mastectomy, flap reconstruction, use of synthetic mesh, acellular dermal matrix, drain, antibiotics, funnel, nipple shield, irrigation of pocket, change of surgical gloves), and implant characteristics(typed in or scanned via barcode). The data collection system was linked with a digital implant catalogue that enabled the barcode to automatically fill in the implant characteristics. The trial K-BIR was initiated in January, 2022, opened to 21 experienced breast plastic surgeons. As an opt-in registry, the surgeon was required to receive informed consent regarding collection of personal data.

RESULTS: From January to November, 2022, a total of 1,059 data collection forms (966 individual patients, 1,470 breasts) were registered in the K-BIR. The mean age of the patients was 44.95 years. 32%(339 cases) of the 1,059 cases were aesthetic, and 68%(720 cases) were reconstructive. 90.3%(956) were primary cases, and 9.6%(103) were revision operations. 10.3% were revisions of aesthetic, and 9.4% were revisions of reconstructive procedures. 92.2% of the registered implants had a smooth surface, 7.8% surface of unknown properties.
Revision procedures were performed due to complications in 62.1% of cases, pure patient demand in 26.2%, and both combined in 8.7%. Aesthetic revisions were due to complications in 57.1%, purely patient demands in 40%, and combined in 2.9%, whereas reconstructive revisions were 64.7%, 19.1%, and 11.8%, respectively. The most common complication in aesthetic procedures was implant rupture(30.2%), and capsular contracture(39.7%) in reconstructive procedures.
Feedback from participating surgeons revealed that the smaller dataset, digital interface and digital implant catalogue was time-saving, but the process of explaining the whole concept, and receiving patient consent was the largest burden.

CONCLUSIONS: The K-BIR is the first nationwide registry for specific medical devices in Korea, and the first BIR initiated in Asia. However, the trial run has augmented the limitations exposed during the pilot registry. Considering the annual estimate of breast augmentation procedures is over 50,000 nationally, a trial run open to all surgeons is necessary to assess the actual capture rate. The legislative background for an opt-out registry, a confidential personal data protection system, incentives for participation, and permanent maintenance personnel with stable funding are goals that must be achieved for the K-BIR to become a consistent, high-quality registry.

Staging Wise Pattern Oncoplastic Reduction/Mastopexy Provides Superior Control of the Skin Pocket Compared to Vertical Pattern Prior to Nipple Sparing Mastectomy

Abstract Presenter
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INTRODUCTION: Nipple sparing mastectomy (NSM) is an oncologically safe procedure that compared to skin sparing techniques can enhance the reconstructive patient's body image and health-related quality of life. However, for patients who present with large, ptotic breasts, control of the nipple position and skin envelope is unpredictable. Mastopexy and reduction mammoplasty techniques have long been a powerful tool to preserve perfusion of the nipple whilst achieving satisfactory NAC position over a lifted or reduced breast. Oncoplastic reduction/mastopexy performed prior to NSM has the potential to increase control of the skin envelope, nipple position, and reduce complications for patients with significant macromastia or ptosis. There is limited insight into the advantages of one technique over another in the reconstructive patient. To discern whether Wise or vertical pattern reduction/mastopexy provides superior control over the mastectomy skin, we examined the rate of revision of patients treated with these techniques prior to undergoing NSM with more than 4 years of follow up.

METHODS: An IRB approved retrospective review was performed on all patients who underwent staged reduction/mastopexy prior to NSM and reconstruction from 2013-2023 at a single institution by two surgeons. Patients were queried for demographic factors, operative factors, outcomes, and revisions, specifically to that of the skin envelope.

RESULTS: 67 patients (123 breasts) underwent reduction/mastopexy with an average of 4.25±0.8 years of follow up. Wise pattern (N=34) and vertical pattern (N=33) patients were well matched by demographic factors, however, the average BMI of all patients was 31±6. Both groups presented with similar grades of ptosis and asymmetry, but Wise pattern patients had higher rates of symptomatic macromastia (23 (68%) vs. 12 (36%), p=0.01). Indication did not differ significantly between either group. Superior/superiomedial dermoglandular pedicles were consistently used in both cohorts (32 (97%) vs. 28 (82%), p=0.10). Cohorts were well matched by treatment factors including lymphatic surgeries, radiation, and reconstructive plane with most undergoing prosthetic prepectoral reconstruction (18 (55%) vs. 18 (53%), p=1). Time between stages was also similar (83±59 vs. 79±61 days, p=0.84). The overall complication rate of 37% (13 (39%) vs. 12 (35%), p=0.79) did not differ significantly by staging pattern. Most complications were minor with delayed wound healing (4 (12%) vs. 4 (12%), p=1) occurring most frequently. There were no instances of complete nipple loss or reconstructive failure. Vertical staging pattern was correlated with an overall higher revision rate to the skin pocket (7 (21%) vs. 22 (67%), $p<0.05$); in particular, correction of relative pseudoptosis with excision of excess inferior pole skin (2 (6%) vs. 16 (48%), $p<0.05$). Nipple malposition was not common in either group, but statistically higher among the vertical cohort (1 (3%) vs. 4 (12%), p=0.04).

CONCLUSIONS: When performed prior to NSM, Wise pattern reduction/mastopexy techniques afford the surgeon superior control of the mastectomy skin with an acceptable risk profile. While vertical staging patterns may be favored by patients that desire a lower scar burden, over the long term they are associated with significantly more revisions in the reconstructive context.

A Paired Analysis of Outcomes in Therapeutic versus Prophylactic Breasts Following Bilateral Mastectomy with Deep Inferior Epigastric Perforator (DIEP) Flap Reconstruction

Abstract Presenter
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BACKGROUND: There is an increasing trend in patients electing for bilateral mastectomy when diagnosed with unilateral breast cancer.1 Although there is no increase in patient survival, women often are still satisfied with their decision to undergo contralateral prophylactic mastectomy. Patients that elect for contralateral prophylactic mastectomy and the incidence of breast reconstruction are closely related. Earlier literature investigating the complications of prophylactic contralateral mastectomy with reconstruction has been contradictory and focused mainly on implant-based reconstruction.2,3 Patients with unilateral cancer that undergo bilateral mastectomy with autologous reconstruction deserve clearer answers about reconstructive outcomes that are not convoluted with implant-based RESULTS. The PURPOSE of our study is to compare outcomes in the therapeutic versus prophylactic breast following bilateral mastectomy with DIEP flap reconstruction.

METHODS: A single-institution retrospective review was conducted of women undergoing autologous breast reconstruction following bilateral mastectomy for treatment of a unilateral breast cancer between January 2019 and March 2022. Patient demographics, medical history, and postoperative complications were collected. 263 patients (526 breasts) met inclusion criteria. A paired analysis was performed using repeated measures logistic regression.

RESULTS: 263 patients with unilateral breast cancer underwent bilateral mastectomy with DIEP flap reconstruction. 55.1% of patients underwent radiation, 54.8% of patients received chemotherapy and 80.6% of patients had delayed reconstruction. 33% of patients had surgical complications and 19.8% of patients developed complications on the prophylactic side. Paired analysis comparing reconstruction of the therapeutic versus prophylactic mastectomy side revealed no difference in overall complications (p=0.68); however, when stratified by type of complication, the therapeutic side experienced a higher rate of fat necrosis (p= .0463). Mean follow up was 311.9 days.

CONCLUSION: This is the largest paired analysis of surgical outcomes between therapeutic and prophylactic breasts following bilateral autologous DIEP flap reconstruction. Patients may

often assume that the prophylactic side will have less reconstructive complications than the therapeutic side; however, our analysis shows similar rates of overall complications. Patients should be counseled of the risk associated with reconstruction on the prophylactic side, with nearly 1 in 5 patients experiencing a complication. Our study additionally found a higher incidence of fat necrosis in the therapeutic mastectomy reconstruction. This may lead to increased medical interventions and anxiety for a patient during breast cancer surveillance. Our study provides clarity on reconstructive outcomes for patients with unilateral breast cancer undergoing bilateral mastectomy with autologous reconstruction.

1. Panchal H, Matros E. Current Trends in Postmastectomy Breast Reconstruction. Plast Reconstr Surg. 2017;140:7S-13S. doi:10.1097/PRS.0000000000003941

2. Crosby MA, Garvey PB, Selber JC, et al. Reconstructive Outcomes in Patients Undergoing Contralateral Prophylactic Mastectomy. Plast Reconstr Surg. 2011;128(5):1025-1033. doi:10.1097/PRS.0b013e31822b6682

3. Nealon KP, Sobti N, Gadd M, Specht M, Liao EC. Assessing the additional surgical risk of contralateral prophylactic mastectomy and immediate breast implant reconstruction. Breast Cancer Res Treat. 2020;179(2):255-265. doi:10.1007/s10549-019-05460-0

A National Claims Database Case-Matched Cohort Comparison of Breast Implant Illness Symptoms in Women With and Without Breast Implants

Abstract Presenter
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PURPOSE: Patients and physicians describe a variety of systemic symptoms that may be reported by women with breast implants as breast implant illness (BII). Currently BII does not have an international classification of diseases designation to aid in recording and analysis of patient outcomes for these non-specific symptoms. The Food and Drug Administration's review of the medical device report (MDR) database yielded 7,467 cases of women with breast implants reporting systemic symptoms (August, 2022). There were ten symptom types that were found in the majority of these cases including fatigue, joint pain, brain fog, anxiety, hair loss, depression, autoimmune diseases, rash, headache and inflammation with 40% of these patients reporting device explantation after experiencing these symptoms. We performed a national insurance claims database review to determine if women with breast implants were more likely to seek medical care for these symptom categories than women without breast implants.

METHODS: A national claims database (Pearldiver) query was performed to define a group of women that had breast implants for augmentation or breast reconstruction after mastectomy from 2010-2022 and an age and Charlson Comorbidity Index (CCI) matched control group without breast implants. The proportion of patients seeking medical care for the symptoms listed above were recorded for each cohort and subsequent analysis on any relationship of age, geographic region and medical comorbidities on symptom reporting was analyzed as well as the proportion of patients explanted during the study time period.
RESULTS: 36,680 women with breast implants were identified with 5,757 after augmentation, 21,272 direct to implant at the time of mastectomy and 14,261 staged expander to breast implant reconstruction. 102,934 case-matched women were identified without breast implants. 59.9% of women with breast implants reported one of the listed symptoms compared to 50.1% of women without breast implants ($p<0.001$) with significantly more women with implants carrying diagnoses for fatigue, joint pain, anxiety, hair loss and rash than those without ($p<0.001$). Depression and brain fog were more commonly reported by patients without breast implants ($p<0.001$) (Table 1). 18,959 or 24.5% of patients with breast implants reporting any symptoms underwent explantation during the study period. Logistic regression demonstrated having breast implants increased the likelihood of carrying a diagnosis for any of these symptoms (OR 1.49 CI 1.46-1.53) and patients carrying a diagnosis of anxiety (OR 1.09 CI 1.04-1.114), hair loss (OR 1.16 CI 1.03-1.29) or depression (OR 1.12 CI 1.06-1.19) were significantly more likely to undergo explantation while patients with a diagnosis of fatigue were less likely (OR 0.93 CI 0.88-0.97) while other symptoms did not contribute to explant.

CONCLUSION: Women with breast implants were more likely to carry medical diagnoses for systemic symptoms identified by the MDR in the majority of cases of BII when compared to age and CII-matched controls without implants. Patients with diagnoses of anxiety, depression or hair loss were more likely to undergo explantation within this cohort. Multi-center studies are required to understand the associations between non-specific medical diagnoses and having breast implants.

Evaluating the Association Between Flap Monitoring and DIEP Flap Outcomes in Postmastectomy Patients at Mayo Clinic, Florida

Abstract Presenter
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INTRODUCTION: The use of the deep inferior epigastric artery perforator (DIEP) flap is the current gold standard for autologous breast reconstruction. Clinical flap monitoring is the most cost-effective METHOD for postsurgical monitoring, yet the evidence is still needed to recommend it. Routine doppler assessments can aid in detecting vascular compromise, but their utility has remained controversial. Despite the evolution and improvement of free flap procedures to achieve high success rates, the necessity of flap monitoring has yet to be widely studied. This study analyzes the association between postoperative flap monitoring and reconstructive DIEP flap outcomes in patients who underwent a mastectomy at Mayo Clinic, Florida.

METHODS: Using the EPIC system, we conducted a chart review of patients who underwent unilateral or bilateral DIEP flap procedures between July 2018 and November 2022. Patients who underwent bilateral DIEP flap reconstruction were counted as separate cases per side. We collected patient demographics (age, BMI, smoking status, significant past medical history), diagnosis at admission, surgical interventions, postoperative adverse events, length of stay, and monitoring device use (pencil doppler, Vioptix, and implantable Cook-Swartz Doppler) and flap survival at discharge. We used a statistical analysis tool (Rstudio v2022.12.0+353) to perform a chi-square on the categorical variables of interest; furthermore, we adjusted the p-value using FDR.

RESULTS: A total of 167 DIEP flaps were assessed in our study, of which 48.5% were monitored clinically and 51.5% were monitored using a device. The mean age of participants was 53.7 (SD 10.2), 82.0% were white, 81.4% were "not Hispanic or Latino," 53.3% were obese (BMI $\geq$ 30), 7.8% were diabetic, and 68.3% had never smoked. The mean length of stay was 3.84 (SD 1.27), with 81.4% of patients having a length of stay lower than 4 days; moreover, the mean number of comorbidities was 1.65 (SD 1.51). Skin-sparing mastectomies preceded 68.3% of the DIEP flaps, and 68.3% were immediate reconstructions. The mean number of perforator arteries used in each DIEP flap was 2.03 (SD 0.83), and the mean flap weight was 738 (SD 200). In addition, 7.8% of the flaps had at least 1 postoperative complication during hospitalization, including drain obstruction, hematoma, seroma, and venous and arterial obstruction; moreover, 99.4% of flaps survived at discharge. Ninety-six (57.5%) of the procedure were non-buried, and 71 (42.5%) were buried. The pencil doppler was the most common flap monitoring tool, used in 67 cases (77.9%). The flaps were clinically monitored in 86.4% of the buried procedures and 13.6% of the non-buried procedures. There was no statistically significant association between the use of devices for flap monitoring and flap survival ($p = 0.99$) or the need for surgical re-exploration during hospitalization ($p = 0.99$).

CONCLUSION: Our data indicate no association between the use of devices for flap monitoring and DIEP flap survival in postmastectomy patients. A cost/analysis is deemed necessary to determine the economic impact of using devices to monitor DIEP flaps.

Temporal Trends in Free Flap Breast Reconstruction from 2005 to 2020, a Longitudinal ACS-NSQIP Study of 11,500 Cases

Abstract Presenter
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PURPOSE: Free flap breast reconstruction (FFBR) is an established option in the armamentarium of reconstructive microsurgeons. Over the years, improving patient optimization has been an important focus in the attempt to create better outcomes. However, actual trends in FFBR patient demographics, comorbidities, and outcomes over time, has not been well described. Therefore, the PURPOSE of this study is to investigate these temporal trends in demographics, comorbidities, and short-term outcomes of patients undergoing FFBR, in order to determine how the typical FFBR patient and their outcomes have evolved.

METHODS: The 2005-2020 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for all cases of FFBR using Current Procedural Terminology (CPT) code 19364. Data was stratified by year, with 2005-2012 being grouped together to maintain adequate sample size. Data regarding patient demographics, medical comorbidities, and episode of care characteristics including length of stay, operative time, and 30-day readmission were recorded. Chi-square tests and analysis of variance were used to identify any significant difference in variables over time.

RESULTS: Overall, 11,500 cases met inclusion criteria. From 2005-2012 (n=408) to 2020 (n=1,707), ranges for average age were (50.1-51.0) and average BMI were (29.4-29.9). Clinically significant changes were seen in functional status (2012: 95.6%, 2020: 99.8%, $p < 0.05$), smoking status (2012: 7.6%, 2020 5%, $p < 0.05$) and hospital length of stay (2012: 5.5 days, 2020: 3.6 days, $p < 0.05$). There was not a clinically significant change in age, BMI, BMI >40, and other medical comorbidities. Across 2005-2020, most comorbid conditions only affected a very minor (<1-2%) of cases for that year. The vast majority (>99%) of cases were discharged home with a low (<7.0%) rate of readmission.

CONCLUSIONS: Contemporary FFBR remains a safe and viable reconstructive option. Although it was expected that improving approaches to preoperative patient optimization would have yielded more significant differences in rates of objective patient health measures over time, this was not completely observed. However, the downward trend of current smoking status is of relevance given the known detrimental effects on surgical outcomes. In general, the average patient undergoing FFBR is healthy and is likely to have an acceptable short-term outcome, with a shorter total hospital length of stay compared to prior. Therefore, more focused studies examining patient temporal trends within certain races, age groups, or from breast cancer programs offering high-risk management may yield more significant differences. Overall, FFBR in a healthy patient remains an excellent reconstructive choice for women battling breast cancer.

Autoaugmentation with own tissues for Mastopexy and Breast Reduction - A Comprehensive Personal Approach

Abstract Presenter
Pawel Szychta MD, Phd, Dsc

BACKGROUND: Ptotic breast RESULTS from involution of breast parenchyma and laxity of the skin envelope, perceived as an apparent volume loss in the upper pole and the central breast, with the lower pole usually fuller and wider. A variety of techniques of breast reduction and mastopexy treat ptosis and upper pole hollowness, while simultaneously narrowing the lower breast pole and raising the inframammary fold. However, there are several challenges regarding the long-term RESULTS in the individual clinical scenarios of diverse chest wall shapes, breast parenchyma quality, fascia and skin laxity, resulting in unpredictable longevity of upper breast fullness.

OBJECTIVE: This study focuses on perioperative decision making, several surgical techniques of the autoaugmentation techniques and the breast parenchyma suspension during mammaplasty, for the pleasing long-term aesthetic outcomes of breast shape with narrow cleavage, upper pole fullness and uplifted breast base.

RESULTS: For the retrospective series, 250 patients operated by a single surgeon received autoaugmentation and mastopexy or breast reduction. In cases requiring mastopexy, the superior pedicle vertical mammaplasty included autoaugmentation based centrally and inferiorly (type I). In severe cases of breast ptosis, the medially based glandular flap was transposed (type II). In patients undergoing breast reduction with autoaugmentation, island modified flap was described by the author and used (type III). In cases of poor parenchyma quality and high laxity of fascia and skin, Island modified flap and autologous internal bra was described by the author and performed (type IV). Long-term pleasing RESULTS of uplifted breasts with narrow medial cleavage, upper pole fullness, correct nipple-areola position, controlled breast volume and youthful lower breast pole were seen, with the mean follow-up of 12 months. Autoaugmentation increased projection, apparent volume of the upper breast pole with optimal cleavage.

CONCLUSIONS: The proposed algorithm of 4 types of autoaugmentation techniques designed for diverse range of clinical scenarios has proven to be an effective model for mammaplasty without implants, with consistent RESULTS for patients presenting with any grade ptosis and upper pole hollowness. In patients with low-lying, wide breasts who do desire breast augmentation without implant, this recommendations in the study can be employed to deliver patients with a reliably more youthful breast shape.

Postoperative Antibiotics Following Reduction Mammaplasty Does Not Reduce Rates of Surgical Site Infection

Abstract Presenter

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PURPOSE: The 2022 American Society of Plastic Surgeons Clinical Practice Guidelines do not recommend antibiotic prophylaxis following reduction mammaplasty.1 The evidence informing this recommendation is limited and there is a lack of data describing subgroups who are high-risk for surgical site infection (SSI) such as those with elevated body mass index (BMI). Many surgeons continue to routinely prescribe postoperative antibiotics. The purpose of the current study is to compare SSI rates in reduction mammaplasty patients who received postoperative antibiotics and those who did not. The same analysis was also performed for the subgroup of patients with BMI ≥30 kg/m2.

METHODS: The 2010-2021 PearlDiver Mariner dataset was reviewed to identify primary encounters for reduction mammaplasty using Current Procedural Terminology code 19318. Patients were confirmed to have received preoperative antibiotics. Exclusion criteria were age 59 years, history of diabetes or smoking, and <90 days of follow up. Age, BMI, and Elixhauser Comorbidity Index (ECI) were tracked.

Patients with postoperative antibiotic use, defined as filling an outpatient antibiotic prescription within 3 days of surgery, were identified and matched 1:1 to patients without postoperative antibiotics based on age and ECI score. Type of prescribed antibiotics were recorded. Ninety-day rates of SSI, emergency department (ED) visits, and readmissions were recorded and compared. Pearson's Chi-squared test was used to compare rates of SSI, ED visits, readmissions, and types of antibiotics prescribed. A subgroup analysis was performed on patients with BMI ≥30 kg/m2.

RESULTS: Among patients who also received preoperative antibiotics, 2230 patients who received postoperative antibiotics were identified and matched to 2230 patients who did not. Rates of SSI (1.8% vs 1.7%, p=0.661), ED visits (12.5% vs 11.7%, p=0.435), and readmission (1.8% vs 1.4%, p=0.235) were not statistically different. After filtering for obesity, 218 patients who received postoperative antibiotics were identified and matched to 218 patients who did not. Rates of SSI (1.4% vs 2.8%, p=0.312), ED visits (19.3% vs 15.6%, p=0.313), and readmissions (3.7% vs 0.9%, p=0.055) were not statistically different. First/second generation cephalosporins were the most frequently prescribed antibiotics and prescribed at similar rates between both cohorts (86% and 83%, p=0.127).

CONCLUSIONS: The current study found no difference in SSI rates between patients who receive postoperative antibiotics and those who did not. These observations are corroborated in the obese population. While it is important to optimize the postoperative management plan for each patient, surgeons should perform a thoughtful benefit-harm assessment when considering postoperative antibiotics in patients undergoing reduction mammaplasty.

REFERENCES
1. Perdikis G, Dillingham C, Boukovalas S, et al. American Society of Plastic Surgeons Evidence-Based Clinical Practice Guideline Revision: Reduction Mammaplasty. Plast Reconstr Surg. 2022 Mar 1;149(3):392e-409e. doi: 10.1097/PRS.0000000000008860. PMID: 35006204.

The "Big Easy" Breast Reduction: A Safe, Reproducible Technique for Surgical Management of Gigantomastia

Abstract Presenter
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BACKGROUND: Gigantomastia is broadly defined as macromastia requiring a surgical resection of greater than 1500 grams of breast tissue per breast. Patients presenting with gigantomastia can pose significant operative challenges and often are not deemed candidates for reduction mammaplasty as a result of a less favorable risk profile. The Big Easy Breast Reduction (BEBR) is a technique proposed to improve the reliability of reconstructive success for patients with gigantomastia.

METHODS: A retrospective review was performed of 115 consecutive patients who underwent reduction mammoplasty for gigantomastia from 2018-2021 by the senior author (J.A.D.), using the BEBR technique. The technique avoids use of a vertical scar, eliminates flap undermining, and employs free nipple grafting. During the study period, the BEBR technique was adopted by a second surgeon (author C.M.R.), for treatment of an additional five patients, including three in the oncoplastic setting. Endpoints including patient demographics, operative times, and complication rates were recorded.

RESULTS: The median total specimen weight was 4475g (range 1937-9890g). The average patient BMI was 40.7 (range 26-63.1). Median operative time, measured by total time spent by the patient in the operating room, was 1 hour, 59 minutes. Minor complications occurred in 7 patients (5.8%). There were no occurrences of partial or complete free nipple graft loss. Consistent symmetry and aesthetic outcomes were achieved.

CONCLUSION: The BEBR technique demonstrates a safe, efficient method for surgical management of gigantomastia, and yields aesthetically pleasing RESULTS. The reported series demonstrates the ease of procedure, reproducibility across multiple institutions, and indications.

Impaired Wound Healing after Autologous Free Flap Breast Reconstruction in the Setting of Monoclonal Antibody for Chronic Migraine: A Case Report

Abstract Presenter
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Abstract Co-Author(s)
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Robyn Broach
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INTRODUCTION: Fremanezumab is a calcineurin gene-related peptide receptor (CGRP) monoclonal antibody indicated for the preventative treatment of migraine in adults. CGRP is a vasoactive peptide that naturally exists in the trigeminovascular system, but presence of CGRP in the bloodstream causes migraine attacks. CGRP is also critical in the wound healing process by promoting revascularization.

Although biologics have a theoretical risk of post-operative infections and wound healing issues, it is not common clinical practice to stop these medications prior to elective surgical procedures. Here we present a case of severely impaired wound healing following autologous free flap breast reconstruction in a patient treated with fremanezumab.

CASE REPORT: In February 2022, a 48-year-old Caucasian female with a history of chronic migraine (controlled with fremanezumab) presented for consultation for breast reconstruction after testing positive for the BRCA gene. She elected to undergo bilateral prophylactic nipple-sparing mastectomy with muscle-sparing TRAM flap reconstruction in August 2022. Her hospital course was uncomplicated and she was discharged home on post-op day 3 with no immediate wound healing concerns.

Skin necrosis was noted at her first post-operative visit along all incisions. Her wounds continued to evolve with worsening skin necrosis, blistering, and skin sloughing. Topical chemical debridement agents were applied to the compromised skin of the breasts and abdomen. She eventually required sharp debridement of large eschars overlying bilateral breast and abdominal wounds.

The patient was seen in the office weekly over the next six weeks and required additional debridement of her wounds. Continued wound care was recommended to encourage epithelialization of the open wounds. By late December, both breasts had completely healed, and the abdomen had contracted considerably but healed almost completely.

DISCUSSION: We hypothesize that the marked skin necrosis and delayed wound healing seen in this patient may be linked to fremanezumab. It is important to note that she did not have traditional risk factors for poor wound healing such as obesity, smoking, or corticosteroid use. Her treatment with fremanezumab began in May 2021 without interruption of her monthly injections including this elective surgery.

Although relatively new to market, there are currently no official warnings of poor wound healing or increased infection rates with fremanezumab. There is a case report of impaired wound healing after a trivial skin injury with probable association with use of a CGRP receptor antibody.1 However, to our knowledge, there are no reports of impaired wound healing after any surgical procedures in the current literature.

It appears the severely impaired would healing seen in this patient after free flap breast reconstruction can be contributed to her use of fremanezumab. The use of biologic agents for autoimmune or chronic diseases should be taken into consideration when determining perioperative management as the possible risk of delayed wound healing must be weighed against the risk of worsened underlying disease control.

REFERENCES:
1. Wurthmann S, Nägel S, Hadaschik E, et al. Impaired wound healing in a migraine patient as a possible side effect of calcitonin gene-related peptide receptor antibody treatment: A case report. Cephalalgia. 2020;40(11):1255-1260. doi:10.1177/0333102420933571.

The Cost-Effectiveness of Enhanced Recovery after Surgery (ERAS) Protocols in Abdominally-Based Autologous Breast Reconstruction: A Systematic Review

Abstract Presenter
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PURPOSE: Healthcare systems are shifting towards value-based models where cost-effectiveness of interventions is more important.1 Enhanced Recovery After Surgery (ERAS) pathways are protocols published by the ERAS society for various surgical procedures with evidence-based recommendations on a perioperative care pathway that shortens recovery times while improving cost and clinical efficacy.2,3 Other pathways with similar goals but different interventions are called Enhanced Recovery Pathways (ERP).3 Breast reconstruction is a unique procedure because of the variety of interventions available that can result in large cost variations between patients.4 The purpose of our study was to conduct a systematic review on the cost-effectiveness of ERAS/ERP protocols in abdominally-based autologous breast reconstruction. Further, we reviewed the use of liposomal bupivacaine transversus abdominis plane (TAP) blocks in abdominal autologous reconstruction, focusing on outcomes related to hospital length-

of-stay (LOS) and cost.

METHODS: PubMed, Embase, Cochrane, Scopus were searched and PRISMA guidelines for systematic reviews were followed. Articles were screened by abstract and full text. Articles were included if full text was available, cost data included, and TAP block was used. Reviews, case reports, and comparisons between immediate and delayed breast reconstruction were excluded. Included articles were reviewed for study-level data highlighting cost of treatment and associated LOS. Cost and LOS were stratified by treatment group (ERAS/ERP vs. non-ERAS/ERP) and postoperative pain control (TAP vs. non-TAP). Incremental cost-effectiveness ratio (ICER) was calculated as the ratio of difference in cost and difference in LOS between treatment and control groups.

RESULTS: Of 381 initial articles, 11 were included. These contained 919 patients, of which 421 participated in an ERAS/ERP pathway. The average ICER for ERAS/ERP pathways was $1664.45 per day (range, $952.70 - $2860). Average LOS of ERAS/ERP pathways was 3.12 days vs. 4.57 days for controls. The average ICER of TAP blocks was $909.19 (range, $89.64 - $1728.73) with an average LOS of 3.70 days for TAP blocks vs. 4.09 days in controls.

CONCLUSIONS: The use of ERAS/ERP pathways and postoperative pain control with liposomal bupivacaine TAP block during breast reconstruction is cost-effective and beneficial. These interventions should be included in comprehensive perioperative plans aimed at positive outcomes with reduced costs.

REFERENCES:
1. Teisberg E, Wallace S, O'Hara S. Defining and Implementing Value-Based Health Care: A Strategic Framework. Acad Med. May 2020;95(5):682-685. doi:10.1097/acm.0000000000003122
2. Temple-Oberle C, Shea-Budgell MA, Tan M, et al. Consensus Review of Optimal Perioperative Care in Breast Reconstruction: Enhanced Recovery after Surgery (ERAS) Society Recommendations. Plast Reconstr Surg. May 2017;139(5):1056e-1071e. doi:10.1097/prs.0000000000003242
3. Altman AD, Helpman L, McGee J, et al. Enhanced recovery after surgery: implementing a new standard of surgical care. Cmaj. Apr 29 2019;191(17):E469-e475. doi:10.1503/cmaj.180635
4. Sheckter CC, Matros E, Lee GK, Selber JC, Offodile AC, 2nd. Applying a value-based care framework to post-mastectomy reconstruction. Breast Cancer Res Treat. Jun 2019;175(3):547-551. doi:10.1007/s10549-019-05212-0

The cadaveric study for the safe elevation of the profunda artery perforator(PAP) flap; Anatomy of perforators and the obturator nerves

Abstract Presenter
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BACKGROUND: The profunda artery perforator (PAP) flap was first introduced as an alternative to the DIEP flap in 2012 (1). and quickly became recognized as a popular secondary option for autologous breast reconstruction. This study aimed to evaluate the detailed anatomical position and characteristics of the PAPs. We also focused on the anatomical relationship between the obturator nerves, which pass the perforators and PAPs. This article may provide readers with a better understanding of the anatomy of the PAPs and donor site morbidities due to nerve injury when harvesting a PAP flap.

METHODS: In total, nine free cadavers with 18 upper thighs were dissected. Twelve were female, and six were male. The average age was 84.7±4.2 years. Dissection was performed to evaluate the anatomic position and characteristics of perforators from the profunda femoral artery perforators. The perforator distance from the gluteal sulcus, number of perforators, perforating muscles, diameter of the perforators, origin of the perforators, and number of nerves passing above and below the perforators were determined.

RESULTS: The average number of perforators that penetrate the adductor magnus muscle was 2.5. The average distance from the origin of the perforators to the gluteal sulcus was 71.72±28.23 mm. The average number of the obturator nerves passing above and below the perforator in the adductor magnus muscle was 1.3 (range, 0–4) and 0.7 (range 0–2), respectively.

CONCLUSIONS: The data presented in this article provide a detailed anatomic basis for the profunda artery perforator (PAP) flap. The perforators of a PAP flap could possibly be included in a flap with a transverse design. It seems that sacrificing the small obturator nerves during dissection may not lead to significant donor site morbidity.

1. Qian, B., Xiong, L., Li, J., et al. A Systematic Review and Meta-Analysis on Microsurgical Safety and Efficacy of Profunda Artery Perforator Flap in Breast Reconstruction. J Oncol 2019;2019:9506720.

Prepectoral versus Subpectoral Breast Reconstruction after Nipple Sparing Mastectomy: A Systematic Review and Meta-Analysis

Abstract Presenter
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INTRODUCTION: Nipple-sparing mastectomy (NSM) allows for complete preservation of the skin envelope but may carry a higher risk of ischemic mastectomy flap or nipple complications. Different implant planes in immediate breast reconstruction (pre-pectoral [PP] or subpectoral [SP]) have different tolerances for ischemic complications though large studies on reconstructive outcomes in NSM are lacking.

METHODS: We performed a systematic review of comparative studies in PubMed, EMBASE, and Cochrane databases. In total, 1317 unique articles were identified, of which six met criteria for meta-analysis. Fixed-effects meta-analytic METHODS were used to compare cohorts when possible; otherwise, pooled averages are reported without statistical comparison.

RESULTS: A total of 1668 reconstructions were included in PP cohorts, and 4023 reconstructions in SP cohorts. Demographics were similar between pooled cohorts, including age (45.1 years in PP vs 46.3 years in SP), BMI (23.3 vs 25.0), and prevalence of neoadjuvant radiotherapy (4.5% vs 6.6%). Mastectomy weight and implant size were also similar, although ADM use was slightly more prevalent in the PP cohort (66.6% vs 55.0%). Pooled rates of capsular contracture were similar between cohorts (PP 4.8% vs SP 3.1%).

Fixed-effects meta-analysis demonstrated a lower rate of mastectomy flap necrosis in the PP cohort (RR 0.24, 95%CI 0.08-0.74). The findings suggested increased rates of infection (RR 1.35, 95%CI 0.95-1.92) and hematoma (RR 1.51, 95%CI 0.44-5.21) in the PP cohort but decreased risk of NAC necrosis (RR 0.75, 95%CI 0.45-1.27), though these did not reach statistical significance. There was no difference in the rate of reconstructive failure (RR 0.95, 95%CI 0.52-1.72).

CONCLUSIONS: Rates of mastectomy flap necrosis were lower in prepectoral reconstruction after NSM which may be secondary to selection of this plane only in cases with well-perfused flaps. Rates of other major complications including reconstruction failure are comparable between immediate prepectoral and subpectoral reconstruction after NSM.

Inappropriate Referrals to Plastic Surgery: A Single-Institution Review on Unsuitable Breast Reduction Referrals and it's Longitudinal Impact on Surgeon and Patient

Abstract Presenter
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BACKGROUND: Do you have new consultations show up to clinic with multiple comorbidities, high BMI, and lack of medical/nutritional optimization requesting a breast reduction (BBR) at the suggestion of an alternate provider? The purpose of this study is to look

at patients in a given year at a single-institution academic center who were inappropriately referred to plastic surgery for breast reduction and to elucidate how these impacts both the patient and the surgeon in regards to time and money.

METHODS: A single-institution, two-surgeon retrospective analysis was performed between Jan 2022-Jan 2023. Patients deemed eligible for the study were seen as new consultations at our institution for breast reduction. Patients were separated into cohorts of "appropriate for surgery" and "not appropriate for surgery" on the basis of BMI and comorbidities. Demographics, comorbidities, referring providers, time and cost of the visit lost to the surgeon, distance and time spent driving by the patient, cost to the patient in gas milage, and the conversion rate of patients who came back as suitable candidates for breast reduction were collected and analyzed.

RESULTS: A total of 156 patients were identified who were referred to plastic surgery for breast reduction between Jan 2022-Jan 2023. 40 of these (25%) were denied surgery on the basis of high BMI (>35) or uncontrolled comorbidities. Mean age and BMI at presentation were 36 years (range 16-70) and 30 kg/m2 (range 22.7-48.3). 6 patients (3.8%) referred were active smokers, 18 patients (11.5%) had BMI>35, and 7 patients (4.5%) had uncontrolled diabetes. Of the inappropriate referrals, 65% (26) were from non-surgical subspecialties, 20% (8) were from bariatric surgeons, 10% (4) were from OBGYNs, and 5% (2) were from other various surgical subspecialties. Patients denied surgery drove an average of 42.18 miles (range 10-414) for an average of 98 minutes round-trip (range 20-384). Surgeon's estimated time lost on non-surgical consults ranged between 15-74 minutes with 57.5% (23) reporting 45-60 minutes lost, 20% (8) at 30-44 minutes, 10% (4) at 15-30 minutes, and 5% (2) estimating >60minutes. CPT code 19318 at our institution corresponds to 16.03 + 8 (50%) RVU's per bilateral breast reduction. There was a 5% (2) conversion rate of inappropriately referred patients who were able to control their comorbidities and return to undergo breast reduction, which translates to 913.14 potential RVU's lost across 38 patients.

CONCLUSION: Many providers refer patients inappropriately to plastic surgery for a multitude of body contouring and breast reduction procedures and many are denied surgery. Very few of these patients return with appropriateness for surgery. The impact of this is significant time and money lost by both the patient, provider, and institution. Our study shows the importance of adhering to general health guidelines, further education on surgical suitability for non-surgical subspecialties, and understanding who an appropriate referral for elective-type surgeries is.

Breast Reconstruction Reduces the Risk of Postmastectomy Lymphedema: A TriNetX-Based Analysis

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BACKGROUND: The advantages of restoring the breast after a breast cancer surgery overweight the risk of complications associated with these procedures.1,2 Nowadays, patients undergoing oncological mastectomy have several options to regain their body shape, which will vary according to the patient's characteristics, surgeon preferences, and experience.3 However, some surgical alternatives and patient features have been associated with an increased risk of complications.4,5 The study aims to determine the association between the reconstructive breast technique for obesity and the increased risk of postoperative lymphedema.

METHODS: On February 2023, anonymized data was extracted from the TriNetX platform, including 20 years from 2000 to 2019. Cohorts were built utilizing the ICD-10, CPT, and TNX-curated codes. The data was analyzed using the platform analytic tools following the data protection laws of the included healthcare organizations. The outcome of interest was postmastectomy lymphedema in mastectomy patients who underwent any form of breast reconstruction compared to those who did not.

RESULTS: There were 111,619 mastectomy encounters in the TriNetX database during the 20-year period from the year 2000 to 2019, of which 20,646 (18.5%) underwent reconstruction. The mean age at the index for the cohort was 57.3 years (SD 15.2), and 96% were females. After matching the cohort by age at index, sex, race, axillary lymph node dissection, radiotherapy, chemotherapy, hypertension, diabetes mellitus, congestive heart failure, chronic kidney disease, cellulitis, type of mastectomy procedure, and BMI, patients who underwent reconstructive surgery showed a lower risk of postmastectomy lymphedema (RR 0.903, 95% CI 0.831- 0.98, P= 0.0151). A significant risk reduction was observed with delayed implant-based reconstruction (RR 0.565, 95% CI 0.459- 0.695, P< 0.0001) and free flap reconstruction (RR 0.767, 95% CI 0.627- 0.937, P= 0.0092). No risk reduction associated with immediate implant reconstruction (RR 0.888, 95% CI 0.76- 1.037, P= 0.1339) or TRAM reconstruction (RR 1.583, 95% CI 0.784-3.197, P= 0.1953) was found.

CONCLUSIONS: Delayed implant-based and free flap reconstruction is associated with a lower risk of developing postmastectomy lymphedema, while immediate implant-based and TRAM reconstruction is not associated with a similar effect. Future studies should focus on the potential mechanisms of this effect.

REFERENCES

1. Citgez B, Yigit B, Bas S. Oncoplastic and Reconstructive Breast Surgery: A Comprehensive Review. Cureus. Jan 2022;14(1):e21763. doi:10.7759/cureus.21763
2. Macadam SA, Zhong T, Weichman K, et al. Quality of Life and Patient-Reported Outcomes in Breast Cancer Survivors: A Multicenter Comparison of Four Abdominally Based Autologous Reconstruction METHODS. Plast Reconstr Surg. Mar 2016;137(3):758-771.

doi:10.1097/01.prs.0000479932.11170.8f
3. Weber WP, Shaw J, Pusic A, et al. Oncoplastic breast consortium recommendations for mastectomy and whole breast reconstruction in the setting of post-mastectomy radiation therapy. Breast. Jun 2022;63:123-139. doi:10.1016/j.breast.2022.03.008
4. Shen A, Lu Q, Fu X, et al. Risk factors of unilateral breast cancer-related lymphedema: an updated systematic review and meta-analysis of 84 cohort studies. Support Care Cancer. Dec 14 2022;31(1):18. doi:10.1007/s00520-022-07508-2
5. Matar DY, Wu M, Haug V, Orgill DP, Panayi AC. Surgical complications in immediate and delayed breast reconstruction: A systematic review and meta-analysis. J Plast Reconstr Aesthet Surg. Nov 2022;75(11):4085-4095. doi:10.1016/j.bjps.2022.08.029

Flap characteristics between robotic and standard DIEPs: number of perforators, pedicle length and vessel size

Abstract Presenter
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INTRODUCTION: The deep inferior epigastric perforator (DIEP) flap has become the gold standard in autologous reconstruction, although there are inherent risks of donor site morbidities including hernia, bulge and decreased core strength.1 Our previously published data showed a significant decrease in fascial incision length between standard and robotic DIEPs.2 Previous studies have shown that multiple perforators per flap have decreased complications.3 Abdominal perforator exchange (APEX) was introduced in 2019 and further reduced muscle injury while increasing the number of perforators.4 Our aim is to study flap characteristics between standard and robotic DIEPs in terms of number of perforators per flap, average pedicle length, vessel size and number of APEX performed.

METHODS: A retrospective cohort study was performed for patients who underwent robotic and standard DIEP flap harvest from October 2021 through September 2022. We compared the number of perforators, pedicle length, vessel size and APEX performed for standard versus robotic flaps.

RESULTS: 44 robotic and 44 standard flaps were included during the collection period. There was no statistically significant difference in number of perforators (2.5 for standard, 2.0 for robotic for p value of 0.079), pedicle length (13.6 cm for standard, 12.7 cm for robotic for p value of 0.331) and vessel size (artery 2.71 mm for standard versus 2.77 mm for robotic for p value of 0.424, vein 3.37 mm for standard versus 3.58 mm for robotic for p value of 0.067). The

number of APEX performed in the standard DIEP were 4 compared to 12 on the robotic side (p value of 0.032). There were no pedicle injuries in either group and no flap losses. There were two takebacks in the standard group and one in the robotic group (p value of 1.00).

CONCLUSION: As robotic assisted harvest of the DIEP becomes more common, we show no difference in flap characteristics between the two groups in term of number of perforators, pedicle length or vessel size. In order to increase the number of perforators in the robotic group, there were more APEX performed, which does increase the complexity of the case without any compromise in safety.

REFERENCES:
1. EA Bailey and SN Bishop. (2023). Minimally Invasive Surgery in Breast Reconstruction: The Past and Future. Breast Cancer Updates [Working Title]. Doi: 10.5772/intechopen.109503
2. EA Bailey, B Chen, W Nelson, S Nosik, R Fortunato, A Moreira, D Murariu. Robotic versus Standard Harvest of Deep Inferior Epigastric Artery Perforator Flaps: Early Outcomes. PRS - Global Open 2022; 10(10S):p 64-65. Doi: 10.1097/01.GOX.0000898644.00762.77
3. DP Baumann, HY Lin, P Chevray. Perforator number predicts fat necrosis in a prospective analysis of breast reconstruction with free TRAM, DIEP, and SIEA flaps. PRS 2010; 125(5):p1335-1341. Doi: 10.1097/PRS.0b013e3181d4fb4a.
4. FJ DellaCroce, HC DellaCroce, CA Blum, SK Sullivan, CG Trahan, MW Wise, IG Brates. Myth-busting the DIEP flap and an INTRODUCTION to the abdominal perforator exchange (APEX) breast reconstruction technique: A single-surgeon retrospective review. PRS 2019; 143(4):p992-1008. Doi: 10.1097/PRS.0000000000005484

Eliminating the Suction Drain: A Propensity Score Matched Outcomes Analysis of Dual-Port vs Single-Port Tissue Expanders

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INTRODUCTION: The most common method for breast reconstruction is a two-stage approach beginning with tissue expanders placed immediately after mastectomies. Closed suction drains are routinely placed due to significant drainage that builds up in the breast pocket postoperatively. However, drains often contribute to patient discomfort, pain, and overall decreased quality of life. The INTRODUCTION of dual-port tissue expanders offers the possibility to eliminate drain usage altogether. This study aims to evaluate our experience in using dual-port tissue expanders without drain placement.

METHODS: The authors retrospectively identified patients who underwent immediate breast reconstruction with tissue expanders between 2011 and 2022. Patient demographics, medical comorbidities, oncologic treatment, plane of reconstruction (prepectoral or dual plane), and drain placement were reviewed. Propensity score matching was utilized to pair comparable breasts in the drainless cohort with breasts in the drain cohort. Primary outcomes were infection and mastectomy skin flap necrosis rates. Univariate and multivariate regression analysis were performed to identify risk factors for infection.

RESULTS: After propensity score matching across a ten-year period, 218 breasts (124 patients) in the drainless cohort were paired with 218 breasts (136 patients) in the drain cohort. Breasts in the drainless cohort had a comparable rate of infection as those in the drain cohort (11.2% vs. 8.0%, OR 0.62, $p = 0.07$). The drainless cohort also had comparable rates of mastectomy skin flap necrosis as the drain cohort (10.4% vs. 7.7%, OR 0.71, $p = 0.20$). On multivariate regression analysis, higher body mass index was a significant risk factor for infection (OR 1.09, $p = 0.005$) while prepectoral placement of tissue expanders significantly decreased risk of infection (OR 0.09, $p = 0.01$). Age, smoking status, diabetes, hypertension, neoadjuvant chemotherapy, and postoperative radiation were not significant risk factors ($p > 0.05$).

CONCLUSIONS: In our propensity score matched analysis, immediate breast reconstruction with dual-port tissue expanders offers a drainless alternative to traditional implant-based reconstruction while still maintaining similar complication rates. Furthermore, the prepectoral approach to tissue expander placement significantly decreases the risk of infection. Our RESULTS advocate for the use of prepectoral dual-port tissue expander reconstruction that can enhance patient comfort and decrease drain-associated pain postoperatively.

Opioid Consumption following Autologous Flap Breast Reconstruction: Effect of Depression and Anxiety at 90 Days Post-Operatively

Abstract Presenter
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BACKGROUND: Breast cancer patients are vulnerable to mental illness.1 A psychiatric history of generalized anxiety disorder (GAD) and/or depression, have previously been shown to be predictive of opioid consumption after breast reconstruction.2,3 In this study, we aimed to

identify the impact of preoperative mental health diagnoses on opioid consumption after autologous breast reconstruction.

METHODS: PearlDiver, a national database encompassing private payers with 153 million unique patients, was queried from 2010-2020. Patients with a history of breast cancer or increased risk of breast cancer and those who underwent autologous free flap breast reconstruction were included utilizing International Classification Codes 9 and 10 and Current Procedural Terminology codes. Patients were divided into four groups based on psychiatric history at the time of surgery: those with no diagnosis, those with GAD only, those with depression only, and those with both diagnoses. Cohorts were matched based on age, obesity, and Charlson Comorbidity Index. Morphine milligram equivalents (MME) were calculated up to 90-days postoperatively and one-way analysis of variance determined group differences with p-value of <0.05 used for significance. Linear regression was performed to determine psychiatric risk factors associated with increased postoperative opioid consumption.

RESULTS: Of the 36,629 patients who underwent autologous breast reconstruction, 5,130 (14%) patients had a history of either GAD and/or depression before reconstruction. Average opioid consumption per day was significantly higher among patients with concomitant GAD and depression (75.10 MME/day, $p<0.05$) compared to all other groups (46.90-63.94 MME/day) up to 90-days postoperatively. Among patients with greater than 2 opioid prescriptions, those with a psychiatric history had a significantly longer duration (19.2 days) of opioid use when compared to those without a psychiatric history (13.9 days) at the time of surgery. Linear regression analysis of all patients up to 90-days postoperatively showed that a history of depression only and concomitant diagnosis were significantly predictive of increased opioid consumption ($p<0.05$).

CONCLUSION: Patients with a history of depression or concomitant GAD and depression at the time of autologous breast reconstruction had a significant risk of increased opioid consumption postoperatively. Surgeons performing autologous breast reconstruction should be aware of the increased need for opioids among this population in order to promote multidisciplinary care to better manage postoperative pain.

REFERENCES:

1. Fox JP, Philip EJ, Gross CP, Desai RA, Killelea B, Desai MM. Associations between mental health and surgical outcomes among women undergoing mastectomy for cancer. Breast J. May-Jun 2013;19(3):276-84. doi:10.1111/tbj.12096
2. Rodnoi P, Dickey RM, Teotia SS, Haddock NT. Increased Opioid Consumption following DIEP Flap Breast Reconstruction: Effect of Depression and Anxiety. J Reconstr Microsurg. Nov 2022;38(9):742-748. doi:10.1055/s-0042-1749595
3. Nelson JA, Polanco TO, Shamsunder MG, et al. Perioperative Inpatient Opioid Consumption Following Autologous Free-Flap Breast Reconstruction Patients: An Examination of Risk and Patient-Reported Outcomes. Ann Surg Oncol. Nov 2021;28(12):7823-7833. doi:10.1245/s10434-021-10023-z

Augmentation-Mastopexy in the Secondary Breast Implant Patient: Outcome Analysis of 1,664 Consecutive Procedures

Abstract Presenter
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PURPOSE: As the rate of breast augmentation procedures continue to rise, there is a corresponding increase in the number of patients requesting secondary operations to improve breast aesthetics and correct breast ptosis. Secondary augmentation-mastopexy succeeds in enhancing breast volume and simultaneously decreasing the skin envelope in one operation. However, secondary-augmentation mastopexy remains a challenge due to compromised blood supply to the nipple-areolar complex and the risk of wound healing complications. The purpose of this study was to evaluate the safety and efficacy of one-stage augmentation mastopexy in secondary breast implant cases, through an analysis of long-term complication and re-operation rates.

METHODS: A retrospective review of 847 patients who underwent 1,664 consecutive secondary augmentation-mastopexy procedures by a single surgeon from January 2008 to January 2021 was performed. All patients had previously undergone breast augmentation or augmentation-mastopexy. Demographics and clinical outcomes, including breast implant specifications, surgical technique, post-operative complications, and re-operation rate were analyzed.

RESULTS: Mean age of our cohort was 44 years (22 – 76 years), with a mean BMI of 24.5 kg/m2 (19-34 kg/m2). Multiple (≥2) previous breast procedures were performed in 35.1% (n=297) of patients. Mean time from last implant surgery to secondary augmentation-mastopexy procedure was 5.9 years (7 months-22 years). All patients underwent bilateral breast implant replacement of submuscular (61.4%) or subglandular implants (38.6%), with simultaneous mastopexy. The distribution of mastopexy techniques consisted of inverted "T" (67.3%, n =570), followed by vertical (26.9%, n=228), circumareolar (4.8%, n=41), and sailboat technique (0.9%, n=8). Mastopexy procedures were bilateral in 96.4% (n=817) with submuscular implant placement in 96.9% (n=821). Silicone implants were utilized in 90.2% (n=764) of patients, with a mean implant fill volume of 380cc (175–700 cc). Adjunctive biomaterials were utilized for implant or soft tissue support in 13.6% of patients (n=115). Additionally, autologous fat grafting was used concurrently to correct soft tissue irregularities in 7% of patients (n=60). Over a mean follow-up period of 47 months (3 months-131 months), the overall complication rate was 11.1% (n=94) with a reoperation rate of 8.7% (n=74). Tissue-related complications occurred in 7.3% (n=62), which was primarily recurrent ptosis (3.4%, n=29). The most common implant-related complication was capsular contracture (Baker III or IV) in 1.7% (n=14). There were no cases of periprosthetic infection requiring explantation, no significant skin flap necrosis (>2cm diameter), and no nipple or areolar loss. Indications for re-operation included recurrent ptosis (3.4%, n=

29), capsular contracture (1.7%, n=14), and implant malposition (1.2%, n=10). Patients who underwent multiple previous breast surgeries for capsular contracture and ptosis (>3) had a significantly higher re-operation rate (19.4%, n=14), compared to patients with <3 previous breast surgeries ($p<0.05$).

CONCLUSION: Simultaneous augmentation-mastopexy in the secondary breast implant patient can be performed safely and effectively, demonstrated through our low complication rate, acceptable aesthetic RESULTS, and a reduced number of operations for the patient. Our study can help improve pre-operative counseling and provide an effective paradigm to manage secondary augmentation-mastopexy. An individualized, patient-centric, approach should be considered for optimal RESULTS.

Tissue Expanders versus Implants in Delayed-Immediate Abdominally-Based Autologous Reconstruction: Does it Make a Difference?

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BACKGROUND: Delayed-immediate (DI) breast reconstruction is a two-staged approach involving temporary prosthesis insertion at the time of mastectomy followed by the final reconstructive surgery of choice.(1-3) While the traditional approach to DI autologous breast reconstruction employed tissue expanders (TE) at the time of mastectomy, technical advancements have facilitated improvements in immediate implant-based reconstruction.(4) We therefore sought to examine the role of implants in DI abdominally-based free flap (Ab-FF) reconstruction through a comparative analysis of post-prosthetic outcomes in patients receiving TEs or implants at the index procedure.

METHODS: A single-center retrospective cohort study of adult patients who underwent DI Ab-FF reconstruction from March 2017 to November 2022 was conducted. Patients were included if they underwent TE or implant-based prosthetic reconstruction at the time of mastectomy followed by Ab-FF within two years. Patient demographics, comorbidities, oncologic history, operative details, and post-prosthetic complications were compared between cohorts.

RESULTS: Of the 326 patients (473 breasts) who underwent Ab-FF within the study period, 66 (106 breasts) met inclusion criteria. Forty-three patients (71 breasts) received TEs and 23 patients (35 breasts) received implants at the index surgery. Multivariate analysis revealed that,

compared with TEs, implants were associated with lower odds of overall complications (OR 0.3, 95% CI 0.130-0.848, p=0.015), prosthesis erosion (OR 0.1, 95% CI 0.012-0.833, p=0.033), and premature extrusion (OR 0.2, 95% CI 0.075-0.773, p=0.017). Body mass index was a positive predictor of dehiscence (OR 1.2, 95% CI 1.037-1.405, p=0.015).

CONCLUSION: In the setting of viable mastectomy flaps, implants may be preferable to TEs in DI autologous reconstruction to limit complications and associated additional procedures.

REFERENCES

1. Patel AA, Borrelli MR, Cai L, et al. Comparing prepectoral versus subpectoral tissue expander placement outcomes in delayed-immediate autologous breast reconstruction. Ann Plast Surg. 2020;84(5S):S329-S335.
2. Cuffolo G, Pandey A, Windle R, Adams T, Dunne N, Smith B. Delayed-immediate breast reconstruction: An assessment of complications and outcomes in the context of anticipated post-mastectomy radiotherapy. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2022.
3. Kronowitz SJ, Hunt KK, Kuerer HM, et al. Delayed-immediate breast reconstruction. Plastic and reconstructive surgery. 2004;113(6):1617-1628.
4. Jones G, Yoo A, King V, et al. Prepectoral immediate direct-to-implant breast reconstruction with anterior AlloDerm coverage. Plastic and Reconstructive Surgery. 2017;140(6S):31S-38S.

Predictors of Autologous Fat Grafting in Immediate, Implant-Based Breast Reconstruction

Abstract Presenter
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BACKGROUND: Autologous fat grafting (AFG) is a common adjunct to implant-based breast reconstruction (IBBR). Patients frequently need or desire fat grafting to improve common issues such as implant visibility and contour deformity, often done as a second, staged procedure following immediate reconstruction. While many studies have examined IBBR and fat grafting outcomes separately, there is a lack of studies examining the factors contributing to patients undergoing autologous fat grafting following breast reconstruction. This study aimed to identify which patient factors and reconstructive techniques predict the need for revision with AFG after IBBR.

METHODS: Patients who underwent IBBR with either tissue expanders or implants following mastectomy from 2017 to 2021 were identified. Demographics, comorbidities, and the postoperative course were reviewed. The primary outcome variable was AFG after the initial reconstruction. Univariate and regression analyses were performed to identify factors predictive of AFG.

RESULTS: Five-hundred twenty-nine patients were included in our analysis, with 43% having AFG. The grafting cohort was younger (P<.0001) and less likely to have undergone radiation therapy (p=.0457). Mean implant size was larger in the AFG cohort (p=.0375). Univariate regression displayed single-stage reconstruction (OR=0.53, 95% 0.37-0.75) and previous radiation (OR 0.59, 95% 0.35-0.99) negatively predicted the need for AFG, while bilateral breast reconstruction (BBR) was a predictor (OR 2.32, 95% 1.58-3.4). On multivariate analysis, decreasing age and BBR remained predictive of AFG. The odds of AFG decreased by 3% for every one-unit increase in age (95% CI [0.96, 0.99]). Interestingly, neither pre-pectoral breast reconstruction nor specimen weight:implant ratio was associated with increased need for AFG on univariate/multivariate analysis.

CONCLUSIONS: This is the first study of to examine the factors predictive of a patient undergoing fat grafting. Patients requiring AFG were likely younger and had undergone BBR with tissue expanders. Plane of implant did not appear to affect need for AFG. Some of the findings were contrary to common teaching.[1,2] Knowledge of these predictive factors may help plastic surgeons in preoperative counseling before implant-based breast reconstruction.

1. Patel, Ashraf A. BS; Cemaj, Sophie L. BS; Martin, Shanique A. MD; et al. Revision Rates in Prepectoral Versus Subpectoral Delayed-Immediate Autologous Breast Reconstruction. Annals of Plastic Surgery 86(5S):p S409-S413, May 2021. | DOI: 10.1097/SAP.0000000000002760

2. King CA, Bartholomew AJ, Sosin M, et al. A Critical Appraisal of Late Complications of Prepectoral versus Subpectoral Breast Reconstruction Following Nipple-Sparing Mastectomy. Ann Surg Oncol. 2021;28(13):9150-9158. doi:10.1245/s10434-021-10085-z

Surgeon-reported Monitoring Protocols for Deep Inferior Epigastric Perforator Flap in Breast Reconstruction

Abstract Presenter
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The use of deep inferior epigastric perforator (DIEP) flaps is a well-established breast reconstruction technique. This project aims to describe postoperative monitoring practice patterns among surgeons performing DIEP surgery. A 29-question survey was emailed to 3,186 active American Society of Plastic Surgery members.

A total of 255 responses were received (8%), and 193 of the respondents (79%) reported performing DIEP surgery and were included for analysis. Of the surgeons, 65% have been practicing for >10 years. Surgeons reported that for the first 24 hours after DIEP surgery, most flaps were monitored in the ICU (37%) followed by floor monitoring (34%). Flap checks were performed Q1 until postoperative day one (POD1) (42%) or POD0 (33%), Q2 until POD1 (33%) or POD2 (28%), and Q4 until POD3 (31%) or POD2 (27%). Most surgeons performed flap monitoring with external Doppler (71%), tissue oximetry (34%), and implantable Doppler (32%), the most common combination at 26% using both Doppler and tissue oximetry. Surgeons used acetaminophen (74%), NSAIDs (69%), neuromodulators (52%), and opioids (4.4%) as scheduled post-operative analgesia. On POD1, most surgeons reported discontinuing IV fluids (60%), allowing ambulation (67%), removing the Foley catheter (71%), and starting a regular diet (71%). However, surgeons discharged patients from the hospital most frequently on POD3 (49%), followed by POD4 (23%), and POD2 (19%).

This study indicates heterogeneity among DIEP surgeons' practice patterns. Notably, there was a lack of consensus on the setting of initial flap monitoring, with a slight majority of physicians favoring the ICU (37%) versus the floor (34%). The ICU represents a costly flap monitoring setting for a generally non-critical, stable patient. Current literature has demonstrated no significant difference in flap failure rates and adverse event rates between ICU and non-ICU postoperative flap monitoring.1 There was also a wide variety in practice patterns for the length of stay: most surgeons (71%) discharged DIEP patients on or after POD3. However, most surgeons reported that their patients could ambulate, resume a regular diet, and discontinue the Foley catheter on POD1. Previous studies have determined that the highest risk of flap failure occurs within the first two postoperative days, which suggests diminished cost-effectiveness of monitoring flaps beyond POD2.1 Standardized DIEP flap monitoring protocols may decrease the length of stay and cost of care while ensuring adequate pain control and flap monitoring.

REFERENCES:

1. Vemula R, Bartow MJ, Freeman M, et al. Outcomes Comparison for Microsurgical Breast Reconstruction in Specialty Surgery Hospitals Versus Tertiary Care Facilities: Plast Reconstr Surg - Glob Open. 2017;5(10):e1514.

Assessing the Quality of Breast Reconstruction Outcomes Reporting: A Five Year Scoping Review

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INTRODUCTION: Improving the quality of surgical care in breast reconstruction relies on effectively comparing outcomes across studies. Prior research from 2000 to 2014 has demonstrated inconsistency in reporting in breast surgery literature, but the current state of reporting quality and related opportunities for improvement are unknown.1 Our study aims to assess the comprehensiveness and consistency of outcomes reporting in recent breast reconstruction literature with the aim of providing reporting recommendations.

METHODS: All original articles in Plastic and Reconstructive Surgery and Annals of Plastic Surgery from 2016 to 2021 were reviewed for articles that pertained to breast reconstruction by two authors. Utilizing ten plastic surgery reporting criteria defined previously in the literature (Table 1), the following variables were collected: procedures, count by breast or by patient, follow-up time, complications, complication definitions, cost data, patient-reported outcomes. Data

RESULTS: Of the 833 articles reviewed, 192 articles were included. Approximately one-half of the articles (n = 87, 45.38%) included autologous breast reconstruction, 66% (n = 127) included prosthetic breast reconstruction, with 16.15% (n = 31) including both procedures. The average article met 3.3 of 10 possible criteria (Figure 1). The least commonly met criteria included reporting length of hospital stay (n = 23, 12.12%), defining at least half of the complications listed (n = 63, 16.26%), and utilizing severity grades to describe complications (n = 46, 24.19%). Patient-reported outcomes and/or aesthetic data was included in 20.3% of articles (n = 39). Approximately one-half of studies reported complications by patient (n = 87, 45.16%) versus by breast (n = 91, 47.31%), and 7.5% (n = 14) did not clarify.

CONCLUSION: Our RESULTS demonstrate that there is a significant opportunity to improve both the comprehensiveness and consistency of outcomes reporting in breast reconstruction. The average criteria met in our study is unchanged from the average number of criteria met by articles from 2000 to 2014, indicating a lack of improvement in reporting over time. Recommendations for improving reporting quality include defining all complications, reporting outcomes by both breast and patient, and indicating the severity of complications reported. This study provides an important step toward highlighting the need for the standardization of outcomes reporting in breast reconstruction.

REFERENCES

1. Parikh, R. P., Sharma, K., Qureshi, A. A., Franco, M. J., & Myckatyn, T. M. (2018). Quality of Surgical Outcomes Reporting in Plastic Surgery: A 15 Year Analysis of Complication Data. Plastic and reconstructive surgery, 141(6), 1332.

Breast Cancer Risk and Screening Rates in Female-to-Male Transgender Patients

Abstract Presenter
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INTRODUCTION: The number of individuals who identify as transgender in the U.S. has been steadily increasing. Unfortunately, evidence relating to breast cancers in this population is limited, and current data is insufficient to estimate cancer prevalence in female-to-male (FtM) individuals. Better data is needed to contribute to evidence-based screening guidelines. This study aims to characterize breast cancer risk in FtM transgender patients and evaluate current rates of screening.

METHODS: A retrospective cohort study was conducted using a multicenter electronic health record database to identify patients 40-75 years of age and born female from January 2015 to January 2023. Patients were split into two cohorts, cisgender females who had not undergone mastectomy and FtM transgender patients. The latter cohort was further divided based on whether they had undergone gender-affirming mastectomy. Patients with genetic predisposition for breast cancer were excluded. Cohorts were propensity score matched based on age, race, and ethnicity. Using ICD-10 codes, rates of breast cancer screening and patients with a diagnosis of breast cancer were identified.

RESULTS: 6,140,906 patients met inclusion criteria. Of these, 6,132,901 cisgender females who had not undergone mastectomy, 7,742 FtM patients who had not undergone mastectomy, and 263 FtM patients who had undergone mastectomy were identified. Cisgender patients were twice as likely to receive breast cancer screening compared to transgender patients (24.19%vs12.12%, RR:1.995, $p<0.0001$). Transgender patients were 3.2 times more likely to develop invasive breast carcinoma versus the cisgender group (3.67%vs1.14%, RR:0.312, $p<0.0001$). Following mastectomy, cancer screening rates decreased 2.2-fold in the transgender population (4.93%vs10.59%, RR:2.150, $p<0.0288$). No transgender patients developed invasive breast carcinoma after mastectomy.

CONCLUSION: This study shows that transgender patients received breast cancer screening at much lower rates than cisgender females, despite having similar screening recommendations. Furthermore, screening rates drop significantly following mastectomy. The goals of gender-affirming mastectomy are different than mastectomy for cancer resection. This can result is residual breast tissue after surgery, posing a remaining risk for future cancer development and continued need for surveillance. The RESULTS of this study highlight the current insufficiency in care of transgender patients and need for interventions to improve healthcare outcomes of gender minorities in the U.S.

How Do Sociodemographic Factors Impact Patient Reported Outcomes? Using the BREAST-Q to Interpret Patient Reported Outcomes Following Oncopalstic Breast Reduction

Abstract Presenter
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INTRODUCTION: Over 50% of women diagnosed with breast cancer are younger than 65 years of age, emphasizing the need for therapy that prioritizes long-term survival in addition to providing patient satisfaction with aesthetic RESULTS, and having a positive psychosocial impact1,2. Oncoplastic reduction performed at the time of lumpectomy can maximize aesthetic RESULTS, however, the impact on patient satisfaction and quality of life are not well known currently. The primary goal of this study was to evaluate patient-reported satisfaction and quality of life before and after oncoplastic breast reduction, while the secondary goal was to determine the effect of sociodemographic factors on these measures.

PATIENTS AND METHODS: Following IRB approval, patients who underwent immediate oncoplastic breast reduction between January 2012 and June 2021 by a single plastic surgeon at Emory University were extracted from our database. Included patients completed a preoperative and 1-year postoperative BREAST-Q patient-reported outcome measure. Mean Q-Scores were compared using two sample t-tests, Stata BE v17.0 (College Statiomn, TX) was used for statistical analysis.

RESULTS: Forty-eight patients were included in the study. Mean age at surgery was 60.6 years (SD 8.3); mean BMI was 33.2 (SD 6.5). Whole breast radiation was completed in 92% of patients, while systemic chemotherapy was administered to 39.6%. Race and ethnicity were self-reported for each patient and obtained from the electronic medical record, with 37.5% of patients identifying as White/Caucasian (N = 18), 58.3% (N = 28) as Black/African American, and 2.1% (N = 1) Asian. In the sample as a whole, postoperative mean Q-Scores significantly increased for satisfaction with breasts, psychosocial well-being, and sexual well-being. Pre- and postoperative mean Q-Scores were lower for Black/African American patients when compared to White/Caucasian patients among all pre- and postoperative modules, with a significantly lower Q-score observed for the postoperative physical well-being module.

CONCLUSIONS: Patients who underwent oncoplastic reduction demonstrated significant post-operative improvement in breast satisfaction, psychosocial well-being, and sexual well-being. The ability to offer partial breast reconstruction is an important part of multi-disciplinary breast cancer care. Quantifying effects of sociodemographic variables on postoperative patient reported outcomes can be a useful tool in guiding patient decision making. More studies are needed to determine why differences in satisfaction exist in patients of different races.

REFERENCES

1. Bertozzi N, Pesce M, Santi PL, Raposio E. Oncoplastic breast surgery: comprehensive review.

Eur Rev Med Pharmacol Sci. 2017;21(11):2572-2585.
2. Chu CK, Hanson SE, Hwang RF, Wu LC. Oncoplastic partial breast reconstruction: concepts and techniques. Gland Surg. 2021;10(1):398-410. doi:10.21037/gs-20-380

The Superomedial Pedicle Breast Reduction: A Comparison

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INTRODUCTION: Breast reduction mammoplasty remains one of the most common procedures performed in plastic surgery, yet there is no consensus on pedicle approach, particularly for gigantomastia patients. The inferior pedicle technique remains the most popular choice in the United States, as it produces consistent and successful outcomes for reductions of all sizes. The inferior pedicle has aesthetic downfalls to consider including inframammary hypertrophic scarring, squaring of the breast, and tendency to produce pseudoptosis.1 Thus, the superomedial pedicle technique has been gaining popularity for its desirable aesthetic outcome. Studies suggest that the superomedial pedicle has higher rates of complications correlating with reduction size as well as NAC blood supply compromise in comparison to other techniques.1 Our aim is to assess outcomes of the superomedial pedicle breast reduction versus other pedicle approaches in a diverse population.

METHODS: A single-institution retrospective review was conducted on all patients who underwent bilateral reduction mammoplasty for symptomatic macromastia between January 2015 to October 2021. At least 3 months of follow-up were required for inclusion. Patients receiving concomitant procedures or cancer-related procedures were excluded. Data was collected pertaining to each patient's demographics, operative characteristics, type of pedicle used, and any post-operative complications that occurred. Major complications were defined as those requiring surgical intervention and/or admission to the hospital. Patients were stratified by pedicle type into superomedial versus non-superomedial. Univariate and multivariate analyses were used to compare outcomes based on pedicle type.

RESULTS: The final cohort included 491 patients with a mean age of 39 and mean BMI of 35. The majority of patients were Black (59%), followed by White (35%), and Asian (4%). Patients had 4 comorbidities on average. 412 patients (84%) received a superomedial technique and 79

patients (16%) received a non-superomedial technique. The average weight of breast tissue removed was 1730g with a mean EBL of 111mL. The distribution of non-superomedial pedicle type was as follows: superior (7.9%), free nipple graft (4.5%), inferior (1.8%), medial (1.4%), and lateral (0.4%). There was no difference in the incidence of major complications between the superomedial technique and non-superomedial technique (5.3% vs 5.1%, p=0.092). There were 17 patients (4.1%) who received a superomedial pedicle that returned to the operating room, versus zero patients in the non-superomedial pedicle group (p=0.066). In the superomedial group, 15 patients (3.6%) required admission to the hospital versus 4 patients (5.1%) in the non-superomedial group (p=0.548).

CONCLUSION: The superomedial pedicle approach remains a safe and effective technique for breast reduction mammoplasty, providing low complication rates that are not significantly different from those of other pedicle techniques. Our RESULTS would suggest that this approach can be reliably used in reductions of all sizes for symptomatic relief, including patients with gigantomastia.

REFERENCES:

1. Antony AK, Yegiyants SS, Danielson KK, et al. A matched cohort study of superomedial pedicle vertical scar breast reduction (100 breasts) and traditional inferior pedicle Wise-pattern reduction (100 breasts): an outcomes study over 3 years. Plast Reconstr Surg. 2013 Nov;132(5):1068-1076. doi: 10.1097/PRS.0b013e3182a48b2d. PMID: 24165588; PMCID: PMC3923626.

A Systematic Review and Meta-Analysis of Synthetic Mesh Outcomes in Alloplastic Breast Reconstruction

Abstract Presenter
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INTRODUCTION: Mesh implants are frequently employed in alloplastic breast reconstruction. Acellular dermal matrix (ADM), a biologically-derived mesh device, is the standard within the United States. Notably, no mesh to date has FDA approval for this indication. Many studies, primarily conducted outside of the US, have assessed outcomes in employment of various synthetic meshes with costs preferable to those of biologics. While the literature shows RESULTS comparable to those of ADM, data are heterogeneous and the molecular properties of

both synthetics and biologics are diverse. This study aims to systematically review synthetic mesh use in alloplastic breast reconstruction, describe reported rates of short-term complications, and analyze these outcomes in reports comparing synthetic and biologic meshes.

METHODS: Following PRISMA guidelines, the authors conducted systematic literature review of the PubMed and Medline libraries. Twenty-nine studies reporting use of synthetic mesh and clinical outcomes were included. Seven studies directly comparing synthetic mesh and biological mesh were meta-analyzed for relative risk. Nineteen non-comparative studies were analyzed for meta-rates. Studies and mesh properties were described and outcomes including seroma, infection, re-operation, and explant were analyzed on a per-breast basis.

Meta-analyses of comparative studies employed the Mantel-Haenszel method, and those for non-comparative studies used a generalized linear mixed model. To assess for impact of small-study effects and publication bias, models were challenged with leave-one-out analysis, funnel plots, and trim-fill modeling.

RESULTS: From 2012 to 2012, six different synthetic mesh devices were described. Comparative studies included a total of 923 synthetic and 2367 biologic mesh cases. Non-comparative studies included 2985 synthetic mesh cases.

Meta-analysis of comparative studies demonstrated an insignificant difference in risk of infection with synthetic mesh (RR=0.49; 95%CI [0.19, 1.23]) and significantly reduced risk of re-operation (RR= 0.49; 95%CI [0.28, 0.88]) and explant (RR=0.36; 95%CI [0.16, 0.76]). Meta-analysis of non-comparative studies demonstrated rates of seroma = 0.03; 95%CI [0.01, 0.06], infection = 0.04; 95%CI [0.03, 0.06], re-operation = 0.10; 95%CI [0.07, 0.13], and explant = 0.03; 95%CI [0.02, 0.05]). Conflicting RESULTS were found in comparative study model challenges and strong evidence of publication bias was demonstrated in non-comparative studies.

CONCLUSIONS: This study reports a contemporary systematic review and meta-analysis of short-term complications associated with synthetic mesh use in alloplastic breast reconstruction. Comparative outcomes demonstrated non-inferiority of synthetic mesh when compared to biologic mesh and non-comparative outcomes demonstrated generally low and favorable complication rates. With heterogeneity of reports and demonstrated potential for bias in outcomes reported, these models may underestimate true complication rates. Further research comparing synthetics and biologics, particularly those available within the United States, is warranted.

Psychosocial Impact of Breast Cancer-Related Lymphedema: Insights from a National Claims Database

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INTRODUCTION: Post mastectomy lymphedema syndrome (PMLS) has been associated with lower quality of life due to symptomology and financial consequences. This study aims to determine the impact of lymphedema on the psychosocial wellbeing of breast cancer survivors after mastectomy in comparison to postmastectomy patients who do not develop lymphedema. We hypothesized that PMLS was associated with increased fills of antidepressants.

METHODS: Using the IBM® MarketScan® Research Databases, mastectomy encounters were extracted from 2007-2021 using Common Procedural Terminology (CPT) codes. Among these, patients who developed PMLS were identified using International Classification of Disease, ninth (ICD-9) and tenth (ICD-10) edition codes, as were patients who filled antidepressant prescriptions throughout the study period, using National Drug Code Numbers. Patients who filled antidepressant prescriptions prior to the index mastectomy procedure were excluded. Patient demographics, lymphedema procedures, and comorbidities (measured and reported using the Elixhauser index) were evaluated. Univariate and multivariable logistic regression were performed for statistical analyses.

RESULTS: Of 289,705 patients meeting criteria (mean age 50.96 ± 9.43), 23,989 (8.3%) experienced PMLS following index mastectomy. Those who did not experience PMLS were, on average, older ($p < 0.001$), underwent mastectomy more recently ($p < 0.001$), and had higher Elixhauser index comorbidity scores ($p < 0.001$). In a multivariable logistic regression, younger age, more distant surgical year, and higher Elixhauser index comorbidity scores ($p < 0.001$) were associated with heightened odds of experiencing PMLS following the index mastectomy procedure. PMLS patients filled antidepressant prescriptions more frequently than patients without lymphedema (26% vs. 16%; $p < 0.001$). In a multivariable logistic regression, younger age, more distant surgical year, and higher Elixhauser index comorbidity scores increased odds of filling at least one antidepressant prescription during the study period. In the same model, PMLS diagnoses additionally increased odds of filling at least one antidepressant prescription during the study period (OR 1.554; $p < 0.001$). Out of 476 PMLS patients who eventually underwent a surgical intervention for PMLS, 85 patients (17.9%) filled at least one antidepressant prescription prior to surgery. Of these 85 patients, 19 patients (22%) stopped filling antidepressant prescriptions following their surgical intervention for PMLS; surgical interventions for PMLS were associated with eliminating antidepressant fills ($p < 0.001$).

CONCLUSION: PMLS was associated with increased antidepressant prescription fills

compared to mastectomy patients without lymphedema. Lymphedema surgery was associated with less antidepressant use compared to PMLS patients who did not undergo lymphedema surgery. Future studies should explore more longitudinal impacts of surgical intervention and if they ameliorate the depression seen in PMLS patients.

Risk Factors for Complications after Immediate Tissue Expander-Based Reconstruction: A Propensity Matched Analysis

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PURPOSE: Two-staged, tissue expander-(TE)-based reconstruction is the most common type of breast reconstruction. Despite its relative safety, postoperative complications may lead to delays in recovery and unfavorable reconstructive outcomes. Although matched pair analyses have been performed to identify risk factors for complications, additional studies are needed to better characterize these as patient demographics and surgeon techniques vary widely. We therefore conducted a propensity-matched analysis on patients undergoing immediate TE-based reconstruction and hypothesized patients who smoked, had higher body mass indices (BMIs), and longer operative times would experience more postoperative complications.

METHODS: We performed an IRB-approved retrospective review was performed on patients aged ≥ 18 years who underwent immediate, TE-based reconstruction from July 1, 2016 to January 30, 2022 at our institution. We abstracted patient demographics (e.g. age, race, and payer); chemoradiation treatment and intraoperative details (e.g. operative times), and 90-day postoperative complications including hematoma, surgical site infection, wound dehiscence, seroma, flap necrosis, sepsis, thrombosis, blood transfusion, and death. Unplanned reoperations included hematoma/seroma washouts, TE removal with replacement, TE removal without replacement, and incision and drainage. Complications and unplanned reoperations were grouped into an "overall complications" category. We performed patient-level analyses using descriptive

statistics and Fisher's exact tests, and then performed 2:1 nearest neighbor propensity score matching to estimate treatment effects and standard errors (SE) using logistic regression of patients with and without overall complications. Data were matched on age, payer, race, and BMI. Significance was set at $p<0.05$. All analysis was conducted in R 4.1.2.

RESULTS: Of 1,086 patients identified, 343 patients (533 reconstructed breasts) were included. Forty-nine patients (14.3%) underwent subpectoral and 294 (89.7%) prepectoral reconstruction. One hundred-thirty two (38.5%) patients received unilateral mastectomies and 211 (61.5%) bilateral. One hundred-fifty five patients (45.2%) experienced complications; TE removal without replacement (n=38, 24.5%) and surgical site infection (n=36, 23.2%) were the most common complications; there were no deaths. Logistic regression demonstrated that risk factors associated with complications included BMI (estimated effect: 1.9 kg/m2, SE 0.7 kg/m2, p=0.00655), bilateral mastectomy (estimated effect 21.9%, SE 5.8%, $p<0.001$), no intraoperative TE fill (estimated effect 15.6%, SE 6.0%, $p = 0.00878$), and higher mastectomy weights (estimated effect 109 grams, SE 47.1 grams, $p = 0.0202$) were risk factors associated with complications. After matching, 90 patients with complications and 180 without were included. The group that experienced an overall complication was more likely to have had bilateral mastectomies (p=0.005) and TEs not filled intraoperatively (p=0.015). Logistic regression RESULTS of matched groups identified private insurance (estimated effect 2.0e-14%, SE 9.0e-15%, p=0.0264), smoking (estimated effect 10.6%, SE 5.4%, p=0.0492), bilateral mastectomy (estimated effect 18.7%, 5.4%, $p <0.001$), and no intraoperative TE fill (estimated effect 18.6%, SE 6.1%, p=0.00235) to be risk factors for postoperative complications.

CONCLUSIONS: Our propensity matched regression analysis found that patients with complications after immediate, TE-based breast reconstruction had higher rates of private insurance, smoking, bilateral mastectomy, and no intraoperative TE fills. We hope this analysis contributes to the understanding of postoperative complications likely to occur in this patient population.

Short Term Complication Profiles of Mentor Artoura vs Sientra Allox2 Tissue Expanders for Immediate Breast Reconstruction

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BACKGROUND: Tissue expander (TE) based reconstruction after mastectomy is associated with high rates of adverse outcomes, such as infection and seroma.1 Within TE-based breast

reconstruction, literature shows that seroma is associated with an increased risk for infection.2 Prior TE models, such as the Mentor Artoura (Mentor) have a single access port, used for expansion of the device. However, the Sientra AlloX2 (AlloX2) TE is a newer TE implant with a dual-port system: one port used for expansion and the other for fluid aspiration from the periprosthetic space.3 Previous literature on this implant has been equivocal on whether there are reduced infection rates with an additional port.4,5 The goal of this study was to compare post-operative complications of TE-based breast reconstruction using either the Mentor or Sientra implant at our institution.

METHODS: Patients undergoing TE-based breast reconstruction with either the Artoura or AlloX2 TE implant were included. Demographic information and surgical factors were collected for patients. Patients were followed for 90 days following placement of TEs. Adverse outcomes, such as infection, seroma, hematoma, flap necrosis, and incisional dehiscence, were recorded and compared between the two cohorts.

RESULTS: Overall, 64 patients, for a total of 97 breast reconstructions, were included. The Artoura and AlloX2 groups were comparable based on patient demographics, acellular dermal matrix use, and post-operative antibiotic choice. Adverse outcomes were similar between the two groups, except a higher rate of in the Artoura group compared to the AlloX2 group (34.0% vs. 8.5%, p=0.002). Infection rates remained comparable between the two cohorts. All seromas noted in the AlloX2 group were drained in clinic, requiring no visits to interventional radiology or the emergency department.

CONCLUSIONS: The dual-port Sientra AlloX2 TE was highly effective for removing periprosthetic fluid when compared to the Mentor Artoura TE, with a reduction in the need for additional seroma treatment modalities such as ultrasound-guided seroma aspiration. However, this did not translate to a lower infection rate in our patient population.

REFERENCES

1. McCarthy CM, Mehrara BJ, Riedel E, et al. Predicting complications following expander/implant breast reconstruction: an outcomes analysis based on preoperative clinical risk. Plast Reconstr Surg. Jun 2008;121(6):1886-1892. doi:10.1097/PRS.0b013e31817151c4
2. Long C, Sue GR, Chattopadhyay A, Huis In't Veld E, Lee GK. Critical Evaluation of Risk Factors of Infection Following 2-Stage Implant-Based Breast Reconstruction. Plast Reconstr Surg Glob Open. Jul 2017;5(7):e1386. doi:10.1097/gox.0000000000001386
3. Breast Tissue Expaneders. Accessed January 23, 2022, https://sientra.com/for-us-surgeons/breast-tissue-expanders/
4. Parmeshwar N, Piper M, Viner J, Foster R, Kim EA. Evaluation of Dual-port versus Single-port Tissue Expanders in Postmastectomy Breast Reconstruction. Plast Reconstr Surg Glob Open. Jul 2021;9(7):e3703. doi:10.1097/gox.0000000000003703
5. Liu F, Henn D, Shrefren K, Momeni A. Advances in Tissue Expander Technology Enable Early Targeted Intervention in Prepectoral Breast Reconstruction. Plast Reconstr Surg Glob Open. Aug 2021;9(8):e3781. doi:10.1097/gox.0000000000003781

Use of Absorbable Dermal Staples During Bilateral Breast Reduction Surgery: Effects on Operative Times and Surgical Outcomes

Abstract Presenter
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BACKGROUND: Over the last decade, use of the absorbable dermal stapler in wound closure has become more common in plastic surgery due to its reduction in operative times and subsequent decrease in operative room costs. In this study, we examine the effects of the absorbable stapler on operative times and postoperative complications in bilateral reduction mammoplasties, one of the most commonly performed procedures in plastic surgery.

METHODS: A retrospective, observational cohort study was conducted via electronic chart review on consecutive patients who underwent bilateral reduction mammoplasties by the senior author at a single institution from January 2014 to December 2022 using either inferior or superior wedge pedicles. Patients were stratified by wound closure method into two groups: those who had their incisions closed solely with sutures, and those in whom the deep dermal absorbable stapler was used during closure of the inframammary fold (IMF) incision. Patient co-morbidities were analyzed, as well as postoperative complications, including bleeding, infection, wound dehiscence, and increased scarring. Differences in patient groups, and relationships between collected variables, were analyzed via student's t-tests, multivariate linear regression, and logistic regression.

RESULTS: The records of 66 consecutive women who underwent bilateral reduction surgery were included for final analysis. Wound closure in 30 patients involved use of the absorbable dermal stapler during closure of the IMF incision, whereas closure of the deep dermis of the IMF incision in the remaining 36 patients was done solely with 3-0 Polysorb deep dermal sutures. There were no statistically significant differences between the two groups with regard to average BMI (29.3 in the staple group vs. 28.3 in the suture only group, $p = 0.34$), average age (40 years in both groups), or in average weight of breast tissue removed (684.0 grams per breast in the staple group vs. 676.1 grams in the suture only group, $p = 0.91$). However, operative time was significantly reduced by an average of 19.3 minutes in women who had IMF deep dermal closures using the absorbable staples compared to those who had closures solely with sutures (171.3 minutes in the staple group vs. 190.6 minutes in the suture only group, $p = 0.034$). When controlling for mass of breast tissue removed and type of pedicle, the staple closure method still predicted a reduction of 23.4 minutes in operative time ($p = 0.031$). In a logistic regression model, postoperative complications were not significantly affected by wound closure method ($p = 0.58$) or pedicle type ($p = 0.81$).

CONCLUSION: We found the use of absorbable dermal staples in wound closure during reduction mammoplasty surgery to produce a significant decrease in operative time, with no

increase in postoperative complication rates. These benefits were present in both types of pedicles used during the study.

Cost Effectiveness Of Highly Cohesive Versus Less Cohesive Implants In Breast Reconstruction

Abstract Presenter
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PURPOSE: Rippling is a common complication of implant-based breast reconstruction (IBR) that can result in return to the operating room (RTOR) for fat grafting and/or revision. We have demonstrated that highly cohesive (HC) implants reduce RTOR for rippling correction in the setting of two-stage, prepectoral IBR. While the use of HC implants may require greater upfront cost, we hypothesize that episode of care cost will be lower due to reduced RTOR for fat grafting when compared with less cohesive implants.

METHODS: A secondary cost-effectiveness analysis was conducted for a retrospective cohort of patients undergoing two-stage pre-pectoral IBR from January 2020 to June 2022 at our institution. Patients receiving either HC or low cohesive (LC) implants were identified. Two analyses were conducted: 1) costs from the public payer perspective using the 2023 Medicare Physician Fee Schedule (CPT codes: 15771 and 15772) and 2) costs from the hospital perspective using institutional estimates of HC vs. LC implant costs (assuming all other costs of IBR were equivalent between implant types) and inflation-adjusted estimates from the literature for operating time, procedural, personnel, and equipment costs for fat grafting (1). Costs reflected two observations from our cohort: 86% of included patients received bilateral implants and 85cc of fat grafting were used per patient on average.

RESULTS: One hundred and thirty-two patients underwent two-stage, prepectoral IBR with mean follow-up of 235 (±190) days and mean age of 48.5 years. Forty-seven (36%) did not receive fat grafting at the time of implant exchange and were comprised of 12 patients (9.0%) who received HC implants and 35 patients (26.5%) who received LC implants. No patient who received HC implants required RTOR for fat grafting, while 31% (n=11) of patients who received LC implants required RTOR for fat grafting. The cost of RTOR for fat grafting was $664 per instance from the public payer perspective, corresponding to an average cost increase of $209 per patient receiving LC as compared to no cost increase for patients receiving HC. From the hospital perspective, the average cost per patient was $2037 for HC and $2273 for LC after taking into account the need for RTOR. Given that costs would be $2037 for HC and $1395 for LC without RTOR, the need for RTOR among patients with LC resulted in a 63% cost

increase ($878) from baseline.

CONCLUSIONS: When compared to LC implants, the use of HC implants may prevent RTOR for fat grafting and reduce overall costs to payers. From the hospital perspective, the use of HC resulted in overall cost reduction per episode of care when compared to LC after accounting for the average costs incurred from RTOR. Future study is needed to compare these costs with patient-centered outcomes such as the physical, emotional, or psychological burdens associated with RTOR.

1. Gabriel A, Maxwell GP, Griffin L, Champaneria MC, Parekh M, Macarios D. A Comparison of Two Fat Grafting METHODS on Operating Room Efficiency and Costs. Aesthet Surg J. Feb 2017;37(2):161-168. doi:10.1093/asj/sjw169

Current State of Evidence-Based Long-Term Monitoring Protocols for Cosmetic Breast Augmentation Plastic Surgery Patients

Abstract Presenter
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BACKGROUND: Recommendations for breast surveillance following breast plastic surgery are frequently changing. Establishing guidelines for long-term monitoring protocols may help identify treatable conditions and prevent untoward sequelae. We sought to evaluate the current state of evidence-based long-term monitoring protocols for patients following cosmetic breast augmentation.

METHODS: A literature search of the PubMed database was conducted using keywords such as "breast augmentation monitoring", "breast implant," and "imaging guidelines." Official guidelines from the Food and Drug Administration (FDA), American societies, and British societies were analyzed for congruence and disparity in evidence-based recommendations.

RESULTS: Since the silicone breast implant moratorium for cosmetic surgery was lifted in 2006, the FDA has issued recommendations in 2006 and 2020 regarding long-term monitoring of implants. Despite the FDA recommending surveillance imaging for implant rupture, research has indicated that both provider and patient rarely follow recommendations.1 The most recent FDA update recommends MRI or ultrasound starting 5-6 years after surgery and every 2-3 years thereafter.2 While the American Society of Plastic Surgeons defers to the FDA guidelines, the American Society of Breast Surgeons and American College of Radiology (ACR) find no role for imaging if asymptomatic. Patients with saline implants with clinical suspicion for rupture are best evaluated with ultrasound. For silicone implants, ACR guidelines recommend US or MRI if there are suspected implant complications.3 In contrast to the FDA guidelines, the British

Society of Breast Radiology, Association of Breast Surgery Great Britain & Ireland, and British Association of Plastic Reconstructive and Aesthetic Surgeons all find that routine breast implant imaging is not indicated. Ultrasound is first-line for any implant concerns, with MRI indicated if ultrasound is equivocal or clinical concerns persist.4

CONCLUSION: Breast implant surveillance is crucial for patient safety and health after breast augmentation. While there is agreement that guidelines are necessary, professional organizations are divided on the efficacy of surveillance imaging in guiding management. Multispecialty and regulatory body alignment may promote provider and patient adherence. Ongoing studies of long term outcomes are needed to strengthen the level of evidence for monitoring guidelines.

REFERENCES:

1. Carr LW, Roberts J, Mericli AF, Liu J, Arribas EM, Clemens MW. Breast Implant Imaging Surveillance among US Plastic Surgeons: US FDA Recommendations versus Clinical Reality. Plastic & Reconstructive Surgery. 2020;145(6):1381-1387. doi:10.1097/PRS.0000000000006812

2. Food and Drug Administration. Breast Implants - Certain Labeling Recommendations to Improve Patient Communication - Guidance for Industry and Food and Drug Administration Staff. Published online September 29, 2020.

3. Lourenco AP, Moy L, Baron P, et al. ACR Appropriateness Criteria ® Breast Implant Evaluation. Journal of the American College of Radiology. 2018;15(5):S13-S25. doi:10.1016/j.jacr.2018.03.009

4. Lowes S, MacNeill F, Martin L, et al. Breast imaging for aesthetic surgery: British Society of Breast Radiology, Association of Breast Surgery Great Britain & Ireland, British Association of Plastic Reconstructive and Aesthetic Surgeons. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2018;71(11):1521-1531. doi:10.1016/j.bjps.2018.07.004

A Rapidly Resorbing Biosynthetic Mesh Wrap Significantly Improves Implant Positional Stability

Abstract Presenter
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PURPOSE: The use of textured tissue expanders has all but ended in the US due to their association with breast implant-associated anaplastic large cell lymphoma. To provide an alternative to biologic adjuncts, such as acellular dermal matrix, absorbable mesh has been used as a transitory scaffold to reinforce the lower pole and to delineate the position of the inframammary and lateral mammary creases of the reconstructed breast. While device tabs have been utilized to anchor devices and improve positional stability, possible drawbacks include pain at soft tissue anchor points, palpable prominences in reconstructions, and inevitable anchor point failure. In this animal model, we explore the application of absorbable polyglactin 910 (Vicryl) mesh covering the entirety of a smooth implant as a method for stabilizing the implant position within the dissected pocket.

METHODS: Approximately 6cm2 of Vicryl mesh was wrapped around miniature 2cc smooth anatomically shaped polydimethylsiloxane implants. Textured implants were manufactured to serve as controls. In order to counteract rodent skin laxity and better mimic the tight surgical pocket created when placing a human breast implant, fast absorbing Polysorb sutures were used to anchor implants to the underlying soft tissue by passing sutures through three holes traversing the entirety of the implant. Anchored and unanchored smooth, textured, and wrapped smooth implants were implanted on the dorsum of Sprague-Dawley rats. Rotation and implant lateral movement were measured to assess positional stability. Implants were removed 1-and 3-months after implantation, evaluated for positional stability, and histology was performed to evaluate the capsule characteristics.

RESULTS: Among the unanchored conditions at 1 month, wrapped implants rotated 76 degrees less than textured and 86 degrees less than smooth implants ($p<0.05$). Unanchored wrapped implants showed 12mm less lateral movement compared to the unanchored smooth implants ($p<0.05$). Among anchored implants, wrapped implants experienced increased stability with 49 degrees less rotation compared to the smooth anchored implants at 1 month and 76 degrees less rotation at 3 months ($p>0.05$). The short-term anchoring of implants to the underlying tissue showed similar trends to unanchored implants with unanchored wrapped implants able to counteract the skin laxity without anchoring. Histologically, minimal residual mesh was noted on wrapped implants after 1 month with no significant difference in capsule thickness between all conditions. Wrapped implants at 3 months demonstrated no mesh on histology, and capsule thickness was not statistically different from smooth implants. At 3 months, the deposit of collagen and presence of myofibroblasts was similar among all conditions as measured through trichrome and smooth muscle actin staining respectively.

CONCLUSIONS: Wrapping implants in fast-absorbing Vicryl mesh did not impact the long-term surrounding capsule histology. Despite the notable skin laxity of our rat model, wrapped smooth implants remained positionally stable in anchored and unanchored conditions. Wrapping implants with a rapidly degrading biosynthetic mesh may be a cost-effective and straightforward approach to stabilize silicone implants. This method eliminates the need for suture tabs or more expensive biologics. Ongoing experiments will evaluate implant stability and capsule formation over longer timepoints.

Optimizing an Optimization Pathway: Investigating ERAS Compliance and the Impact of Individual Elements in DIEP Flap Reconstructions

Abstract Presenter
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INTRODUCTION: Enhanced recovery after surgery (ERAS) protocols have been shown to reduce hospital length of stay (LOS) and post-operative opiate utilization after deep inferior epigastric perforator (DIEP) flap breast reconstruction. Compliance with ERAS protocols is variable, and it is unclear whether certain components of the protocol are more important than others in predicting superior outcomes. This study investigated the relationship between ERAS protocol compliance and key outcome measures, including LOS, postoperative pain scores, and complication rates. Significant relationships were further explored through stepwise regression models to identify which ERAS elements were most predictive of these outcomes.

METHODS: A retrospective chart review was conducted on 128 consecutive patients who underwent DIEP flap reconstruction from January 2018 to December 2021 at the Johns Hopkins Hospital. Data were collected on demographics, clinical and operative details, medication administration, and key outcome measures. Descriptive statistics, linear regressions, and stepwise regressions were used to analyze the data. Relationships between overall compliance and key outcomes that were significant on linear regression were further explored with iterative forward and backward stepwise regression analyses. Key predictors were identified through addition or removal of individual ERAS elements to the model until additional adjustments did not significantly improve the model's predictive power.

RESULTS: All 18 individual ERAS elements were implemented to varying degrees. Perforator flap planning, flap checks, and drain and wound checks were performed on every patient (Table 1). The mean overall compliance rate for all ERAS patients was 76.9%. Mean length of stay was 3.6 days (range 2-14), and mean self-reported pain scores (on 10 point scale) were 3.7, 3.8, and 3.6 on POD0, POD1, and POD2 respectively. Mean overall compliance with the ERAS protocol had a negative correlation with length of stay (Figure 1; $r=-0.179$, $p= <0.0001$). Participants with higher compliance rates had lower pain scores on POD2 ($r=-0.063$, $p=0.0029$) and fewer total postoperative complications ($r=-0.053$, $p=0.0053$). On exploratory stepwise regression analysis, key predictor variables for LOS were pre- and intraoperative analgesics, early feeding, early mobilization, DVT prophylaxis, and postoperative analgesics. Key predictors for number of postoperative complications were pre- and intraoperative analgesics, early feeding, early mobilization, and DVT prophylaxis. Key predictors of pain scores on POD2 were early mobilization, perioperative fasting, and postoperative analgesics.

CONCLUSION: This study found that compliance of an ERAS protocol is correlated to LOS, number of complications, and pain on POD2 after DIEP flap breast reconstruction. Not all elements of the ERAS protocol are of equal importance, and each element has heterogeneous effects on postoperative outcomes. Exploratory analysis identified pre and intra-operative analgesics, early feeding, early mobilization, DVT prophylaxis, and postoperative analgesics as important predictors for several key outcome measures. These ERAS elements should be emphasized during patient management. Other ERAS elements were not identified in any of the optimal models and their importance in perioperative patient care should be investigated further. These findings serve as a starting point for optimization of ERAS pathways in breast reconstruction and maximization of ERAS protocol value.

Disparities in Follow-Up for Breast Reconstruction

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INTRODUCTION: Successful breast reconstruction plays a critical role in the psychosocial wellbeing of breast cancer patients undergoing mastectomy. However, reconstructive breast surgery has inherent complications that can jeopardize aesthetic and health outcomes for women. It has been established that such adverse events disproportionately affect underserved women of Hispanic and African American descent, although the mechanisms by which these disparities are not fully elucidated.1,2 We hypothesize that barriers to post-operative follow-up care may play a role. The purpose of this study is to evaluate the disparity in post-mastectomy follow-up care between the English-speaking and Spanish-speaking population.

METHODS: We identified a group of 114 primarily English-speaking (n=57) or Spanish-speaking (n=57) patients who underwent mastectomy with reconstruction from January 2015 to July 2022. Main data points collected via retrospective chart review included number of completed telephone encounters, number of completed office encounters, number of planned OR visits, and number of unplanned OR visits all within ninety days of the primary mastectomy. Other factors such as age, BMI, insulin-requiring DM, smoking status, race, and ethnicity were also collected and variables were analyzed via two-tailed independent t-tests.

RESULTS: Groups were similar in terms of age (p= 0.2), BMI (p=0.88), radiation therapy (p=0.059), and insulin-requiring DM status (p=.52). The 57 Spanish-speaking women demonstrated no significant difference in number of office encounters (M= 8.4) or telephone encounters (M=6.2) when compared with their English-speaking counterparts (M= 8.4, 7.7, respectively) (p = 0.99, 0.15). However, when office and telephone counters were combined for

each patient, there was a significant difference in Spanish (M=12.7) and English (M= 15.9) speakers (p=0.031). There were no differences in planned or unplanned OR visits for Spanish (M= 0.10, 0.069), vs English (M= 0.034, 0.086) speaking patients (p=0.15, 0.76).

DISCUSSION: The main finding from this preliminary study indicates that English-speaking mastectomy patients have more frequent healthcare follow-up telephone calls and office visits than their Spanish-speaking counterparts. Although this does confirm our hypothesis, the RESULTS were less clear-cut than expected seeing as there was no difference in number of phone calls or office visits taken individually between groups. Our institution is unique in that it is located within a historically-disadvantaged area and strives to serve the members of this community as well as it does the patients from the more affluent surrounding towns. We have teams of individuals poised to ensure proper access to follow-up care for our patients by securing transportation, outreach, financial relief, and language-appropriate home care instructions. Perhaps part of why we did not discover more differences between these populations lies in the fact that we are making a positive impact on our patients' outcomes through these services. However, work remains to be done to untangle the roles of other contributing factors to our patients' success in obtaining adequate post-operative care.

REFERENCES

1. Butler PD, Morris MP, Momoh AO. Persistent Disparities in Postmastectomy Breast Reconstruction and Strategies for Mitigation. Ann Surg Oncol. 2021;28(11):6099-6108. doi:10.1245/s10434-021-10487-z
2. Mets EJ, Chouairi FK, Gabrick KS, Avraham T, Alperovich M. Persistent disparities in breast cancer surgical outcomes among hispanic and African American patients. European Journal of Surgical Oncology. 2019;45(4):584-590. doi:10.1016/j.ejso.2019.01.016

Presence of Tissue Expanders and Fill Volume Does not Affect Radiotherapy Dose Distribution to Heart and Lungs

Abstract Presenter
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PURPOSE: Nearly 300,000 women/year are diagnosed with breast cancer in the US.1 Mastectomy and radiation are the standard treatment for high-risk disease.2 In 3D computer-tomography (3DCT) radiation, the lungs/heart are difficult to protect. Radiation has been shown to cause dose-dependent changes in the lungs and heart.3 Few studies have investigated the effect of tissue expanders (TE) on radiation dose to the heart and lungs.4 We investigated the differences in post-mastectomy radiation therapy (PMRT) doses to these organs at risk (OARs) in patients with mastectomy only versus immediate reconstruction with a TE.

METHODS:
Using the ARIA© oncology database, retrospective analysis identified all women with breast cancer who underwent total mastectomy and completed a full course of PMRT with 3DCT between January 2005 and August 2022 at our institution. They were then divided into mastectomy versus mastecomy+TE. Demographics, BMI, mastectomy side, tumor size, lymph node involvement, chemotherapy status, PRMT boost and bolus use were collected. TE intraoperative fill volume was obtained and dichotomized ≤60cc versus >60cc. Using Wilcoxon rank sum tests, dose statistics for ipsilateral lung and heart were compared between mastectomy versus mastectomy+TE and dose statistics were compared between the dichotomized TE intraoperative fill volumes. Bivariate correlations between dose statistics and BMI were analyzed using Spearman correlation.

RESULTS: 124 women met inclusion criteria (mastectomy n=66 versus mastecomy+TE n=58). 21 women had a TE fill volume ≤60cc versus 35 women had >60cc. No significant differences were observed in lung or heart radiotherapy across all dose metrics between patients who underwent mastectomy versus mastectomy+TE nor between patients with TE fill volume 60cc. Correlations between BMI and heart maximum dose ($p = 0.03$) were significantly different and showed a positive, mono-clonal correlation (correlation: 0.20, 95% Cl: 0.02, 0.37). Significant differences in bolus ($p < 0.01$) and age ($p < 0.01$) were observed between the two procedures. Bolus rate was higher for patients receiving mastectomy alone compared to mastectomy+TE (93.94% vs. 72.41%). Patients who underwent mastectomy alone were older compared to mastectomy+TE (Mean: 62.62 years vs. 48.19 years). In addition, significantly more patients who underwent a bilateral mastectomy subsequently underwent reconstruction (65.52% vs. 28.79%).

CONCLUSION: Overall, there were no differences in the radiation dose to the OARs in patients with mastectomy only vs. mastectomy+TE. Importantly, TE intraoperative expander fill did not affect dose distribution to the OARs.

REFERENCES
1. Siegel, R. L., Miller, K. D., Wagle, N. S., & Jemal, A. (2023). Cancer statistics, 2023. CA: A Cancer Journal for Clinicians, 73(1), 17–48.
2. Remick J, Amin NP. Postmastectomy Breast Cancer Radiation Therapy. 2022 Jan 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan.
3. Darby SC, Ewertz M, McGale P, et al. Risk of ischemic heart disease in women after radiotherapy for breast cancer. N Engl J Med. 2013;368:987–998.
4. Liljegren A, Unukovych D, Gagliardi G, et al. No difference in dose distribution in organs at

risk in postmastectomy radiotherapy with or without breast implant reconstruction. Radiat Oncol. 2014 Jan 9;9:14.

Scrolling for Answers: Application of Validated Tools to Assess the Quality of Breast Implant Illness Information on TikTok

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INTRODUCTION: Breast implant illness (BII) describes a constellation of systemic symptoms that patients report to be associated with their breast implants [1]. Social media platforms are increasingly being utilized as a medical resource; this is particularly true of TikTok (Culver City, CA, USA), which is an international popular video-sharing platform that has amassed 1.2 billion monthly active users in the third quarter of 2021 [2]. As BII is a largely patient-driven phenomenon, it is important to understand how patient's knowledge of it is influenced by social media. These platforms are increasingly being utilized as a medical resource for surgery, where patients seek insight on treatment options [3]. This study sought to evaluate the quality and popularity of TikTok videos about BII.

METHODS: Two validated tools for health information, DISCERN and the Patient Education Materials Assessment Tool (PEMAT), were utilized to evaluate the quality of information regarding the topic of breast implant illness on TikTok. Higher scores on these scales indicate higher quality content. Thirteen items on the PEMAT are related to comprehension and understandability, and four are related to actionability. The search phrase "breast implant illness" was used to query and screen videos, which were then sorted based on relevance and view count. The first 100 videos that fulfilled inclusion criteria were independently graded by three reviewers. Video characteristics, including video link, account name, number of account subscribers, account type, date of upload, length of video, number of likes, number of comments, and the presence of overlying audio were collected from each video.

RESULTS: Increased video duration, number of shares, and videos that were categorized as patient education on TikTok were all statistically significantly associated with a higher total

DISCERN score (all $p < 0.05$). Increased video duration was also statistically significantly associated with a higher PEMAT actionability score ($p < 0.001$). Videos in the patient experience category scored higher on PEMAT understandability ($p = 0.004$). A higher total DISCERN score was statistically significantly associated with higher PEMAT actionability ($p < 0.001$). Videos in the self-promotion category had lower DISCERN and PEMAT understandability scores ($p = 0.018$).

CONCLUSION: Total DISCERN and PEMAT scores for videos regarding BII on TikTok are low. However, videos with a higher number of shares were found to have a higher overall quality, suggesting that higher quality content quality content may therefore have an increased likelihood of reaching a larger audience. Increased video length, discussion of a patient experience, and the presence of a provider are worth considering when developing high-quality online content for breast reconstruction and augmentation patients.

REFERENCES

1. Magnusson MR, Cooter RD, Rakhorst H, McGuire PA, Adams WP, Jr., Deva AK. Breast Implant Illness: A Way Forward. Plast Reconstr Surg. Mar 2019;143(3S A Review of Breast Implant-Associated Anaplastic Large Cell Lymphoma):74S-81S. doi:10.1097/PRS.0000000000005573
2. IQBAL M. TikTok Revenue and Usage Statistics (2022). December 2022. https://www.businessofapps.com/data/tik-tok-statistics/
3. Ward B, Ayyala HS, Zhang K, Manuskhani PA, Paskhover B, Lee ES. YouTube for Cosmetic Plastic Surgery: An Effective Patient Resource? Aesthet Surg J. Apr 14 2020;40(5):NP314-NP319. doi:10.1093/asj/sjz268

Bilateral LAP Flaps for Breast Reconstruction: A Perforator Classification System

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BACKGROUND: Autologous breast reconstruction is continually evolving with focus on the ideal donor site. This study presents 108 consecutive simultaneous LAP flaps and a perforator classification system.

METHODS: An IRB approved retrospective review of all LAP flaps was completed and appropriate data recorded. All simultaneous bilateral LAP flaps were included, and perforator patterns were assessed using CTA.

RESULTS: Fifty-four patients (108 flaps) were included in the final review. Mean age was 50.7

and mean BMI was 26.6. Mean ischemia times for all flaps and grafts were 130 +/- 64.5 and 300.6 +/- 97.3 minutes, respectively. Pedicle lengths averaged 4.6 +/- 1.5 cm and composite graft lengths averaged 6.2 +/- 1.7 cm. Donor site complications consisted of seromas (10 patients, 19%), hematomas (six patients, 11%), procedural wounds (four patients, 8%), and infections (two patients, 4%). Total flap loss rate was 2.8%. Perforators were classified into categories based on pedicle pattern, lumbar spine level, and clusters, all in relation to posterior iliac bone as seen per CTA. Vascular pedicle pattern types 1, 2, and 3 were seen in 44.7%, 46.4%, and 8.9% of patients respectively. Perforators were dissected at lumbar spine level L3 in 52.7% of patients, L4 in 45.5%, and L5 in 1.8%.

CONCLUSIONS: We present a CTA directed, anatomical perforator classification system to assist in pre-operative planning, guide in dissection and choosing composite graft suited best for particular perforator pattern or calibers. Simultaneous LAP flaps can be successfully performed with excellent outcomes in patients unsuitable for other flaps.

Head-to-Head Analysis of Vertical vs. Horizontal Incision Patterns in Breast Reconstruction: Surgical Outcomes and Aesthetic Implications

Abstract Presenter
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BACKGROUND: Breast reconstruction is a team-oriented experience requiring collaboration between a patient, breast surgeon, and plastic surgeon. In order to optimize both surgical outcomes and aesthetic results, incision patterns must be carefully planned. We aim to determine whether vertical or horizontal orientation of mastectomy incision is preferred in the general population as well as analyze corresponding complication profiles.

METHODS: A REDCap database was utilized to perform a retrospective review of all patients undergoing bilateral mastectomy followed by autologous breast reconstruction utilizing either vertical or horizontal incision from January 2011 – November 2022. Post-operative complications of the two groups were analyzed. Additionally, crowdsourcing was performed to assess aesthetic implications of horizontal and vertical incision patterns on post-operative pictures of completed breast reconstruction. Survey rater demographics were also analyzed to assess for differences in scoring based on voter characteristics.

RESULTS: There were no significant differences in post-operative breast complications between patients with horizontal or vertical incisions when looking at wounds, infections, seromas, hematomas, fat necrosis, or overall complications ($p > 0.05$). Crowdsourcing showed

that regardless of voter demographics, vertical incisions were preferred over horizontal incisions ($p < 0.001$). Additionally, voters who knew someone who had undergone breast reconstruction were more likely to rate all incision patterns higher than other voters ($p < 0.001$).

CONCLUSION: While there are no significant differences in complication profiles between vertical and horizontal incisions in mastectomy patients, vertical incision patterns are preferred aesthetically in the general population across all demographic populations.

Stratifying Outcomes of Direct-to-Implant versus Two-Staged Implant-Based Breast Reconstruction

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BACKGROUND: Post mastectomy reconstruction is on the rise. Implant-based techniques constitute approximately 81% of all breast reconstruction procedures performed in the United States. Alloplastic reconstruction may be performed as direct-to-implant (DTI) or, more commonly, as a two-staged reconstruction (TSR). While rigorous studies have explored the postoperative complication rates between DTI or TSR,1 little to none have stratified these outcomes by relevant populations, pre-operative physical exam findings, mastectomy characteristics, or plane of implant placement. Therefore, we sought to examine and compare the outcomes between these cohorts at our institution.

METHODS: All patients who underwent skin-sparing or nipple-sparing mastectomy followed by immediate DTI or TSR from 2011 to 2021 at a large academic medical center were included. Intraoperative data included ADM use, mastectomy weight, and plane of implant placement. Post-operative data included the presence of mastectomy skin necrosis (MSN), nipple areolar complex (NAC) necrosis, seroma, hematoma, infection, or capsular contracture. Demographic data included age, race, ethnicity, BMI, and comorbidities. Data analysis included descriptive statistics, Mann-Whitney for continuous variables, and Fisher's Exact tests for categorical variables.

RESULTS: Two-hundred ninety-seven patients were included in the study. Of these, 272

(91.6%) underwent TSR, and 25 (8.4%) DTI. A higher percentage of patients who received chemotherapy underwent TSR (55% vs 32%, p = 0.025). Patients who underwent DTI had a higher rate of NAC necrosis (16% vs 1.5%, p=0.002) and dehiscence (28% vs 11.9% p=0.032). There was no difference in the rate of infection, seroma, hematoma, or MSN between types of reconstruction. Regardless of procedure, higher BMI (p<0.001), history of diabetes (p=0.03), higher preoperative grade ptosis (p=0.010), and larger mastectomy resection weights (p=0.002) were associated with a higher risk of any complication. For either DTI or TSR, higher grade ptosis was specifically associated with an increased risk of developing MSN (p=0.025) and NAC necrosis (p=0.045). Pre-pectoral placement was not significantly associated with risk of NAC or MSN. Prior tobacco use was associated with a higher risk of infection (p=0.037) and dehiscence (p=0.029).

CONCLUSIONS: This single-institution study suggests that TSR may still be preferred in alloplastic reconstruction to minimize the risk of NAC necrosis and wound dehiscence. Pre-pectoral placement did not significantly affect the risk of MSN or NAC necrosis and should be considered for all patients as it leads to less donor site morbidity and pain as well as prevents animation deformity.2 Lastly, these RESULTS highlight known higher risk conditions for alloplastic reconstruction including higher degrees of ptosis, history of diabetes or tobacco use, and higher BMIs.

REFERENCES

1. Srinivasa DR, Garvey PB, Qi J, et al. Direct-to-Implant versus Two-Stage Tissue Expander/Implant Reconstruction: 2-Year Risks and Patient-Reported Outcomes from a Prospective, Multicenter Study [published correction appears in Plast Reconstr Surg. 2018 Feb;141(2):532]. Plast Reconstr Surg. 2017;140(5):869-877. doi:10.1097/PRS.0000000000003748

2. Fracol M, Feld LN, Chiu WK, Kim JYS. An overview of animation deformity in prosthetic breast reconstruction. Gland Surg. 2019;8(1):95-101. doi:10.21037/gs.2018.09.09

Augmenting the Breast Reconstruction: Core Projection with Hybrid Microsurgical Breast Reconstruction with Flap and Stacked Prepectoral Acellular Dermal Matrix

Abstract Presenter
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PURPOSE: Many patients who require breast reconstruction prefer a flap-based approach for various reasons, including the permanence and the aesthetic benefit of a natural-looking and feeling breast. For patients who desire autologous breast reconstruction following mastectomy but lack adequate donor site volume, the authors utilize a novel Hybrid Flap, Prepectoral Acellular Dermal Matrix (HyPAD®) approach. In this technique, the deep inferior epigastric perforator (DIEP) flap is augmented with stacked acellular dermal matrix (ADM). The PURPOSE of this study is to quantify the soft tissue augmentation and core projection achieved with this technique during autologous flap-based breast reconstruction.

METHODS: Consecutive patients who underwent the HyPAD® technique during the study period (August 2021 to December 2022) were identified. All patients lacked adequate donor site volume and wished to avoid the placement of implants during their reconstruction. Demographic information and outcomes were assessed. Intraoperatively, the weight (grams, g) of the mastectomy specimen, flap donor site, and stacked ADM were recorded.

RESULTS: During the study period, twenty-one patients (n=21) were identified. The mean age of patients at the time of surgery was 48.9 years. The mean body mass index (BMI) was 24.1 kg/m2. The mean mastectomy specimen weight was 436.4 g and the mean flap weight was 373.8 g, posing an average discrepancy of 14.3%. On average, the weight of the ADM used to augment the flap was 83.4 g. This weight accounted for 18.2% of the total reconstructed breast weight on average.

CONCLUSION: The use of ADM during autologous breast reconstruction provides patients with an alternative to implants that allows them to obtain their desired breast volume. Given the aesthetic impact that ADM has on the total amount of flap weight and projection, it is recommended that the HyPAD® technique be considered for patients who desire a breast that cannot be restored with their own flap weight and yet wish to avoid implants.

Shifts in Reduction Mammaplasty Surgical Volumes with the Emergence of a Global Pandemic

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INTRODUCTION: The onset of the COVID-19 pandemic resulted in significant changes to the surgical caseload for various surgery departments around the United States. As medical

institutions prioritized resources for the expected increase in patient volumes due to SARS-CoV-2 viral infection, surgical departments saw a decrease in non-emergent and elective surgical procedures. Reduction mammaplasties, which are largely covered by insurance, are among the elective procedures that provide significant revenue to the hospital. This expected decline in procedures suggests a potential decline in revenue provided by the plastic surgery department of a hospital. The PURPOSE of this study is to analyze the loss of revenue experienced by a single medical institution due to changes in breast reduction mammoplasty volumes during the COVID-19 pandemic.

METHODS: Upon Institutional Review Board approval, using the Augusta University Medical Center's Financial Billing Data, 373 patients that underwent bilateral reduction mammoplasty were queried. A time horizon of March 2019 to March 2022 were used to determine the pre- and post-COVID caseload and charges that were incurred. Statistical analysis to compare the 12 months pre- and 24 months post-COVID was conducted using two-samples of equal variance t-test and F-test confirming equal variance.

RESULTS: There was a statistically significant increase in the number of reduction mammoplasties performed per month from the year prior to the onset of COVID-19 (March 2020) to the 2 years after (6.6 to 11.4 per month, p-value 0.012). There was a statistically significant increase in the per-month charges from the AU Health system for reduction mammoplasties for the same time period ($31,780.92 to $52,113.34 per month, p-value 0.021). Although there was an increase in per-month revenue from reduction mammoplasties, this increase failed to reach statistical significance ($7,059.95 to $10,423.51 per month, p-value 0.058)

CONCLUSION: The plastic surgery department saw a statistically significant increase in reduction mammaplasty cases and subsequent charges in the post-COVID cohort. These findings suggest that the emergence of a nationwide pandemic did not necessarily lead to a decrease in the volume of non-emergent surgical cases despite an expected decrease in caseload due to the need to reallocate hospital resources. On the contrary, there was an increase in caseload suggesting that there may be other factors contributing to patients pursuing reduction mammoplasty post-COVID including convenience resulting from time off due to the pandemic, meeting insurance-covered reduction criteria, and projected recovery time.

Current State of Evidence-Based Long-Term Monitoring Protocols for Cancer Recurrence in Post-Mastectomy Breast Reconstruction Patients

Abstract Presenter
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BACKGROUND: Breast cancer is the most common malignancy affecting women worldwide,

accounting for nearly 25% of cancers in women. While screening and advances in management have increased lifespan in breast cancer patients, locoregional recurrence has been estimated to have a 3-8% 5-year incidence.1 Current guidelines for breast reconstruction monitoring are controversial, with conflicting evidence supporting imaging or physical examination alone. We sought to evaluate the current state of evidence-based long-term monitoring protocols for patients who have undergone mastectomy and breast reconstruction.

METHODS: Guidelines issued by the American Society of Clinical Oncology (ASCO), National Comprehensive Cancer Network (NCCN), American Society of Plastic Surgeons (ASPS), and American College of Radiology (ACR) were evaluated for recommendations on clinical examination and imaging. The REFERENCES were reviewed for level of evidence and CONCLUSIONs.

RESULTS: Evidence-based clinical practice guidelines from professional organizations conflict in their recommendations for monitoring of cancer recurrence after mastectomy and breast reconstruction. Most organizations (ASCO, NCCN, ASPS) agree on the utility of annual clinical exams, with more frequent exams in the first six years.2 Evidence suggests that physical examination is sufficient to detect local cancer recurrence, with imaging only if there is concern for recurrence in patients who have undergone post-mastectomy implant-based reconstruction.3 No surveillance imaging is recommended by ASCO, NCCN, or ASPS; however, ACR recommends mammography or digital breast tomosynthesis for autologous reconstruction, and found no evidence to support screening with implant-based reconstruction.4 While some studies found utility in screening mammography for autologous reconstruction, others found that there was no difference in 5-year survival rate for patients who underwent surveillance imaging, symptomatic imaging, or no imaging.5 However, recommendations are based on minimal level I evidence from systematic reviews and primarily level III evidence.

CONCLUSION: Breast cancer patients need continued monitoring following breast reconstruction. While professional organizations all agree that clinical examinations are a vital component of recurrence detection, recommendations conflict regarding surveillance imaging. Further research is necessary to assess the utility of post-mastectomy imaging for cancer recurrence surveillance.

REFERENCES:

1. Abe, O., Abe R., Enomoto K., et al. Effects of radiotherapy and of differences in the extent of surgery for early breast cancer on local recurrence and 15-year survival: an overview of the randomised trials. The Lancet. 2005;366(9503):2087-2106. doi:10.1016/S0140-6736(05)67887-7

2. Khatcheressian JL, Wolff AC, Smith TJ, et al. American Society of Clinical Oncology 2006 Update of the Breast Cancer Follow-Up and Management Guidelines in the Adjuvant Setting. JCO. 2006;24(31):5091-5097. doi:10.1200/JCO.2006.08.8575

3. Barnsley GP, Grunfeld E, Coyle D, Paszat L. Surveillance Mammography following the Treatment of Primary Breast Cancer with Breast Reconstruction: A Systematic Review: Plastic and Reconstructive Surgery. 2007;120(5):1125-1132. doi:10.1097/01.prs.0000279143.66781.9a

4. Heller SL, Lourenco AP, Niell BL, et al. ACR Appropriateness Criteria® Imaging After Mastectomy and Breast Reconstruction. Journal of the American College of Radiology. 2020;17(11):S403-S414. doi:10.1016/j.jacr.2020.09.009

5. Shammas RL, Broadwater G, Cason RW, et al. Assessing the Utility of Post-Mastectomy Imaging after Breast Reconstruction. Journal of the American College of Surgeons. 2020;230(4):605-614e1. doi:10.1016/j.jamcollsurg.2020.01.006

Three-Dimensional Printing in Autologous Breast Reconstruction: A Scoping Review and New Classification of Constructs

Abstract Presenter
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PURPOSE: Three-dimensional (3D) printing has been successfully used in several plastic and reconstructive surgery sub-specialties. For example, in craniomaxillofacial surgery, 3D printed constructs have facilitated faster operative times and significant improvements in clinical and patient outcomes. However, its use in the field of autologous breast reconstruction is still emerging. This scoping review aimed to characterize 3D printed constructs and their clinical impact in autologous breast reconstruction.

METHODS: We searched PubMed, Embase, Web of Science, Cochrane, and Scopus and retrieved 252 articles, 11 of which met our inclusion criteria. From these articles, we extracted data regarding the 3D printed construct, including the method, material, and cost, as well as how the construct was used in surgery. In addition, we collected data on the outcomes reported in the literature, including accuracy of the construct, the surgical planning time, intraoperative time, length of hospitalization, number of postoperative complications and flap failures, cosmesis, and patient satisfaction.

RESULTS: We identified 11 articles describing 137 3D printed constructs. The utilization of 3D constructs in breast reconstruction was classified into three types: Type IA breast models (2.9%, n=4), Type IB breast molds (32.8%, n=45), and Type II perforator templates (64.2%, n=88). Breast models were positive-space constructs of the breast that help determine the desired flap projection compared to a contralateral breast. Breast molds were negative-space constructs of the breast that aided the surgeon in creating shape and volume of the autologous flap intra-

operatively. Finally, perforator templates were printed from pre-operative imaging scans and used to localize perforator vessels. Most constructs were used both pre- and intra-operatively (64.2%, n=88). The most common procedure that used 3D printed constructs were deep inferior epigastric perforator (DIEP) flap procedures (67.9%, n=93). Three studies on perforator templates (Type II) reported significant reductions in intraoperative time and reductions, but not significantly so in postoperative complications, reoperations, or flap failures. Other outcomes measured included breast mold (Type IB) volume and width accuracy, perforator template (Type II) identification accuracy, cosmesis, flap projection, patient satisfaction, and surgeon perception of the construct.

DISCUSSION: We performed a scoping review of the use of 3D printing in autologous breast reconstruction. We created a new classification system to describe the 3D printed constructs and to better characterize their functionality and clinical impact. Breast models (Type IA) and breast molds (Type IB) were primarily used to achieve symmetry and to improve cosmesis. Outcomes focused on objective appearance (e.g., flap projection, breast width, breast volume) and subjective assessment (e.g., cosmetic outcomes) of the breasts post-surgery. Perforator templates (Type II) were primarily used for flap design and inset to reduce operative time. Outcomes centered on postoperative complications and operating time, which encompassed perforator identification time and flap harvest time. Our RESULTS suggest that 3D printing represents a promising new technology in autologous breast reconstruction. Future studies comparing 3D printed construct use to control cases are needed to clarify the clinical impact, and our classification system can provide a framework on how to guide future comparison studies based on the construct and its outcomes.

Outcomes After Implant-Based Breast Reconstruction Following the National Institution of a Ban on Bacitracin Irrigation

Abstract Presenter
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INTRODUCTION: The use of irrigation with bacitracin-containing solution has been common among surgeons, as it was widely thought to have anti-bacterial properties and to prevent post-operative infection. Current literature, however, suggests that antibiotic-containing irrigation confers little added benefit; some studies suggest a partial benefit, others suggest no benefit or

perhaps even detriment to the patient [1, 2]. On January 31, 2020, the Federal Department of Agriculture (FDA) instituted a ban on bacitracin-containing irrigation for operative use. Despite the institution of a nationwide ban on perioperative bacitracin-irrigation, some surgeons continued to use it, possibly due to a perception among surgeons that antibiotic-containing solutions were unlikely to cause harm and that the literature did not form a consensus on outcomes for patients who did not receive antibiotic-containing irrigation versus those who did. This study aimed to determine whether bacitracin has a beneficial effect on postoperative infection rates by analyzing infection rates before and after the FDA ban on bacitracin irrigation.

METHODS: A single-institution retrospective chart review was conducted. Eligible patients underwent implant-based breast reconstruction following total mastectomy between October 1, 2016 and July 31, 2022. Procedure date, reconstruction type, patient comorbidities, use of bacitracin irrigation, post-operative infection, and secondary outcomes were collected. Univariate and multivariable logistic regression analysis was performed.

RESULTS: A total of 188 female patients aged 30-83 were included in the study, who underwent implant-based reconstruction procedures on 345 breasts. Twenty-seven (14%) pre-ban procedures resulted in post-operative infection and 21 (14%) post-ban procedures resulted in post-operative infection. Nine (13%) procedures involving bacitracin irrigation use resulted in a post-operative infection; of these procedures, 4 took place prior to the bacitracin ban and 5 took place after the bacitracin ban. Bacitracin use did not protect against infection in univariate or multivariable analysis. Age under 50 years was associated with increased risk of postoperative infection ($p=0.03$). The presence of comorbidities, smoking status, neoadjuvant chemotherapy, implant position prepectoral versus subpectoral, and laterality were not statistically significantly associated with postoperative infection development.

CONCLUSION: The use of bacitracin-containing irrigation solution does not decrease the risk of postoperative infection. As bacitracin is no longer FDA approved for use in irrigation, further research is required to explore the optimal antibiotics for inclusion in pocket irrigation for implant-based reconstruction.

REFERENCES

1. de Jonge, S.W., et al., Systematic Review and Meta-Analysis of Randomized Controlled Trials Evaluating Prophylactic Intra-Operative Wound Irrigation for the Prevention of Surgical Site Infections. Surg Infect (Larchmt), 2017. 18(4): p. 508-519.
2. Tirrell, A.R., et al., Bacitracin for Injection Recall: Impact on Immediate Breast Implant Surgical Outcomes. Breast J, 2022. 2022: p. 1389539.

Craniomaxillofacial

Patterns of Co-occurring Facial Fractures

Abstract Presenter
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PURPOSE: A review of the Global Burden of Disease study reports a 43% global increase in reported facial fractures in 27 years. Unfortunately, there is limited research investigating population's demographics and facial fracture's characterization. The PURPOSE of this study is to conduct one of the first national evaluations of the prevalence and demographics of co-occurring facial fractures.

METHODS: This was a database study of deidentified, aggregate data using PearldiverTM. Between 2010 and 2020. The database was queried by CPT codes categorizing by fracture patterns and surgical treatment (open reduction internal fixation (ORIF) vs. closed reduction). Concurrent treatment of two or more fracture types was determined based on CPT codes reported concomitantly within 30 days of each other. Analysis was conducted utilizing PRISM software. Venn diagrams were used to visually compare the percentage of patients with two-fracture pattern respective to their individual singular-fracture groups.

RESULTS: One-fourth of the 244,751 patients identified were between ages 15-24 years old. About 75% of patients had commercial insurance. Closed reduction of nasal fractures was the most common surgical intervention (56%). 22% of malar ORIF patients had a second orbital fracture, but only 2.5% of all orbital fracture patients had a second malar fracture. 35% of NOE ORIFs have a malar fracture, and 2.5% of malar ORIFs have a concomitant NOE fracture. Our RESULTS contradict CONCLUSIONs by Buchanan et al. from the Seattle Program published in 2012.[1] They described 24.5% of malar fracture patients likely having a concomitant NOE fracture, which is nearly ten times more prevalent than our data reports. About 1/3 of either Le Fort I or II ORIFs had a concurrent malar ORIF. Contrasting, 3-8% of malar ORIFs had a concomitant Le Fort I or II fracture. About 1/3 of all Le Fort fractures had a concomitant orbital floor blowout fracture (BOF). Contrasting, only 5% of patients with an orbital floor BOF had any Le Fort fracture. Nasal and mandibular ORIFs had isolated fracture patterns.

CONCLUSION: 30% of any Le Fort, malar, or orbital fracture needing ORIF treatment will have a second concomitant facial fracture needing surgical reduction, suggesting surgeons to have a higher index of suspicion for a secondary facial fracture in patients initially identified with any Le Fort, malar, or orbital fracture. 35% of NOE fractures have a malar fracture and 2.5% of malar fractures have NOE fracture. This directly contradicts current literature. Surgeons may consider looking for a second malar fracture in patients identified with an NOE fracture, but not vice versa. Majority of nasal and mandibular fractures occur in isolation. Surgeons may not need to look for a secondary facial fracture in patients with an initial identified mandibular or

nasal fracture.

REFERENCES:

[1]Buchanan EP, Hopper RA, Suver DW, Hayes AG, Gruss JS, Birgfeld CB. Zygomaticomaxillary complex fractures and their association with naso-orbito-ethmoid fractures: a 5-year review. Plastic and reconstructive surgery. 2012;130(6):1296-1304.

A Comparison of Three-Dimensional Cone Beam Computed Tomography Outcomes between Early versus Late Secondary Alveolar Bone Grafting in Patients with Unilateral Cleft Lip and Palate

Abstract Presenter
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PURPOSE: Secondary alveolar bone grafting (SABG) during mixed dentition is the standard of care for patients with complete cleft lip and palate. Early SABG (4-7 years) occurs before the eruption of lateral incisors, while late SABG (8-12 years) occurs before the eruption of maxillary permanent canines. This study compares outcomes of early ABG (E-ABG) versus late ABG (L-ABG) among patients with unilateral cleft lip and palate (UCLP).

METHODS: A retrospective review was conducted evaluating non-syndromic patients with UCLP who underwent ABG from April 2018 to January 2020. Patients with preoperative and postoperative cone beam computed tomography (CBCT) imaging of at least six months from the index operation were included. Demographics, age of surgery, perioperative data, and periodontal information were collected. Preoperative cleft width, bony bridge formation and thickness, incisor root length, and periodontal bone height on cleft-incisor were assessed by Dolphin Imagine software. The Bergland scale score using three-dimensional CBCT rather than traditional occlusal radiograph was applied to assess bone graft outcomes.

RESULTS: After 340 patients with UCLP were screened, 49 patients were included, of which 21 were in the E-ABG group (6.8±1.0 years of age) and 28 were in the L-ABG group (10.8±1.6 years of age). The initial alveolar cleft width is significantly smaller in E-ABG group compared to the L-ABG group (5.4±1.9mm vs. 6.6±2.0mm; p=0.035). However, L-ABG group had higher graft failure rates (32.1%) compared to the E-ABG group (32.1% vs. 14.3%; p=0.150). The overall Bergland scale scores were 1.7±1.0 and 2.5±1.2 for the E-ABG and L-ABG cohorts,

respectively (p=0.009). Compared to the E-ABG group, the L-ABG group had significantly greater bony bridge thickness (6.0±2.2mm vs. 3.5±1.8mm; p<0.0001), longer post-graft incisor root length (8.9±2.6mm vs. 13.3±1.8mm; p<0.001), and greater periodontal bone coverage on the root of the cleft-adjacent incisor (80.9±18.6% vs. 66.7±19.9%; p=0.029).

CONCLUSION: Our findings suggest that patients who undergo early SABG at 7 years may have better graft outcomes and benefits to the periodontal bone support on cleft-adjacent incisor compared to late SABG at 11 years. Existing literature also support early SABG due to favorable outcomes compared to late ABG.(1, 2) Further investigation is critical to determine the optimal timing of ABG.

REFERENCES:

1) Fahradyan A, Tsuha M, Wolfswinkel EM, Mitchell KS, Hammoudeh JA, Magee W 3rd. Optimal Timing of Secondary Alveolar Bone Grafting: A Literature Review. J Oral Maxillofac Surg. 2019 Apr;77(4):843-849. doi: 10.1016/j.joms.2018.11.019. Epub 2018 Nov 26. PMID: 30576671.

2) Doucet JC, Russell KA, Daskalogiannakis J, Mercado AM, Hathaway RR, Semb G, Shaw WC, Long RE Jr. Early Secondary Alveolar Bone Grafting and Facial Growth of Patients with Complete Unilateral Cleft Lip and Palate. Cleft Palate Craniofac J. 2022 Feb 16:10556656221080990. doi: 10.1177/10556656221080990. Epub ahead of print. PMID: 35171057.

Risk of 30-day Respiratory Complications following Palatoplasty in Children with a History of COVID-19: A Propensity Score-Matched Analysis of 1,114 Cases

Abstract Presenter
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PURPOSE: The SARS-CoV-2 (COVID-19) pandemic was a major disruptor of healthcare, with aftershocks still being felt today. Importantly, pediatric diagnoses of COVID represented up to 20% of all reported cases since the beginning of the pandemic. Given its tropism, it is important to understand if COVID-19 affects outcomes in procedures involving the respiratory tract. The PURPOSE of this study was to determine the risk of respiratory complications in children undergoing cleft palate repair.

METHODS: This is a retrospective study conducted with the TriNetX database. This database aggregates cases from 55 international healthcare organizations. Pediatric (age ≤3 years) patients undergoing palatoplasty cases based on CPT codes were included if they had a history of COVID-19 (HxC19) based on ICD codes Z86.16 or U07.1. Patient demographics, medical comorbidities, and complications were compared using single variable analysis. Cases were then

propensity score-matched within the database to assess for risk of respiratory complications. All statistical significance was set to $p < 0.05$.

RESULTS: There were 1,114 cases of pediatric palatoplasty meeting inclusion and exclusion criteria: 1,054 cases were without HxC19, and 90 cases reported a diagnosis of COVID-19. Prior to propensity matching, cases without HxC19 had a higher risk of acute respiratory distress (risk ratio [RR], 6.16; P<0.0001), stridor or wheezing (RR, 4.33; P<0.0001), hypoxemia (RR, 11.7; P<0.0001), and emergency reintubation or initiation of ventilation assist (RR, 11.7; P<0.0001). Propensity matching of demographics, comorbidities, and cleft diagnosis, yielded cohorts of 87 cases each. There was no significant difference between these two cohorts in regard to any of the respiratory complications included for analysis.

CONCLUSIONS: Given the similar rates of acute airway and respiratory complications in pediatric palatoplasty cases both with and without HxC19, and no significant change in risk following matching, palatoplasty in children with HxC19 remains a safe option. However, patients and parents with a history of COVID-19 should still be counseled on the possible airway complications but can be reassured that a prior diagnosis of COVID-19 is unlikely to affect their outcomes.

Mandibular Distraction in Patients with Pierre Robin Sequence: A Multi-Surgeon Experience

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PURPOSE: Mandibular distraction osteogenesis (MDO) is rapidly becoming a standard of care for management of patients with severe Pierre Robin Sequence. The tongue is brought forward to alleviate the airway obstruction. This study will look at an institutional, multi-surgeon experience with MDO over ten years.

METHODS: This study was conducted as a retrospective chart review including all patients who underwent MDO at the authors' institution from 2012 to 2022. Demographics, preoperative and postoperative respiratory and feeding status, and distraction data were collected. Primary

outcomes were achievement of full oral feeds, avoidance of a gastrostomy tube (GT), avoidance of a tracheostomy, discharge from hospital on room air and complications. A significance value of 0.05 was utilized.

RESULTS: Twenty-eight patients met inclusion criteria. Three craniofacial surgeons performed all interventions. The average age at MDO was 135 days, mean activation phase was 13.6 days, mean distraction length was 14.9 mm and mean consolidation phase was 64.2 days. MDO showed a significant improvement in apnea-hypopnea index (AHI) ($p < 0.001$) and %O2 Nadir ($p < 0.001$) on postoperative polysomnography. Syndromic patients were associated with discharge with a GT and negatively associated with avoidance of tracheostomy. Patients with preoperatively diagnosed tracheomalacia and subglottic stenosis were negatively associated with avoidance of a tracheostomy. Preoperative diagnosis of gastroesophageal reflux disease (GERD) was negatively associated with extubation immediately to room air (RA) following index procedure. A shorter duration of intubation following index procedure was associated with discharge on RA and a longer duration of intubation was associated with unilateral pan-facial nerve palsy. A longer activation phase was associated with discharge with a GT and a shorter activation phase was associated with discharge on full oral feeds. The ability to discharge on RA was associated with a shorter latency phase, shorter activation phase, and decreased distance of distraction. Repeat MDO was associated with postoperative infection requiring operative management.

CONCLUSIONS: The goal of MDO is to achieve full oral feeds with no respiratory support. Several interesting findings are described in this study. When assessing patients preoperatively it is important to note the higher rate of failure to avoid a tracheostomy in patients with a syndrome and those with tracheomalacia and subglottic stenosis noted on airway evaluation. Syndromic patients were also noted to be more likely to be discharged with a GT. Several different latency periods were used in this study, and it appears that not only is a short latency period safe, but that it may be correlated with successful discharge on RA. This should be tempered with the finding that a decreased time spent intubated following surgery, decreased distance distracted and time spent in activation was also associated with discharge on RA, which may be a function of the severity of micrognathia in these patients. Of note, patients that spent a longer period intubated following surgery experienced a higher rate of facial nerve palsy. The reason for this correlation is unclear but may represent more severe cases that resulted in more forced retraction during surgery.

Impact of Dosage Frequency of Propranolol on Sleep Patterns in Patients with Infantile Hemangiomas

Abstract Presenter
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INTRODUCTION: Infantile hemangiomas (IH) are benign vascular tumors in infants, that rapidly grow in the first year of life and involute during childhood.[1] Propranolol is the standard of care due to the ability to inhibit proliferation, induce regression, and result in involution of the IH.[2] Despite the minor side effect of propranolol induced sleep disturbance, sleep disruption constitutes the most common reason for early medication discontinuation by parents.[3] This prospective pilot study aimed to compare the impact of propranolol therapy on sleep when the drug is administered in either BID or TID dosing regimens.

METHODS: This was a prospective single center pilot study. Patients were assigned to one of three therapy groups: BID propranolol (oral), TID propranolol (oral), or timolol (topical)). Patients with multiple hemangiomas or a single hemangioma >2cm were randomized into either BID or TID dosing. Patients with an isolated hemangioma <2cm were prescribed timolol, a topical beta-blocker, as the control. Parents were offered the Brief Infant Sleep Questionnaire (BISQ) at each clinic visit (every 3 months) until termination of the medication (18 months of age).[4] In the BISQ, scores ranged from 1-5 with 1 representing no changes in sleep and 5 representing major changes in sleep. A univariate analysis was performed.

RESULTS: A total of 94 BISQ surveys were given to 58 patients: 47 at the time of initiation and 46 at the time of follow up. Patients were assigned to treatment group with 56 in the BID group, 17 in the TID group, and 20 in the timolol group. The BID group had the least nighttime sleep hours with 8.08 ± 2.44 compared to the TID group with 9.05 ± 2.32 and the timolol group with 9.50 ± 1.31 (p=0.23). Subjectively, parents in the BID group reported worse sleep scores at 1.84 ±1.29 compared to the TID group at 1.71 ± 1.1 and the timolol group at 1.38 ± 0.52 (p=0.07). Patients in the BID group took the fewest naps per day at 2.72 ± 1.31 compared to 3.29 ± 1.90 and 3.38 ± 1.70 in the TID and timolol groups, respectively (p=0.27). After taking propranolol for 30 days, patients in the BID group exhibited significantly fewer naps per day (Δ=-0.70 naps, p=0.04) and less total time spent napping (Δ=-1.93 hours, p=0.01).

DISCUSSION: Alternative dosing of propranolol appears to play a role in the sleep patterns of infants. BID dosing had significant decreases in total naptime and naps per day, differing from the normal development of infant sleep patterns. The BID dosing pattern additionally had the worst nighttime sleep, sleep scores, and fewest naps per day. The novel TID dosing strategy exhibits sleep patterns consistent with the control group indicating less overall sleep disturbance. Improvements in sleep patterns are likely to have increases in long term drug adherence by parents leading to maximum treatment efficacy. Ongoing enrollment of patients is crucial to eliminate data skew and provide better recommendations in the dosing regimens for beta blockers in the management of infantile hemangiomas.

REFERENCES:
1. Léauté-Labrèze C, Harper JI, Hoeger PH. Infantile haemangioma. The Lancet. 2017;390(10089):85-94. doi:10.1016/s0140-6736(16)00645-0.
2. Léauté-Labréze C, Hoeger P, Mazereeuw-Hautier J. A randomized controlled trial of oral propranolol in infantile hemangioma. Journal of Vascular Surgery. 2015;62(2):518-519. doi:10.1016/j.jvs.2015.06.197.
3. Ji Y, Chen S, Wang Q, et al. Intolerable side effects during propranolol therapy for infantile hemangioma: Frequency, risk factors and management. Scientific Reports. 2018;8(1). doi:10.1038/s41598-018-22787-8.
4. Del-Ponte B, Xavier MO, Bassani DG, et al. Validity of the brief infant sleep questionnaire (BISQ) in Brazilian children. Sleep Medicine. 2020;69:65-70. doi:10.1016/j.sleep.2019.12.018.

Aging and Environmental Associated Changes of Facial Soft Tissues are Detectable on Clinical High Resolution MRI Scans

Abstract Presenter
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PURPOSE: Facial aging is a multifactorial process involving both soft tissues and bony structures1. Factors including volume loss, gravity, muscle laxity, and cellular damage contribute to decreased skin and soft tissue elasticity, resulting in increased mobility of facial soft tissues1-2. Variations in soft tissue integrity have been attributed to age, sun exposure, and smoking. While facial aging has been extensively examined histologically, the present study sought to leverage clinical MRI to quantify facial soft tissue movement (STM) and correlate with environmental and demographic factors.

MATERIALS & METHODS: Sixty-eight patients underwent high resolution MRI scans, which included two identical scans at the beginning and end of imaging separated by approximately 45 minutes. MRIcron was used to label 49 reproducible bony and soft tissue facial landmarks on all scans. An avatar scan was used to co-register and scale all scans. For each patient, early and late scans were coregistered, and mathematical voxel-wise absolute differences were used to render composite maps to highlight the change in soft tissue configuration over the 45 minute gap. Lines between close neighbor landmarks offered corresponding paths by which movement could be compared between patients. Linear regression was used to correlate average absolute differences with age, sex, smoking status, and sun exposure.

RESULTS: Age was positively correlated with the greatest STM compared to sun exposure,

sex, and smoking status. In the upper face, age was correlated with STM in the forehead (glabella to superior orbits, p=0.026), bony orbits (p-range=0.001-0.023), and orbital soft tissue (orbits to medial/lateral canthi, p-range=0.001-0.014). Age was associated with bilateral midface STM in the infraorbital region (between malar eminence, bilateral canthi and inferior orbit, p-range=0.001-0.019) and zygomatic region (malar eminence to auditory canal, p-range=0.001-0.032). In the lower face, age correlated with STM around the mouth and philtrum (lips, oral commissures, columella and nares, p-range=0.028-0.001), and between the mandible and mentum (p-range=0.001-0.031). Sun exposure was only associated with STM in the oral region (lips, columella, and nares, p-range=0.001-0.049) and infraorbital/nasal region (nares to medial canthus, p=0.001). Sex was only associated with STM around the mandibular angle (p=0.004). Smoking was not found to be associated with significant bilateral STM.

CONCLUSIONS: To our knowledge this is the first study to examine facial STM using clinical in vivo MRI. This methodology identified facial regions most susceptible to changes from aging and various environmental factors. These RESULTS provide further understanding of the natural facial aging process and may be helpful in identifying rejuvenative targets in the future.

REFERENCES:

1. Ilankovan V. Anatomy of ageing face. Br J Oral Maxillofac Surg. 2014 Mar;52(3):195-202. doi: 10.1016/j.bjoms.2013.11.013. Epub 2013 Dec 23. PMID: 24370442.
2. Freytag L, Alfertshofer MG, Frank K, et al. Understanding Facial Aging Through Facial Biomechanics: A Clinically Applicable Guide for Improved Outcomes. Facial Plast Surg Clin North Am. 2022 May;30(2):125-133. doi: 10.1016/j.fsc.2022.01.001. PMID: 35501049.

Pick Your Nose: Customizable, Low-cost, Biocompatible Implants for Craniofacial Reconstruction

Abstract Presenter
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PURPOSE: Craniofacial reconstruction or enhancement requires autologous, cadaveric or alloplastic implants, often requiring intraoperative modification to optimize shape and fit for a particular patient, introducing associated risks of infection, extrusion, expense and donor site morbidity. Given these shortcomings, there is substantial need for biocompatible, customizable and low-cost facial implants. This study examines the biocompatibility and durability of various polylactic acid (PLA) implant designs +/- decellularized cartilage infill to assess translatability to craniofacial (nasal) reconstruction.

METHODS & MATERIALS: Cartilage harvested from ovine ribs was minced or zested and decellularized. Dorsal nasal scaffolds with contours similar to commercially available silicone dorsal nasal implants were custom-designed with 3D modeling software and printed in polylactic acid (PLA) on a PRUSA i3 MK3S+ printer. All scaffolds were heterotopically implanted on rat dorsa with 4 implants per rat. Two scaffolds designed as external "cages" of low or high porosity and were without internal supports. These cages were implanted empty or with processed decellularized cartilage (either "minced" or "zested") infill, yielding 6 total treatment groups, n=4 each. The remaining two scaffolds were designed with internal PLA rebar supports and implanted without decellularized cartilage infill. Scaffolds were explanted 3, 6 and 12 months after implantation, after which they underwent same-day volumetric analysis via microCT. Explants were then Formalin-fixed, embedded in paraffin and sectioned for histopathologic and immunohistochemistry analysis. Statistical and image analysis was completed on RStudio and ImageJ.

RESULTS: Overall, implant contours were best retained across all timepoints in the low and high porosity rebar groups. Empty and zested cartilage-filled cages had significant volume loss at 6 and 12 months relative to volume at implant ($p < 0.05$) with explanted constructs grossly collapsed at both timepoints. Rebar and minced cartilage-filled constructs had superior volume retention relative to empty and zested cartilage-filled cages at 6 months; only rebar groups retained this volume after one year ($p < 0.05$). Uniform and well-distributed neotissue ingrowth was evident in all filled implants on MicroCT; "cage" implants without infill no longer had a measurable internal cavity volume due to flattening. Hematoxylin and eosin and safranin-O stain showed a robust lymphocytic inflammatory response at 3 months that subsided by 6 and 12 months, as well as increased tissue vascularization and collagen deposition between timepoints consistent with healthy tissue ingrowth. Immunostaining indicated an environment favorable to tissue proliferation with more M2 than M1 macrophages across all timepoints and strong M2 expression among the cells bordering PLA.

CONCLUSION: This study supports the use of PLA for generating customizable facial implants. With sufficient internal supports, constructs retain contours and volume at one-year post-implant and provide a scaffold for ingrowth of healthy, vascularized, collagen-rich tissue. While volume retention for decellularized cartilage-filled cages was inferior to PLA-only groups, these findings support the biocompatibility of combined decellularized cartilage-PLA implants and future designs may incorporate both rebar and cartilage infill. Importantly, design and fabrication of these bespoke implants can be completed quickly and at minimal cost, potentially at the point of care, allowing for affordable implants with a minimal risk profile.

The Future of Head and Neck Lymphedema Assessment: Comparative Analysis of 3D Imaging vs. Tape Measurement

Abstract Presenter
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BACKGROUND: Head and neck lymphedema (HNL) after head and neck cancer treatment can significantly impact patient quality of life by causing difficulty with swallowing and speech, increasing cost of treatment, leading to facial disfiguration, and decreasing psychosocial wellness. Currently, The M. D. Anderson Cancer Center (MDACC) HNL evaluation protocol is the most commonly used to tool to evaluate the severity and status of head and neck lymphedema by utilizing a series of face and neck tape measurements. However, there is no gold standard assessment tool that reliably and consistently measures HNL despite over 35 assessment tools having been reported in the literature to date. With the continued integration of advanced technology in medicine, three-dimensional (3D) imaging has shown that it's an effective and reliable tool to assess volume changes. Therefore, we studied the efficacy of 3D imaging as a novel method of tracking changes in head and neck volume in patients with head and neck lymphedema. The aim of this study was to compare changes in 3D measurements against traditional MDACC protocol tape measurements.

METHODS: Patients undergoing treatment for head and neck cancer were prospectively enrolled, and 3dMD images were captured at the initial and each subsequent appointment. The MDACC protocol was also used to obtain a composite bilateral hemifacial score from the sum of all facial tape measurements at each appointment. Additionally, the MDACC rating scale was used to determine the degree of lymphedema. Following study completion, the changes in 3dMD imaging measurements and bilateral hemifacial scores from first to last visit were compared for each patient. Pearson's correlation coefficients were used to assess the strength and direction of the relationship between the two measures.

RESULTS: A total of 230 patients were included in the study. The mean age at time of first visit was 61.5 ± 9.4 (SD) years. Most primary cancers originated from the oropharynx (35%), oral cavity (26%), or larynx (17%), with the remaining 22% originating in other locations. 31% of patients received radiotherapy, 8% received surgery, and 61% received both radiotherapy and surgery. 20% of patients were categorized as level 1a lymphedema, 71% as 1b, and 9% as level 2. The median time from first visit to last visit was 3.3 months (2.1-5.8, interquartile range). The average changes in lymphedema measurements were 1.9 ± 25.8 using 3dMD scans and -1 ± 5.2 using the MDACC protocol. The Pearson correlation coefficient for these two variables was 0.207 ($p = .002$), indicating that there is a low, positive correlation between tape and 3D measurements.

CONCLUSIONS: Use of 3D imaging for volume measurement in head and neck lymphedema has not been previously studied. Our study demonstrates that while traditional tape measurement is frequently used to measure HNL, efficacy and accuracy are low. The reliability and accuracy of 3D volume measurement has been validated in other studies, and we believe it is an effective tool in evaluating head and neck lymphedema.

Surgical Correction of Orbital Malposition: Indications for the Use of the Box Osteotomy and Facial Bipartition

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PURPOSE: Movement of the bony orbits can be accomplished with box osteotomy (BO) or facial bipartition (FB). Both procedures have been shown to successfully reduce the interdacryon distance (IDD) as well as the overlying soft tissue, but little data exists to support the use of one procedure over the other. This study compares the outcomes of BO and FB at a single center and proposes an algorithm to assist in preoperative decision-making.

MATERIALS AND METHODS: A retrospective review of patients undergoing BO or FB was performed at a single institution from 2005 to 2022. Patient demographics, medical history, perioperative data, length of hospital stay (LOS), and postoperative complications were collected and analyzed. Correction of the IDD in BO compared to FB was measured on pre- and post-operative CT scans. Chi-squared and Mann-Whitney U tests were used for statistical analysis.

RESULTS: Forty-one patients were included, 27 FB and 14 BO, with varying diagnoses. In the patients with hypertelorism, there was significant improvement of the IDD after surgery for both BO patients (preoperative: 34.8±6.3 mm vs. postoperative: 25.7±6.3 mm; $p=0.018$) and FB patients (preoperative: 27.9±5.6 mm vs. postoperative: 21.6±2.8 mm; $p<0.001$). Notably, the BO cohort had a significantly larger reduction in the IDD compared to the FB cohort (10.2±1.7 mm vs. 6.4±4.4 mm; $p=0.014$). One (7.1%) BO patient had a complication whereas 13 FB patients (18.5%) had complications ($p=0.009$). One FB patient required reoperation for orbital dystopia. The BO cohort had significantly lower intraoperative blood loss (400 vs. 825 mL; $p=0.007$), lower transfusion requirements (293 vs. 799 mL; $p<0.001$), and shorter LOS (5.5 vs. 8.0 days; $p=0.005$) compared to the FB cohort. Average follow-up time was 7.1±4.7 years (FB) and 3.0±2.6 years (BO; $p=0.005$).

CONCLUSION: BO and FB are effective operations for correcting orbital malposition. Both procedures are safe when performed by an experienced surgeon in a tertiary care facility. A surgeon must take into consideration other surgical needs to correct the facial cascade such as malar prominence position and palatal arch width when determining which procedure to perform.

A Nationwide Analysis of the Association Between Parental Age and Incidence of Cleft Lip/Palate

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INTRODUCTION: In many high-income Western countries, parenthood has increasingly been deferred to a higher age.(1) Increased parental age can have various consequences on birth outcomes, including the incidence of congenital birth defects such as cleft lip with or without palate (CLP) and cleft palate-only (CP).(2-4) Given the continually rising parental age at first birth, this epidemiological study aims to assess the relationship between maternal and paternal age and the incidence of non-syndromic CLP and CP in the United States.

METHODS: We examined 22,669,736 births using a US-based cohort from 2016-2021.(5) Dependent variables were CLP and CP. Independent variables include maternal age, race, education, and cigarette use (pre-pregnancy and during-pregnancy). A separate set of modeling examined the influence of paternal factors including paternal age, race, and education. Univariate and multivariate logistic regression examined the association between variables using odds ratios and 95% confidence intervals.

RESULTS: There were 11,341 CLP cases and 3,645 CP cases. After adjusting for maternal race, education, pre-pregnancy smoking, and smoking during pregnancy, higher maternal age was not significantly associated with increased risk of CLP in the offspring (OR, 1.012; 95% CI, 0.996-1.029; p = 0.137); however, after splitting the cohort to compare the incidence of CLP among mothers aged 15-34 years versus those aged 35+ years, mothers aged 35+ were at 8.1% increased odds of having children with CLP (p =0.001) in multivariate modeling. In adjusted models, higher maternal age was significantly associated with increased risk of CP in the offspring (OR, 1.037; 95% CI, 1.012-1.063; p = 0.003). Similar findings were seen in regard to increased paternal age, with higher paternal age being significantly associated with increased risk of CP in the offspring (OR, 1.038; 95% CI, 1.008-1.068; p = 0.013) but not CLP.

CONCLUSION: Increasing maternal and paternal age is significantly associated with increased risk of CP in the offspring. Maternal age greater than 35 years, previously termed a "geriatric pregnancy," was also significantly associated with increased risk of CLP in the offspring. The findings of this study highlight an at-risk population with an increasing birth rate, particularly in Western countries. This population can benefit from heightened prenatal surveillance and awareness of compounding risks such as tobacco use and other controllable variables.

REFERENCES:

1. Morse A. Stable Fertility Rates 1990-2019 Mask Distinct Variations by Age. Published 2022. Accessed 1/8/2023.

2. Fraser GR, Calnan JS. Cleft lip and palate: seasonal incidence, birth weight, birth rank, sex, site, associated malformations and parental age. A statistical survey. Arch Dis Child. 1961;36(188):420-423.
3. Balgir RS. Parental age and incidence of cleft lip and cleft palate anomalies. Acta Anthropogenet. 1984;8(3-4):231-235.
4. McEvitt WG. Cleft lip and palate and parental age; a statistical study of etiology. Plast Reconstr Surg (1946). 1952;10(2):77-82.
5. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Natality on CDC WONDER Online Database. Data are from the Natality Records 2016-2021, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/natality-expanded-current.html.

A Comparative Assessment of Midterm Outcomes following Mandibular Distraction and Tongue-Lip Adhesion in the Treatment of Robin Sequence

Abstract Presenter
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BACKGROUND: The purpose of this study was to assess early and midterm outcomes of tongue-lip adhesion (TLA) and mandibular distraction osteogenesis (MDO) to resolve obstructive sleep apnea and subsequent feeding difficulties in patients with Robin Sequence (RS).

METHODS: A retrospective cohort study was performed of subjects presenting to a tertiary care pediatric center who underwent either primary MDO or TLA for the treatment of RS between 2004 and 2020. Exclusion criteria included subjects without preoperative and postoperative polysomnography (PSG). Study variables included apnea-hyponea indices (AHI), surgery-specific postoperative complications, feeding status, and dental relationships at last follow-up. Dental imaging was reviewed for patients with preoperative CT and postoperative dental imaging.

RESULTS: In total, n=59 subjects met inclusion (n=34 MDO, n=25 TLA) with a median length of follow-up of 8.8 and 6.7 years (MDO v. TLA, $p<0.27$). There were no significant differences in preoperative patient characteristics including enteral access and respiratory status, other than age at surgery (MDO 31 days v. TLA 17 days, $p<0.05$). Preoperative AHI was similar between

cohorts (33.9 and 46.7, p<0.38). Subjects undergoing MDO demonstrated improved AHI on initial postoperative PSG performed at 2 weeks (3.4 v. 11.6, p<0.01), however AHI at the second postoperative timepoint (270 v. 142 days, p<0.007) was no different between cohorts (2.8 v. 2.6, p<0.89). Using linear mixed modeling, MDO resulted in a statistically insignificant AHI improvement of 4.3 [-3.5, 12.1] (p<0.24). Postoperatively, 14.7% of subjects undergoing MDO required repeat distraction while 20% of subjects required TLA revision or conversion to MDO (p<0.43). In subjects undergoing MDO, 3% demonstrated decreased mouth opening and 14.7% demonstrated asymmetric marginal mandibular function. Preoperatively, 68% of subjects in each cohort required enteral nutrition, with only a minority of subjects requiring enteral nutrition at last follow-up (MDO 5.4% v. TLA 9.1%, p<0.59). No subjects required supplemental oxygen at last follow-up. Median overjet in the period of mixed dentition was 3 mm in both cohorts (p<0.88). 8 MDO patients met imaging criteria with median image follow up of 5.4 years post-surgery. All patients had present mandibular first permanent molars on preoperative imaging and 25% of mandibular first permanent molars revealed dental injury on postoperative imaging: one hypoplastic unrestorable, one dysmorphic, and two ankylosed.

CONCLUSION: MDO and TLA ultimately achieve similar correction of OSA and associated feeding difficulties in patients with Robin Sequence. While MDO offers a more immediate airway improvement, the procedure carries a nonzero risk of neurosensory, temporomandibular joint dysfunction, and dental injury when compared to TLA.

Geospatial and Socioeconomic Disparities Influencing the Management and Outcomes of Craniosynostosis: A Retrospective Review

Abstract Presenter
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BACKGROUND: Various social determinants of health have been described as predictors of craniosynostosis clinical outcomes.1 However, literature lacks a granular depiction of socioeconomic factors which impact management, and little is known about the relationship between patients' proximity to the care center and treatment of the condition. The purpose of this study was to assess the impact of geospatial dependency and socioeconomic factors on clinical outcomes for a sample of patients with craniosynostosis at a single institution.

METHODS: This study retrospectively evaluated patients with single suture craniosynostosis who presented to a tertiary children's hospital between January 2000 and December 2019. Outcomes of interest included age at presentation for surgery, incidence of reoperation and length of follow up (LOF). Of note, patients with craniosynostosis are ideally followed through skeletal maturity, therefore, longer LOF is defined as a better outcome. Patient addresses were

geocoded and plotted on two separate shapefiles containing block groups information within San Diego County. The shapefiles included percent parental educational attainment (bachelor's degree or higher) and median household income from 2010. The year 2010 was chosen for the shapefiles because it is the median year of data collection for this study. Multivariate linear, logistic and polynomial regression models were used to analyze the relationship between geospatial and socioeconomic predictors and clinical outcomes.

RESULTS: There were 614 patients with craniosynostosis included in this study. The mean age at index operation was 12 months (SD=17.30). The majority of patient's self-identified race and ethnicity were white (87.3%) and Hispanic (61.8%) respectively. Sagittal synostosis represented 54.2% of the sample with the remainder including metopic (23.8%), unicoronal (16.1%), bicoronal (2.9%) and unilateral lambdoid (3.1%). 24.4% of patients underwent at least one reoperation. Mean haversine distance from the patient's home coordinates to the hospital coordinates was 105.17 miles (SD=317.3). After adjusting for the suture fused, polynomial regression yielded a significant association between distance to the hospital and age at index surgery, such that further distance corresponded with an older age at the time of surgery (p=.012). There was not a significant association between distance and incidence of reoperation (p=.49) or distance and duration of follow up (p=.56). Additionally, adjusting for suture fused, lower parental educational attainment and lower median household income correlated with older age at presentation (p=.01 and p=.01 respectively), but were not correlated with reoperation (p=.60 and p=.65 respectively) or duration of follow up (p=.12 and p=.11 respectively).

CONCLUSIONS: The RESULTS offer evidence that living a greater distance from the hospital and socioeconomic disparities including parental education and median household income may serve as barriers to prompt recognition of diagnosis and timely care in this population. However, the geospatial and socioeconomic factors studied do not seem to hinder incidence of reoperation or length of follow up, suggesting that once care has been initiated, longitudinal outcomes may be less impacted.

REFERENCES:

1. Mozaffari M, Hauc SC, Junn A, et al. "Socioeconomic Disparities in the Surgical Management of Craniosynostosis." J Craniofac Surg. (2022) 33;1:294–97.

Facial Reanimation in Head and Neck Cancer: A Systematic Review and Meta-Analysis

Abstract Presenter
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BACKGROUND: Facial reanimation is a well-established topic in the reconstructive surgery literature. Facial nerve palsy has congenital, traumatic, idiopathic, iatrogenic, and oncologic etiologies. This study aimed to systematically review the literature on the management of facial reanimation in the oncologic setting.

METHODS: A PubMed literature search was performed from January 2002 to December 2022 to identify English studies addressing facial reanimation in an oncologic setting. The search term "cancer" OR "oncologic" OR "tumor" AND "facial nerve reconstruction" OR "facial paralysis" OR "facial reanimation" OR "nerve repair" OR "nerve grafts" OR "cross-facial nerve grafting" OR "facial nerve transfer" was used. Two authors independently assessed studies for eligibility. Case reports and studies in which less than half the subjects' deficits were due to oncologic resection were excluded. Discrepancies were resolved by the senior author.

RESULTS: The search yielded 6643 studies for abstract screening. There were 311 articles after abstract screening. These articles' full text were then assessed which yielded 166 articles for the final qualitative and quantitative syntheses. One-hundred and two articles (n = 2745) addressed facial nerve repair, grafting, and transfers. Twenty-eight articles (n = 876) studied free tissue transfer, 5 articles (n = 87) studied muscle and tendon transfers, and 2 articles (n = 250) studied static procedures. Thirteen articles (n = 286) described a combination of surgical METHODS for reanimation, while 16 articles (n = 1144) compared outcomes of different reanimation METHODS. The most utilized outcome measure was the House-Brackmann score, though many others were utilized including electromyography, Sunnybrook Facial Grading Score, Terzis and Mehta scales, and Facial Assessment by Computer Evaluation. Apart from static procedures, all METHODS report successful reanimation in patients receiving adjuvant radiotherapy (n = 529).

CONCLUSION: The majority of the facial reanimation literature focuses on facial nerve repair, transfer, or grafting. There lacks consistency in evaluating facial nerve function after reanimation procedures. Facial reanimation can be successfully performed in an oncologic setting and in the setting of radiation therapy.

The University of Michigan Longitudinal Experience with the Pedicled Buccal Fat Pad Flap in Primary Palatal Repair: Active Mitigation of Velopharyngeal Insufficiency Risk and Severity

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BACKGROUND: Palatoplasty often subjects the cleft maxilla to growth restriction from the INTRODUCTION of post-surgical scar at the time of repair. This significant scar formation can lead to shortening of the levator sling mechanism, potentially resulting in velopharyngeal insufficiency (VPI). VPI can have detrimental effects on a child's quality of life, often leading to difficulties with speech development and intelligibility. We posit that the utilization of the pedicled buccal fat pad flap (BFPF) to provide vascularized soft tissue over the denuded palatal bone or into the posterior palatal void created by the dissection between oral and nasal tissues will mitigate scarring, growth restriction, and VPI.

METHODS: A single center, retrospective chart review was conducted to identify patients with cleft palate that underwent palatoplasty with or without BFPF from 1995-2015. Data collected included sex, age at time of surgery, Veau classification, surgical details, length of follow-up and complications. Our speech language pathologist (SLP) conducted subjective resonance and nasopharyngoscopy assessments to monitor for VPI development. Primary outcomes included the need for speech related surgery. Secondary outcomes included development of obstructive sleep apnea (OSA) or palatal fistula, and the need for additional surgical interventions. Cleft severity scores were computed for the BFPF and non-BFPF groups on a scale of 1-4 as a weighted mean to reflect the frequency of each cleft type (Veau I-IV).

RESULTS: The charts of 806 patients with cleft palate were reviewed; 210 patients met inclusion criteria. Of these, 79 had a BFPF as part of the primary palatoplasty. The average age at palatoplasty was 1.4 years. The average duration of follow-up was 11.5 years.

Despite having a greater severity score (3.06 for BFPF group vs. 2.45 for non-BFPF group, $p<0.001$), the BFPF group had a lower incidence of VPI requiring a surgical intervention (n=10, 11.2% vs. n=38, 31.4% for non-BFPF group, $p<0.001$). Mild cases of hypernasality were treated with a single fat injection (FInj) to the posterior pharynx, the least invasive procedure offered (n=8, 9.1% for BFPF group; n=6, 5.0% for non-BFPF group). The BFPF group developed fewer fistulas (7.1%) than the non-BFPF group (14.5%). The BFPF group was associated with an increased incidence of OSA (19.1% vs. 7.4% for non-BFPF group) defined by Apnea-Hypopnea Index (AHI) ≥ 5, likely secondary to gains in palatal length.

CONCLUSION: Patients with a pedicled BFPF as part of their palatoplasty had a decreased incidence of VPI despite a selection bias towards greater cleft severity in this group. Patients with a BFPF were more likely to resolve their hypernasality with a single FInj, implying milder severity of symptoms. Notably, patients did best when BFPF were placed in both the palatal gutter and posterior void at time of palatoplasty, and this subgroup of patients did not require any VPI surgery. We recommend incorporating a pedicled BFPF as part of any cleft palatoplasty to actively reduce the risk and severity of VPI in patients with a cleft palate.

A Single Institution Comparison of Furlow and Straight Line Palatoplasty Techniques in Bilateral Cleft Lip and Palate

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BACKGROUND: Children with bilateral cleft lip and palate (BCLP) account for approximately 1 in every 3000 live births. Cleft palate repair aims to optimize speech outcomes and facial growth while minimizing fistula formation. The most widely used palatoplasty techniques include Furlow double opposing Z-plasty (Furlow) and straight-line repair (SLR) with muscle approximation. These techniques are often augmented with vomer flaps to provide adequate soft tissue for the closure of the nasal layer of the hard palate. This study aims to compare patient speech outcomes and fistula rates between the Furlow and SLR techniques, particularly in the challenging BCLP repair.

METHODS: A retrospective review was conducted for patients with BCLP who underwent palatoplasty at an urban academic institution from January 2003 to August 2022. All patients with BCLP anomalies were included. Patients with index operations at an outside institution or incomplete medical charting were excluded. Patients with less than two years of follow up were excluded from speech analysis. Patient demographics (i.e., age, gender, race), surgical variables (i.e., palatoplasty technique and vomer flap usage), and outcomes (i.e., fistula, fistuloplasty, velopharyngeal insufficiency, speech correcting surgery, other complications) were collected. Patients were compared based on the palatoplasty technique. Statistical analysis included independent T-tests for continuous variables and Chi-squared tests for categorical variables.

RESULTS: A total of 1,552 patients with primary cleft palate with or without cleft lip underwent palatoplasty during the study period. Of these, 192 (12.4%) met inclusion criteria with a diagnosis of Veau IV anomalies, and 161 patients had sufficient follow-up for speech analysis. One hundred patients underwent SLR (52.1%) and 92 Furlow repair (47.9%). There was no significant difference in fistula rates between the SLR and Furlow repair cohorts (29.3% vs. 33.0%; p=0.697). Subgroup analysis of patients with postoperative fistulas demonstrated SLR was associated with lower surgical fistula repair rates compared to Furlow palatoplasty (41.3% vs 21.9%, p=0.047). In terms of speech, SLR was associated with lower rates of speech-correcting surgery compared to the Furlow repair (12.5% vs. 29.6%, p= 0.011).

CONCLUSIONS: Our findings suggest that SLR resulted in an almost three times lower rate of

VPI requiring surgical intervention in patients with BCLP, while the overall fistula rate remained similar. Based on our findings, we recommend using the SLR technique in patients with wide BCLP, or if Furlow palatoplasty remains the surgeon's preferred repair, addition of buccal flaps could be considered to augment the length of the soft palate.

LeFort I Horizontal Osteotomy: Defining the Feasibility of the "High Osteotomy"

Abstract Presenter
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BACKGROUND: Patients with cleft lip and palate (CLP) commonly develop midface deficiency, and up to 35% of affected patients undergo a LeFort I osteotomy to improve facial aesthetics and occlusion(1). A "high' LeFort I osteotomy can improve aesthetics by transposing more superior aspects of the midface compared to a traditional LeFort I(2,3). However, the inferior turbinates are the upper limit for this cut, and variance in the vertical location of this structure affects the feasibility of a "high-osteotomy." The purpose of this study was to quantify the relationship between the inferior turbinates and superior ala in cleft patients undergoing LeFort I osteotomy to determine the frequency with which the osteotomy was performed above the superior ala and attempt to define the height at which this "high osteotomy" would need to be performed.

METHODS: The surgical records of 35 non-syndromic patients with unilateral CLP who had undergone LeFort I osteotomy between 2013 and 2022 were retrospectively analyzed. Patients were included if cone-beam computed tomography (CBCT) scans were completed pre- and post-operatively. Rhinoplasty prior to post-operative imaging and patients with a bilateral cleft were excluded. Two REFERENCE planes ensured standardization of CBCT head orientation(4). Dolphin Imaging Software was used for CBCT visualization and measurement. The most inferior point of the piriform aperture on the non-cleft side defined the piriform base. The osteotomy height was defined as the most anteromedial point of the osteotomy along the lateral piriform rim. The level of the inferior turbinate was used as the most anterior point of the inferior turbinate at its attachment to the lateral nasal wall. The most superior aspect of the soft tissue ala was superimposed onto the hard tissue for measurement. Descriptive statistics were performed.

RESULTS: The sample included 27 males and 8 females, and 13 right-sided clefts and 22 left-sided clefts. One (2.86%) of the osteotomy cuts was above the level of the cleft side superior ala, and no osteotomy cuts were above the level of the non-cleft side superior ala. On average, the superior ala was located 2.83mm (95% CI 1.70-3.96) above the inferior turbinates. The average

distances between the non-cleft piriform aperture to the mean height of the bilateral superior ala is 12.24mm (95% CI 11.29-13.19) with a variance of 16.41 and from the non-cleft piriform aperture to the mean height of the bilateral inferior turbinate is 15.07mm (95% CI 13.81-16.34) with a variance of 29.11.

CONCLUSION: Given that the superior ala is often positioned above the inferior turbinate, completing an osteotomy above the level of the superior ala is usually not possible. Thus, the feasibility of a clinically useful "high" LeFort I osteotomy is called into question. Furthermore, significant variation in the location of these structures makes it impractical to define a standard measurement for a "high osteotomy."

REFERENCES

1. Good PM, Mulliken JB, Padwa BL. Frequency of Le Fort I osteotomy after repaired cleft lip and palate or cleft palate. Cleft Palate Craniofac J. 2007;44(4):396-401.
2. Davidson, E., & Kumar, A. R. (2015). A preliminary three-dimensional analysis of nasal aesthetics following Le Fort I advancement in patients with cleft lip and palate. Journal of Craniofacial Surgery, 26(7), e629-e633.
3. Yun, Y. S., Uhm, K. I., Kim, J. N., Shin, D. H., Choi, H. G., Kim, S. H., ... & Jo, D. I. (2015). Bone and soft tissue changes after two-jaw surgery in cleft patients. Archives of plastic surgery, 42(04), 419-423.
4. Lonic D, Sundoro A, Lin HH, Lin PJ, Lo LJ. Selection of a horizontal REFERENCE plane in 3D evaluation: Identifying facial asymmetry and occlusal cant in orthognathic surgery planning. Sci Rep. 2017;7(1):2157. Published 2017 May 19.

Posterior Vault Distraction in the Acute Setting

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BACKGROUND: Using posterior vault distraction osteogenesis (PVDO) in cases of slit ventricle syndrome (SVS) and idiopathic intracranial hypertension (IIH) has been shown to resolve acutely increased intracranial pressure (ICP) while carrying an acceptable complication and risk profile. PVDO in such cases has been associated with symptomatic improvement postoperatively and decreased need for additional shunt related surgeries in those patients requiring ventriculoperitoneal shunt placement. We present our experience with PVDO performed as an acute intervention as evidence for the safety and efficacy for management of acutely increased intracranial pressure (ICP).

METHODS: We report four cases of PVDO in patients with acutely increased ICP of varying

etiologies.

RESULTS: Four children with craniosynostosis underwent PVDO to address acutely increased ICP, all at less than 5 years of age. The four patients all presented with papilledema and symptoms of increased ICP. One patient presented with SVS and multiple shunt revisions, now with a non-functioning shunt. There were no reported intraoperative complications during distractor placement or removal. Distraction protocol was similar in all patients with distraction beginning on post-operative day one and proceeding at 1-2 mm per day for an average total distraction of 28 mm. For the 3 cases not requiring shunt placement, the average length of stay was 7 days following distractor placement. The patient with SVS required externalization of the shunt during distraction followed by early distractor removal and replacement of shunt. Computed tomography in all patients indicated increased intracranial volume following distraction and improved symptoms. One case of surgical site infection (in an immunocompromised patient) required premature distractor removal during the consolidation period.

CONCLUSIONS: Our experience with PVDO in the acute setting is reported, alongside a review of current literature, in order to provide supporting evidence for the efficacy of posterior vault distraction as a tool for resolving acutely increased ICP.

Risk Factors for Unplanned Readmission and Reoperation Following Isolated Mandibular Fracture Repair

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PURPOSE: Mandibular fractures are one of the most common facial bone fractures seen in the Emergency Department and primarily result from motor vehicle accidents and physical altercations.1 Open reduction and internal fixation (ORIF) with plate and screws is the definitive management for mandibular fractures. The procedure is not without risks and potential complications due to the location near the airway and need for proper alignment to prevent malocclusion. We aim to understand the risk factors for unplanned readmission and reoperation following treatment of isolated mandibular fractures to better risk-stratify patients based on their initial presentation and demographics.

METHODS AND MATERIALS: Retrospective review was performed using the National

Surgical Quality Improvement Program (NSQIP) database to analyze all patients from January 2015 to December 2019 who presented with mandibular fractures. Multivariate logistic regression analysis was conducted to examine potential risk factors for reoperation and readmission. Variables with p value less than 0.2 in univariate analysis were included in the multivariate logistic regression model. Stepwise model selection was used to select the best set of predictors. Statistical analyses were performed in SAS software version 9.4 (SAS Institute Inc., Cary, NC). P values less than 0.05 were considered statistically significant.

RESULTS: Overall, 1090 cases of mandibular fracture were reported in the NSQIP database from January 2015 to December 2019. Of these cases, 83.6% (911/1090) were male and 16.4% (179/1090) were female. Inpatient status [OR 2.41 (1.15,5.05), p 0.020], ASA classification of 3 or 4 [OR 2.65 (1.28,5.49), p 0.009], and longer hospital stay from operation to discharge [OR 1.06 (1.00,1.12), p 0.049] were significantly associated with reoperation following isolated mandibular fracture repair. Inpatient status [OR 2.43 (1.05,5.63), p 0.039], open fractures [OR 3.91 (1.07,14.26), p 0.039], and ASA classification of 3 or 4 [OR 2.80 (1.22,6.45), p 0.015] were significantly associated with readmission following isolated mandibular fracture repair. Patient demographics and comorbidities on admission including gender, age, smoking status within one year of operation, body mass index (BMI), chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), hypertension requiring medication, diabetes, and sepsis were not significant predictors of reoperation nor readmission.

CONCLUSIONS: Mandibular fractures are one of the most common facial bone fractures that plastic surgeons are entrusted with managing. Patient demographics and comorbidities on admission including diabetes, BMI and smoking status are not associated with risk of reoperation and readmission for mandibular fractures. Inpatient status, ASA classification of 3 or 4, longer postoperative hospital stay, and open wound (open fracture) were significantly associated with reoperation or readmission for isolated mandibular fractures. Patients with open mandibular fractures and higher ASA classification on admission should be monitored carefully and receive close follow-up.

REFERENCES:

1Braasch DC, Abubaker AO. Management of mandibular angle fracture. Oral Maxillofac Surg Clin North Am. 2013;25(4):591-600. doi:10.1016/j.coms.2013.07.007

Epidemiologic Survey of Facial Fractures at a Rural Level I Trauma Center

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BACKGROUND: Maxillofacial fractures are common sequalae of various traumatic injuries to the face.1 Previous studies have established epidemiology of facial fractures in the US, however these studies typically evaluate patients in urban settings. Our study aims to assess etiology and patterns of facial fractures in the largely rural patient population at the University of Vermont Medical Center (UVMMC) over a seven-year period to determine if trends are consistent with urban or international populations. Additionally, this study aims to compare facial fracture patterns and mechanism of injury between patients from rural and urban counties presenting to UVMMC.

METHODS: Medical records for adults with a diagnosis of facial fracture presenting to UVMMC between January 2014 and December 2021 were reviewed. The search returned 458 patients meeting inclusion criteria the study. Patient demographics, fracture patterns, and etiology of injury were evaluated. Patients with zip were classified as "urban" or "rural" based on county of their home zip code. Data was analyzed using traditional statistical techniques, t-testing and chi-squared analyses.

RESULTS: The injury mechanism accounting for the greatest number of facial fractures was ground level fall (24.7%), followed by motor vehicle accident (MVA) (19.7%), fall from height (17.9%), and blunt trauma (14.0%), assault (11.4%), bicycle fall (4.1%), motorcycle accident (3.7%), auto vs pedestrian (3.1%), gunshot wound (0.7%), and stabbing (0.2%). The most common facial fracture was of the maxilla/maxillary sinus (41.7%), followed by nasal bone/septum (41.2%), orbital (excluding the floor) (34.5%), orbital floor (33.6%), zygoma (25.2%), mandible (19.2%), frontal sinus (11.8%), LeFort I (6.6%), LeFort II (6.6%), LeFort III (4.1%) and NOE (2.4%).
A total of 427 patients were categorized as "rural" or "urban." Comparing injury mechanism between these groups revealed a higher rate of facial fractures from assault in the urban cohort (15.2%, 6.9%, p= 0.007) and a higher rate from fall from height (21.2%, 13.4%, p=0.033) and MVA (23.6%, 16.1%, p=0.049) in the rural cohort. There were no statistically significant differences in rates of facial fracture patterns between the two groups.

CONCLUSION: Fall was the most frequent cause of facial fracture at UVMMC and globally, whereas at several US urban centers assault was most common.2,3 Patients presenting to UVMMC were most likely to have a fracture of the maxilla/maxillary sinus. This contrasts findings in the US and globally, where nasal bone fractures and mandible fractures were the most common, respectively.4,5 Additionally, residence in a rural or urban setting was found to impact mechanism of injury but did not impact facial fracture patterns.

REFERENCES

1. Erdmann D, Follmar KE, DeBruijn M, et al. A retrospective analysis of facial fracture etiologies. Annals of Plastic Surgery. 2008;60(4):398-403. doi:10.1097/sap.0b013e318133a87b
2. Lalloo R, Lucchesi LR, Bisignano C, et al. Epidemiology of facial fractures: incidence, prevalence and years lived with disability estimates from the Global Burden of Disease 2017 study. Injury Prevention 2020;26:i27-i35.
3. Allareddy V, Allareddy V, Nalliah RP. Epidemiology of facial fracture injuries. Journal of

Oral and Maxillofacial Surgery. 2011;69(10):2613-2618. doi:10.1016/j.joms.2011.02.057
4. Lee K. Global trends in maxillofacial fractures. Craniomaxillofacial Trauma & Reconstruction. 2012;5(4):213-222. doi:10.1055/s-0032-1322535

Patterns of Postoperative Opioid Use in Patients Undergoing Surgical Treatment of Traumatic Mandibular Fractures

Abstract Presenter
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BACKGROUND: The prevalence of cannabis use has increased with the legalization of cannabis in the United States. Despite this, there is a scarcity of research investigating its effects on pain management following facial trauma. The PURPOSE of this study was to study patterns of postoperative opioid demand in patients with a history of cannabis use undergoing open surgical treatment of traumatic mandibular fractures.

MATERIALS AND METHODS: PearldiverTM, a commercially available healthcare database, was queried to identify all patients who underwent open reduction and internal fixation (ORIF) of traumatic mandibular fractures between 2010 and 2020. Patients were subdivided into those with a history of cannabis use (case) and those without (control) based on ICD-9 and ICD-10 coding. The two groups were propensity score matched by age, gender, region in the United States, Elixhauser Comorbidity Index (ECI), and various psychiatric diagnoses to control for confounding variables. Welch two-sample T-test was used to compare average morphine milligram equivalents (MME) and days per prescription between the case and control group within the 30-day postoperative period.

RESULTS: A total of 1,996 patients who underwent surgical repair of mandibular fractures were included in the study after patients were propensity score matched by a 1:3 ratio - 499 patients with an active diagnosis of cannabis use and 1,497 patients without. The case population filled a significantly decreased amount of MME in their first prescription compared to the control population (212.78 MME vs. 291.59 MME per prescription, $p = 0.003$). In patients who filled a second opioid prescription, there was no significant difference in the amount of MME per prescription between the case and the control (291.59 MME vs. 380.33 MME per prescription, $p = 0.22$). The average number of days per prescription provided ranged between 6 to 7 days and

was comparable between the two groups ($p = 0.19$).

CONCLUSION: This study found a significant reduction of opioid volume filled, measured as MME per prescription, in patients with an active diagnosis of cannabis compared to those without following ORIF of traumatic mandibular fractures. Due to the increased mortality and morbidity burden of opioids, surgeons should take into consideration a patient's history of cannabis use to prevent the overprescription of opioids and further reduce the risk of misuse.

Orbital Fracture Management and Outcomes in Baltimore: A Multicenter Analysis

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BACKGROUND: Orbital fractures constitute up to 25% of facial trauma injuries in adults.[1] Baltimore, a city with one of the highest per-capita violent crime rates in the US, experiences a considerable volume of high-intensity trauma.[2] Although surveillance data is collected by Baltimore city, the characteristics of patients presenting with orbital fractures remain poorly understood.

OBJECTIVE: Our study is the first multicenter analysis of the etiologies, fracture patterns, and management of patients treated for orbital fractures at two Level I trauma centers in Baltimore.

METHODS: We conducted a retrospective review of trauma patients who underwent orbital fracture repair at the R. Adams Cowley Shock Trauma Center and the Johns Hopkins Hospital from January 2015 to December 2019. Primary outcomes were fracture etiology, severity, and location. Secondary outcomes were length of total hospital stay, operating time, surgical service, and incidence of any postoperative ocular complication following repair. Descriptive statistics were calculated. Secondary outcomes were compared between the two institutions using bivariate analysis and multivariate regression.

RESULTS: Of n=374 patients, n=179 (47.9%) had orbital fractures due to violent trauma, n=252 (67.4%) had moderately severe to severe orbital fractures, and n=338 (90.4%) had

concomitant neurological symptoms/signs. Patients who presented to Shock Trauma (n=208), compared to those who presented to Hopkins (n=166), were more likely to have had assault (n=97/208 [46.6%], n=72/166 [43.4%]; P <0.001), concomitant intracranial hemorrhage (n=23/208 [12.3%], n=5/166 [4.4%]; P=0.024), intracranial injury (n=28/208 [15.0%], n=7/166 [6.2%]; P=0.025), and loss of consciousness (n=80/208 [42.8%], n=24/166 [21.2%]; P <0.001). After controlling for factors pertaining to injury severity, there was no significant difference in patient throughput or incidence of any postoperative ocular complication following repair between the two centers.

CONCLUSION: Most patients treated for orbital fractures at our institutions presented after violent trauma and had concomitant neurological symptoms/signs. Despite the different management systems of orbital fracture at our two centers, patient throughput and outcomes were similar.

REFERENCES:
1. Roth FS, Koshy JC, Goldberg JS, Soparkar CN. Pearls of orbital trauma management. Semin Plast Surg. 2010 Nov;24(4):398-410. doi: 10.1055/s-0030-1269769.
2. Etra JW, Canner JK, Aslam U, Nasr IW. Penetrating Trauma in Baltimore: An Analysis of the Effect of a Rise in Localized Violence by Age Group. J Surg Res. 2021 Jun;262:38-46. doi: 10.1016/j.jss.2020.11.083.

Characteristics of Children with 22q11.2 Deletion Syndrome Evaluated Through a Multidisciplinary Velopharyngeal Dysfunction Program

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BACKGROUND: 22q11.2 deletion syndrome (22q) has a heterogeneous phenotypic spectrum with many named syndromes under a single genetic mutation. Children with anomalies such as congenital heart defects are diagnosed at an early age, while those with less severe phenotypes often go undiagnosed until later in life. Velopharyngeal dysfunction (VPD) is a common sequela of 22q, therefore work-up of non-cleft VPD may identify children with previously undiagnosed 22q. Moreover, there may be a unique relationship between VPD and feeding in the 22q population. To those ends, this study identifies patients for whom multidisciplinary VPD clinic evaluation led to a new diagnosis of 22q and comprehensively reports speech, feeding, and medical characteristics of children with 22q evaluated in a multidisciplinary VPD program.

METHODS: This retrospective cohort study included children with genetically confirmed 22q

evaluated at a single multidisciplinary VPD program between February 2007 and February 2023. Pathways to 22q diagnosis, mechanisms of VPD in 22q including velopharyngeal mislearning and neuromuscular hypotonia, speech characteristics, medical comorbidities, surgical management, and referral patterns to our VPD program were systematically extracted from the medical record.

RESULTS: 71 children were evaluated during the 16-year period. Median age at intake was 5.1 years (IQR 2.9 years) with median length of follow-up
21.5 months (IQR 50.6 months). Children were referred by otolaryngology (36.6%), cleft clinic (19.7%) and plastic surgery (4.2%)%, genetics (12.6%), primary-care pediatrics (7.0%), and speech and language clinic (5.6%). 23 referrals (32.9%) were made by providers involved in the VPD program.

Six children received new diagnoses of 22q after evaluation in our multidisciplinary VPD program. An additional three children were diagnosed by VPD providers in cleft or otolaryngology clinic, with subsequent referral to the VPD program for comprehensive evaluation. For collectively these nine cases, non-cleft VPI combined with craniofacial differences (n=6), polydactyly (n=2), aberrant internal carotid (n=3), history of congenital heart defect (n=1), and complex medical history concerning for syndromic cause (n=1) prompted further genetic investigation.

Speech concerns were the primary reason for referral (87.3%), with significant subsets presenting with question of submucous cleft (26.7%) and feeding concerns(19.7%). While secondary to speech concerns, nasal regurgitation and reflux were reported by 52.1% of children(n=37), with 18.3%(n=13) reporting history of nasogastric or gastrostomy tube placement for enteral feeds. Of these children, three presented for VPD evaluation primarily for feeding concerns and were ultimately recommended non-operative management.

40 children underwent superiorly based pharyngeal flaps, five Furlow palatoplasty, and three sphincter pharyngoplasty at our institution. Five children had undergone prior speech surgery and were referred for further management. 18 children were managed non-operatively, with one child deemed not a surgical candidate given cardiac comorbidities. Postoperative perceptual speech evaluations showed compensatory articulation errors in 21.3% of assessments(n=10/47), with seven cases of persistent VPI due to articulation errors.

CONCLUSIONS: Multidisciplinary VPD care effectively identified children with previously undiagnosed 22q, further elucidating the heterogeneous phenotypic presentation that involves non-cleft VPD, speech, and feeding concerns. A high index of suspicion for an overarching diagnosis is warranted in children with complex, multisystem diagnoses presenting for VPD evaluation.

Operating In The Fourth Dimension Of Time: Incorporating Buccal Fat Pad Flaps Into Infants' Cleft Palatoplasty Reduces Future Incidence Of Skeletal Malocclusion And The Need For Corrective Maxillary Osteotomy

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BACKGROUND: Teens with repaired cleft palate commonly present with class III skeletal malocclusion secondary to post-surgical scar tethering. When not correctable with orthodontics alone, the malocclusion is treated surgically. Ideally, we could reduce patients' surgical burden by optimizing maxillary growth during infancy.

We posit that the addition of vascularized tissue during cleft palatoplasty diminishes palatal scarring, thereby enhancing maxillary growth. The pedicled buccal fat pad flap (BFPF) is an excellent source of vascularized tissue given its proximity to the operative field and low morbidity associated with flap harvest. We expect that patients that have had a BFPF as part of their palatoplasty during infancy are at a lower risk for developing class III skeletal malocclusion and corrective operations than those that underwent palatoplasty without BFPF.

METHODS: A retrospective chart review was conducted for patients with cleft lip and/or cleft palate that were eligible to undergo orthognathic surgery (OGS) between 2010-2022. Data collected included sex, age at jaw surgery, operative details (fixation vs. rigid external distraction/RED), and complications. Details of prior palatoplasty, including Veau classification and BFPF use, were documented. Cleft severity scores were calculated based on Veau classification and the number of patients with each type.

RESULTS: The charts of 131 patients with a cleft diagnosis that were eligible for OGS between 2010-2022 were reviewed. Of these, 60 had BFPF as part of their palatoplasty in infancy. Three patients in the BFPF group (5.0%) underwent OGS versus 20 patients in the non-BFPF group (28.2%).

All 3 BFPF patients had early RED as their only corrective jaw surgery. Five of the non-BFPF patients (25.0%) underwent RED and 15 patients (75.0%) underwent traditional OGS with plate fixation. Nine of these 15 traditional OGS patients underwent a concomitant mandibular surgery. The average age for jaw surgery was 13.2 years for the BFPF group and 18.2 years for the non-BFPF group.

When comparing age-matched groups, BFPF patients had an overall decreased incidence of OGS compared to the non-BFPF group. This was evident in the early RED group (3.8% for BFPF vs. 10.0% for non-BFPF, RR 0.4) and in the skeletally mature patients (14.3% vs. 31.1%, RR 0.5). Cleft severity scores were 3.67 for the BFPF group (more Veau III and IV) and 2.70 for the non-BFPF group.

After OGS, the BFPF group had no post-operative complications. The non-BFPF patients had 4 complications, which included infection, dehiscence, velopharyngeal insufficiency and RED device shift. In each, a secondary procedure was required.

CONCLUSION: The group of patients with cleft lip and/or cleft palate that had BFPF as part of their palatoplasty during infancy had up to 2.6 times decreased incidence of OGS than those that did not, even despite having an overall higher cleft severity score than the non-BFPF group. Our study findings show that incorporating a BFPF during infants' cleft palatoplasty can enhance maxillary growth, reduce the incidence of skeletal class III malocclusion treated surgically and improve OGS surgical complication profiles, ultimately decreasing surgical burden in the cleft population.

Rise in incidence of gunshot wounds to the face: a 12-year retrospective study of changing patterns in management

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INTRODUCTION: Gunshot wounds (GSW) to the face present unique challenges regarding effective management and limiting morbidity. This is largely attributed to complex fracture patterns, extensive soft tissue injury and high rates of contamination. (1,2) This project aims to document changes in demographics, presentation, treatment, and clinical outcomes of GSW to the face over the past decade. Furthermore, it identifies trends and helps delineate the current standard of care for management of GSW to the face.

METHODS: A retrospective chart review of GSW to the face from a Level 1 metropolitan trauma center registry was conducted for patients from January 1, 2009, to December 31, 2020. Patients were included if they sustained a GSW to the face, survived for more than 48 hours, and received care at that institution. Data collected included demographic information, injury details, specifics of antibiotic therapy, surgical management, and infections, as well as airway management techniques. The Microsoft Excel Statistical Package and Jamovi statistical software were used to generate graphs and create univariate linear regression models for the parameters studied.

RESULTS: From 2009-2020, a total of 432 patients met the inclusion criteria, with an average of 36 per year [range: 19-72]. The average age at presentation was 31.0 (SD 14.8) and the

majority of patients were males (83.8%). These demographic variables remained relatively constant throughout the study period. While the total annual trauma volume increased by 56.3% over the study period (6,029 to 9,426), incidence of GSW to the face tripled, representing a 91.9% increase in the proportion of the total trauma volume. Over the study period, patients requiring facial surgery decreased by 19.4% (1.8% per year, $p<0.001$) and the average length of hospitalization decreased by 4.2 days (0.48 days per year, $p=0.044$). There were no identifiable trends in operative techniques. However, among patients who underwent facial surgery, 109 (34.4%) required open reduction internal fixation (ORIF), 36 (11.4%) required external fixation, and 29 (9.1%) required a flap. The percentage of patients receiving antibiotics during their hospitalization remained relatively constant, but the average duration of antibiotic coverage per patient decreased by 24.6% over the study period (2.0% per year, $p=0.004$). Despite this, the incidence of head and neck infections decreased by 13.9% (1.0% per year, $p=0.067$).

CONCLUSION: Although GSW to the face are relatively uncommon, the incidence of these injuries is increasing. While the demographic profile of patients sustaining GSW to the face remains constant, there is evidence of reduced operative intervention, decreased infection rates, and better antibiotic stewardship. There is also a potential reduction in hospital costs as evidenced by shorter lengths of stay.

REFERENCES:

1. Jose A, Arya S, Nagori S. High-velocity ballistic injuries inflicted to the maxillofacial region. J Craniofac Surg. 2019;30(6). doi:10.1097/scs.0000000000005418
2. Fagin AP, Dierks EJ, Bell RB, Cheng AC, Patel AA, Amundson MS. Infection prevalence and patterns in self-inflicted gunshot wounds to the face. Oral Surg Oral Med Oral Pathol Oral Radiol. 2019;128(1):9-13. doi:10.1016/j.oooo.2019.02.022

Early Tongue Stitch Removal after Palatoplasty- Challenging the Status Quo

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PURPOSE: The incidence of airway compromise following palatoplasty is reported to be as high as 38%, with an even higher incidence in syndromic children.1 The tongue stitch (TS) is often used by cleft surgeons as a protective airway maneuver to anteriorly displace the tongue from the oropharynx. Although no evidence-based protocol for its use yet exists, many institutions retain the stitch until postoperative day one.2 This study describes a protocol for early tongue stitch removal following palatoplasty and evaluates the impact of this approach on

safety, time to feed, narcotic use, and length of stay.

METHODS AND MATERIALS: Our protocol outlines TS removal in the PACU if the following criteria is met: no use of the tongue stitch to clear the airway for 20 minutes after arrival in PACU, no physical signs of increased work of breathing or retractions, no supplemental oxygen use >2L/min, no fresh blood or clots in pharynx, and the patient is able to protect airway when asleep in supine position.

A retrospective chart review was performed on all patients with cleft palate who received care at a single academic institution from September 2019 to September 2022. Patients who underwent primary palate repair prior to 24 months of age with TS placement postoperatively were included in the study.

EXPERIENCE: Seventy-eight patients with cleft palate were included in this study in an ACPA certified Cleft Center.

SUMMARY OF RESULTS: Of the 78 patients included, 85.9% had their tongue stitch removed in the PACU, with the remaining 11 patients retaining the stitch until postoperative day one. Duration of anesthesia and duration of operation were not statistically different between the two groups (p=0.23, p=0.95). Six patients (9.0%) who underwent tongue stitch removal in PACU had documented desaturations of less than 90% oxygen saturation that resolved spontaneously or by short term blow-by oxygen. No patients required reintubation. Mean time to feed of these patients was 9.1 hours compared to 15.4 hours for patients who retained their tongue stitch after transfer from the PACU (p=0.01). Mean morphine equivalent was 3.4 mg versus 6 mg (p=0.051) for those who had the stitch removed in PACU versus after transfer. Average length of stay for patients with the stitch removed in PACU was 1.6 days versus 2.0 days for those with the tongue stitch removed later.

CONCLUSIONS: The outcomes of our study support the airway safety profile of our postoperative tongue stitch protocol status following palatoplasty in patients less than 24 months of age. Patients with stitch removal in PACU fed earlier on average, required less narcotics, and were discharged earlier.

REFERENCES

1. Jackson O, Basta M, Sonnad S, Stricker P, Larossa D, Fiadjoe J. Perioperative risk factors for adverse airway events in patients undergoing cleft palate repair. Cleft Palate Craniofac J. 2013;50(3):330-336. doi:10.1597/12-134
2. Dorfman DW, Ciminello FS, Wong GB. Tongue suture placement after cleft palate repair. J Craniofac Surg. 2010;21(5):1601-1603. doi:10.1097/SCS.0b013e3181ebccb1

Three-Dimensional Animated Videos Improve Caregiver Craniosynostosis Education

Abstract Presenter

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PURPOSE: Craniosynostosis, the premature fusion of cranial sutures, requires early surgical treatment to minimize the risk of developmental and cognitive deficits. Recent literature showed that caregivers prefer three-dimensional (3D) tools for learning about craniosynostosis. Nevertheless, few 3D tools exist to help caregivers comprehend craniosynostosis anatomy and surgical options. This study aims to assess the efficacy of 3D animated videos for enhancing craniosynostosis education in caregivers and laypersons.

METHODS: We created 3D animated videos describing anatomy and surgical options (e.g., fronto-orbital advancement, posterior vault reconstruction) for three craniosynostosis diagnoses: bicoronal, metopic, and sagittal. A cross-sectional survey was distributed to caregivers through Facebook support groups and to laypersons through Amazon Mechanical Turk. Respondents rated their understanding of craniosynostosis on 10-point Likert-scales, labelled anatomic sutures, and answered true/false general (e.g., "The sutures have fused too early") and diagnosis-specific (e.g., "The distractors are not removed after surgery") questions on craniosynostosis. Caregivers were shown the video that best corresponded to their patient's diagnosis while laypersons were randomized to a diagnosis video. After the video, respondents were asked the same set of questions asked before the video.

RESULTS: A total of 69 craniosynostosis caregivers (mean age 35 years, 73% Caucasian, 64% female) and 111 laypersons (mean age 37 years, 100% Caucasian, 41% female) completed the survey. After watching the video, caregivers scored significantly higher on the knowledge questions (mean score difference: 1.27, $p<0.01$). Laypersons did not score significantly higher on the knowledge questions (mean score difference: 0.32, $p=0.08$). Both caregivers (mean value pre-video: 38.87, mean value post-video: 41.49, $p<0.01$) and laypersons (mean value pre-video: 45.29, mean value post-video: 52.84, $p<0.01$) self-rated their understanding of craniosynostosis as higher after watching the video. Thirty-nine percent of caregivers correctly labeled all four skull sutures before the video while 48% of caregivers correctly labeled all four skull sutures after the video.

CONCLUSIONS: Our 3D animated videos significantly improved caregiver craniosynostosis understanding and knowledge. Caregiver knowledge after watching animations OBJECTIVEly and subjectively improved. Thus, these animations provide an accurate instrument to improve caregiver spatial and anatomical understanding of craniosynostosis. In addition, these videos are

an accessible tool that can be easily incorporated into a surgeon's discussion with caregivers about craniosynostosis diagnosis and surgical treatment. Future work includes creating 3D animated videos from patient-specific CT scans that can provide a more comprehensive tool for the caregivers as well as encompass more diverse patient diagnoses and treatment options.

Assessing the Safety of Multipart Lefort I Osteotomies: A NSQIP Study

Abstract Presenter
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INTRODUCTION: The Le Fort I osteotomy is used to reposition the maxilla to correct numerous maxillofacial and occlusal deformities. This procedure can be performed with one segment or with multiple, depending on surgeon pREFERENCE and patient need. Patients may also need bone grafting. Though the theoretical risk of multiple segments and bone grafting is well established, no study has assessed the perioperative risk of multiple part Le Fort I osteotomy and the use of bone grafting in comparison to single piece Le Fort I osteotomies without bone grafting. Thus, the aim of this study was to delineate perioperative complication rates associated with Le Fort I osteotomy and determine if the number of maxillary segments or bone grafting yielded increased complication rates.

METHODS: Patients undergoing Le Fort I osteotomy from 2012-2019 were identified from the multi-institution National Surgical Quality Improvement Program (NSQIP) database using Current Procedure Terminology (CPT) codes. The predictor variables of interest included maxillary segmentation defined as one, two, or three pieces and the presence of absence of bone graft. Perioperative complications were collected as the primary outcome variable, including superficial and deep space infections, wound dehiscence, airway complication, peripheral nerve injury, and hemorrhage. The secondary outcome variables included readmission and reoperation rate within the 30-day postoperative period. Complication rates were compared using multivariate analysis across groups stratified by number of maxillary segments and inclusion of bone grafting.

RESULTS: A total of 532 patients were identified that met the inclusion criteria of undergoing a variant of a Le Fort I osteotomy procedure. Of the total cohort, 333 patients (62.6%) received one-piece, while 114 patients received two-piece (21.4%), and 85 three-piece (16%) Le Fort I osteotomies. When comparing all complication types, there was no significant effect of the number of maxillary segments or addition of a bone. Similarly, the reoperation and readmission rates within 30 days for patients undergoing a single piece Le Fort I were equivalent regardless of number of pieces. The use of bone grafting also did not have a significant effect on the

observed reoperation or readmission rates. This analysis held when patients with complex congenital syndromes were analyzed as a subgroup.

CONCLUSION: Large database sets suggest that the Le Fort I Osteotomy is a safe surgical procedure with low complication rates in the immediate postoperative period irrespective of number of maxillary segments or implementation of bone graft.

The Evolution of a Large-Scale Facial Gender Affirmation Program: A Comparative Outcomes Analysis

Abstract Presenter
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BACKGROUND: The volume of facial feminization surgery (FFS) performed in the United States has increased tremendously over the last decade as new gender affirmation programs have formed and insurance coverage has improved over time. Advancements in surgical planning and treatment protocols have resulted in complex, multiprocedural FFS operations. 1,2,3 The World Professional Association of Transgender Health Standards of Care 8 recommends that these procedures be done by expert multidisciplinary teams with proper training in transgender health. However, all new programs take time to evolve and mature. This study sought to examine the changes in characteristics, outcomes, and safety of a large-scale FFS program over a 5-year lifespan.

METHODS: A retrospective analysis was performed of all patients who underwent FFS in a single high-volume integrated healthcare system from program initiation in 2018-2019 (early cohort) to maturation in 2021-2022 (late cohort). Patient charts were reviewed for length of stay, operative details, surgery duration, complications, post-operative Emergency Department or Urgent Care (ED/UC) visits, revisions, readmissions, and demographic factors. Patient characteristics and major outcomes including complications, readmissions, revisions, and ED/UC visits were analyzed and compared between early and late cohorts.

RESULTS: A total of 191 patient charts were included in the analysis, including 109 in the early cohort and 82 in the late cohort. Patient demographics were similar in the two groups with the exception of mean age (40.3 years in the early group, 36.3 years in the late group, p=0.03). Mean follow up time was over 90 days in both groups. Patients in the late cohort on average had longer operations (5.40 hours versus 6.16 hours, p=0.008) with a greater percentage of patients having

genioplasty, rhinoplasty, fat grafting, or lip lift in addition to hairline advancement and frontal bone modification. Despite this, fewer patients in the late cohort were admitted post-operatively (62.4% versus 13.4%, $p<0.001$). There were no significant differences in total complications, minor complication rates, revisions, ED/UC visits, or readmissions between the two groups. However, major complications (infections, abscesses, or hematomas requiring IV antibiotics, readmission, or surgical drainage) were significantly more common in the early program group (4.6% vs. 0.0%, $p=0.05$).

CONCLUSION: As a nascent facial gender affirmation program gains experience and optimizes its processes, case complexity and operative length tend to rise. Despite this, post-operative admission rates decreased to the point where most cases were outpatient procedures. Patient demographics may also change over time as an initial cohort of patients with gender dysphoria who have been awaiting therapy for much of their lives gives way to younger, newly-identified patients. The greatest benefits to increasing institutional experience are seen in the prevention of major complications. Overall safety and positive outcomes were maintained throughout the program history as total complications, ED/UC visits, readmission, and revision rates remained low in both early and late cohorts. These RESULTS can help guide developing programs and serve as a standard of care for large-scale healthcare systems.

REFERENCES

1. Chaya, B. F., Berman, Z. P., Boczar, D., Siringo, N., Rodriguez Colon, R., Trilles, J., Diep, G. K., & Rodriguez, E. D. (2021). Current Trends in Facial Feminization Surgery: An Assessment of Safety and Style. The Journal of Craniofacial Surgery, 32(7), 2366–2369. https://doi.org/10.1097/SCS.0000000000007785
2. Rodman, R. (2022). Developments in facial feminization surgery. Current Opinion in Otolaryngology & Head and Neck Surgery, 30(4), 249–253. https://doi.org/10.1097/MOO.0000000000000811
3. Tirrell, A. R., Abu El Hawa, A. A., Bekeny, J. C., Chang, B. L., & Del Corral, G. (2022). Facial Feminization Surgery: A Systematic Review of Perioperative Surgical Planning and Outcomes. Plastic and Reconstructive Surgery. Global Open, 10(3), e4210. https://doi.org/10.1097/GOX.0000000000004210

Demographic Trends and Predictors of Postoperative Complications in Craniosynostosis Surgery

Abstract Presenter
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BACKGROUND: Minimally invasive surgery is preferred to open repair in correction of craniosynostosis due to lower risk of postoperative complications.1 Previous studies identified Hispanic and non-White patients were diagnosed later in life, had higher rates of open repair, and experienced more complications.2 This study analyzed recent trends and identified predictors of postoperative outcomes following craniosynostosis surgery.

METHODS: Retrospective review of Pediatric NSQIP 2019 to 2021 identified all craniosynostosis patients (ICD-10 Q75.0) who underwent surgical repair. Patients who underwent a combination of minimally invasive and open repair were excluded. Covariates included demographics and comorbidities. Outcomes studied include transfusions, postoperative complications (i.e. superficial incisional surgical site infection, wound infection, dehiscence, pneumonia, unplanned intubation, seizure, cardiac arrest, length of stay, reoperations, and readmissions. Multivariable regression assessed predictors for postoperative complications.

RESULTS: 4,711 patients were included. 469 (9.96%) underwent minimally invasive repair, 4,242 (90.04%) open repair. Median age at time of surgery was significantly lower in minimally invasive repair (3.4 months, IQR = 2.8, 4.2) compared with open repair (9.2 months, IQR = 5.0, 15.2, $p<0.001$). Race distribution was significantly different ($p<0.001$): White patients made up a greater proportion of minimally invasive cohort (72.9%) compared with open repair cohort (62.1%), while Black patients made up a greater proportion of open repair cohort (9.5%) compared with minimally invasive cohort (3.0%). Minimally invasive surgery was associated with shorter operative time (80 minutes, IQR = 61, 104), anesthesia time (171 minutes, IQR = 143, 219), and length of stay (1 day, IQR = 1, 2) compared with open repair (179 minutes, IQR = 104, 254, $p<0.001$; 290 minutes, IQR = 214, 375, $p<0.001$; 3 days, IQR = 2, 4, $p<0.001$). In minimally invasive surgery, significant predictors of blood transfusions were American Indian or Native Alaskan race (OR = 7.7, $p=0.031$), longer anesthesia time (OR = 1.02, $p<0.001$), while a significant predictor of other postoperative complications was increasing age (OR = 1.028, $p=0.016$). In open repair, significant predictors of blood transfusions included younger age (OR = 1.014, $p<0.001$), Hispanic ethnicity (OR = 1.226, $p<0.029$), prolonged anesthesia (OR = 1.005, $p<0.001$) and operative times (OR = 1.003, $p<0.001$), while signficiant predictors of other postoperative complications were Asian race (OR = 2.827, $p=0.009$) and presence of preexisting comorbidities (OR = 1.883, $p=0.004$).

CONCLUSIONS: Disparities continue to exist in craniosynostosis care. White and younger aged children are more likely to undergo minimally invasive repair, associated with improved postoperative outcomes. Increased efforts in early craniosynostosis diagnosis in non-White children allowing for minimally invasive surgery is necessary to improve outcomes for all craniosynostosis patients.

REFERENCES:

1. Marupudi NI, Reisen B, Rozzelle A, Sood S. Endoscopy in Craniosynostosis Surgery: Evolution and Current Trends. J Pediatr Neurosci. 2022 Sep;17(Suppl 1):S44-S53. doi: 10.4103/jpn.JPN_47_22. Epub 2022 Sep 19. PMID: 36388003; PMCID: PMC9648654.
2. Badiee, Ryan K. BA, BS*; Maru, Johsias BA*; Yang, Stephen C. DDS†; Alcon, Andre MD*; Rosenbluth, Glenn MD‡,§; Pomerantz, Jason H. MD*,§. Racial and Socioeconomic Disparities

in Prompt Craniosynostosis Workup and Treatment. The Journal of Craniofacial Surgery 33(8):p 2422-2426, November/December 2022. | DOI: 10.1097/SCS.0000000000008815

Adjunctive Techniques in Primary Cleft Palate Reconstruction: A Systematic Review

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BACKGROUND: The use of adjunctive techniques in conjunction with primary palatoplasty is imperative when faced with tension at the defect site and inadequate local tissue coverage. This review aimed to summarize and compare outcomes across various adjuncts employed in primary palatoplasty.

METHODS: A literature search was conducted of MEDLINE, EMBASE, and Cochrane Library from inception to December 2022 using keywords cleft palate, palatoplasty, primary repair, primary reconstruction, surgical flaps, allografts, autografts, and adjunctive techniques. Adjunctive techniques were defined as METHODS that obtain non-palatal tissue for additional coverage of the local defect. Data extracted included demographics, cleft severity (Veau classification), primary and adjunctive techniques, outcomes, and follow-up periods. Logistic regression models and Chi-squared tests were performed to investigate associations among variables.

RESULTS: Forty-seven articles were included, comprising a total of 2,234 patients aged 3 months to 32 years. Follow-up periods ranged from 1 month to 25 years. Submucous cleft was described in 24 (1%) patients, whereas Veau I/II and Veau III/IV in 681 (30.5%) and 1451 (65%) patients, respectively. Furlow (56%) and intravelar veloplasty (9.5%) were the most reported techniques for soft palate repair, while Bardach (21.9%) and V-Y Pushback (11.2%) for the hard palate. Buccal myomucosal flap (BMMF) was utilized in most cases (52%), followed by buccal fat pad flap/graft (BFP) in 32.1%, and acellular dermal matrix (ADM) in 10.3%. Postoperative complications were identified in 3.9% of patients, including bleeding, infection, flap loss, necrosis, delayed healing, re-operation, and dehiscence. Oronasal fistula was present in 4.4% of patients, and velopharyngeal insufficiency (VPI) in 6.5%. Greater cleft severity (Veau III/IV) was most frequently repaired with BMMF compared to ADM/BFP ($p<.0001$). No significance was found between cleft severity and VPI ($p=0.2$) or fistula ($p=0.6$). ADM was associated with a higher incidence of postoperative complications compared to BFP ($p=0.0003$). Within the Veau

III/IV subgroup, fistula was associated with ADM when compared to BFP (p=0.01).

CONCLUSION: Primary palatoplasty adjuncts mitigate the risks of unfavorable outcomes associated with high cleft severity, with BMMF being considered superior given its inherent tissue properties in contrast to BFP and ADM. BFP is effective in reducing the incidence of fistula formation.

Sociodemographic Disparities in Craniosynostosis: A Systematic Review and Meta-Analysis

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OBJECTIVE: Delayed diagnosis and treatment of craniosynostosis leads to craniofacial deformity and threatens elevated intracranial pressure with long term neurocognitive deficits and psychosocial implications. We conducted a systematic review of the literature to evaluate risk factors for delayed craniosynostosis treatment and consistency of reporting practices.

METHODS: PubMed, Embase, and Scopus were searched. Two independent reviewers screened articles by title and abstract followed by full text. Any disagreements were discussed between reviewers and resolved. Pooled means and proportions were calculated to estimate the mean age at presentation and racial/ethnic composition of the patients represented in the literature.

RESULTS: Of 273 resultant articles, 19 were included, representing data from 31,568 patients. All 19 papers were retrospective reviews in the craniofacial (74%), neurosurgical (21%), or oromaxillofacial (5%) literature. There were no publications on the topic of disparity in craniosynostosis treatment prior to 2014, and 42% of publications have been published since 2020. Pooled mean age at presentation was calculated for 14 of the 19 studies and was found to be 9.38 months with a pooled variance of 5.08 months. Pooled proportions revealed a racial/ethnic distribution of 56% White patients (n=17 studies), 12% Hispanic patients (n=11 studies), 6% Black/African American patients (n=15 studies), <2% Asian patients (n=8 studies), <1% American Indian/Alaska Native (n=5 studies) and <1% Native Hawaiian/Pacific Islander patients (n=3 studies). One study by Lin et al. 2015 collapsed Black and Hispanic patients into

one group comprising 17% of their sample. Minority racial/ethnic status was found to be a risk factor for delayed presentation (n=8 studies), increased incidence of open rather than minimally invasive surgery (n=4 studies), higher hospital admission costs (n=3 studies), higher complication rates (n=3 studies), increased length of hospital stay (n=2 studies), increased duration of anesthesia/length of surgery (n=2 studies), and increased transfusion requirement (n=1 studies). The pooled mean delay in initial presentation for non-White patients was 5.7 months (range 4.0 – 9.3 months) compared to White patients, with pooled average delay-to-surgery of 3.0 months (range 2.7-10.1 months). Similar patterns were seen based on insurance status, with government-funded patients at increased risk of requiring open surgery (n=5), delayed intervention (n=3), complications (n=2), and transfusion requirements (n=1). Eighty-nine percent of studies reported any racial composition, with only 3 of 19 (16%) consistently reporting all U.S. Census racial and ethnic categories.

CONCLUSIONS:
Disparity in craniosynostosis is a topic that has garnered more interest over the past decade as the differences in referral patterns, treatment, and outcomes have come to light. In addition to the delay in presentation, what's more concerning is the delay to surgery even after being seen by a specialist. Moving forward, it is essential to collect demographic data consistently and systematically in this population so we may investigate how these observations trend over time and, thus, identify key areas of intervention that may address pressing disparities.

(Not) Talking the Talk: The Role of Primary Language in Velopharyngeal Insufficiency

Abstract Presenter
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BACKGROUND: Velopharyngeal insufficiency (VPI) and resonance disorders may occur following primary cleft palate repair and affect speech. Speech sounds may differ based on primary language. The contributory role of language to VPI is unknown. This study seeks to determine the incidence of VPI in Spanish- versus English-speaking patients after cleft palate repair, as well as to evaluate how primary language affects patient-reported speech outcomes.

METHODS: Patients from the Texas Cleft-Craniofacial Team at UTHealth who had primary cleft palate repair from 2004 to 2019 were identified. Surgical and demographic data were collected. Patients were divided into two groups based on primary language defined by patient

report: English (EN) or Spanish (SP). A retrospective analysis of VPI incidence and a prospective patient-reported survey of speech outcomes were conducted. VPI was defined as receiving VPI surgery, recommendation for VPI surgery, or a Universal Parameters hypernasality score of at least 2 on most recent follow-up. CLEFT-Q Speech Function and Speech Distress surveys were administered to patients ages 7-18 years and parents of patients 4-18 years. Surveys were scored 0-100 with higher scores indicating better function and less distress.

RESULTS: Of the 228 patients included in the study, 46 (20%) were SP and 182 (80%) were EN. There was no statistical difference in the Veau class or type of primary palate repair performed in SP and EN patients. There was a greater incidence of VPI in SP patients compared to EN patients (52% vs. 38%, p=0.04). For patient-reported speech outcomes, 40 cleft palate patients and their parents were surveyed. The median age of surveyed patients was 13 (IQR 8,15.25) years for both groups. There were 30% SP (n=12) and 70% EN (n=28) patients. SP patients had worse CLEFT-Q patient reported Speech Function scores than EN patients (58 ± 18.19 vs. 68 ± 20.61, p=0.17). SP patients also felt more Speech Distress than EN patients (64 ± 17.30 vs. 70 ± 18.16, p=0.43). Parent reported Speech Function scores were worse for SP patients compared to EN patients (61 ± 25.47 vs. 66 ± 24.55, p=0.59).

CONCLUSIONS: In this single institution study, there was a statistically significant greater incidence of VPI in Spanish-speaking patients compared to English-speaking patients. Furthermore, Spanish-speaking patients trended towards worse patient- and parent-reported speech outcomes. It is unclear if these findings are caused by primary language differences. Further research is needed to investigate contributing factors such as socio-demographics with the goal of achieving equitable outcomes in these groups.

Examination of Fistula Rate and Need For Speech Surgery in 242 Cleft Palate Repairs at a Tertiary Care Center

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PURPOSE: Fistula formation is a dreaded complication of cleft palate repair and can result in decreased patient quality of life and additional surgeries. Likewise, the development of

velopharyngeal insufficiency recalcitrant to speech therapy following cleft palate repair often RESULTS in patient distress and necessitates surgical correction. The goal of the present study was to further add to the literature regarding cleft palate repair by providing the authors institution's experience. Specifically, the authors aim to examine different repair techniques with regards to primary endpoints.

METHOD: Institutional review board approval was received. All patients undergoing repair of a cleft palate at the authors' institution over a 10-year period were collected (n=242). Patient and cleft demographics were collected as well as operative details. Primary outcomes measured were development of a fistula and the need for speech surgery. Further details regarding fistula management and speech surgery were collected. Chi square tests and independent t-tests were utilized to determine significance. A significance value of 0.05 was utilized.

RESULTS: During the time period examined, there were 290 cleft palate repairs performed at the authors' institution, 242 patients had enough data for analysis. The most common cleft palate encountered was a Veau II (37%). A two-stage palate repair was performed in 17% of patients. A Furlow palatoplasty was performed on 57% of patients. Fistulas were reported in 22% of patients and speech surgery was needed in 11% of patients. A two-stage palate repair was associated with the eventual need for speech surgery ($p < 0.001$). Furlow palatoplasty was associated with a decreased rate of fistula formation ($p < 0.01$) and a decreased need for eventual speech surgery ($p < 0.001$).

CONCLUSION: This study reiterates much of the existing literature regarding differing cleft palate repairs. A two-stage palate repair is often touted as having a lesser degree of growth restriction, but the present study demonstrates that this comes at the cost of an increased need for speech surgery. Furlow palatoplasty has proven in prior studies to demonstrate an improved speech outcome, which is corroborated in the present study, but is often associated with a higher rate of fistula formation. The present study demonstrated a decreased rate of fistula formation with the Furlow technique, which may be a result of the adoption of the Children's Hospital of Philadelphia modification of the technique. This study further solidifies the clinically superior outcomes of the Furlow palatoplasty over other techniques.

Long-Term Outcomes of Sphincter Pharyngoplasty in Patients with Cleft Palate

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PURPOSE: Sphincter pharyngoplasty has been an established treatment METHOD for velopharyngeal insufficiency after cleft palate repair. Existing studies have generally reported isolated outcomes, in which speech and revision surgery outcomes are separated from airway obstruction complications, a known postoperative risk. Furthermore, studies that have evaluated postoperative airway complications have not distinguished between transient and persistent symptomatology. The PURPOSE of this study is to evaluate the long-term outcomes of sphincter pharyngoplasties, including speech outcomes, revision surgeries, and postoperative incidence of obstructive sleep apnea.

METHODS: A retrospective matched cohort study was conducted across two institutions. Patients with cleft lip/palate (CLP) or isolated cleft palate (iCP) who underwent sphincter pharyngoplasty between 1992 to 2022 were identified. Patients who had sphincter pharyngoplasty surgery at > 21 years of age and patients with less than 6 months of postoperative follow-up were excluded. An age- and diagnosis- matched control group of patients with no history of velopharyngeal insufficiency was also identified. Postoperative speech outcomes, revision surgeries, and incidence of obstructive sleep apnea were evaluated. To evaluate whether sphincter pharyngoplasty was associated with obstructive sleep apnea, we first performed univariable analyses to identify all potential predictors of obstructive sleep apnea. Multivariable regression was then used to evaluate independent predictors of obstructive sleep apnea.

RESULTS: A total of 233 patients (mean age 19.0 ± 2.6 years) with CLP/iCP were reviewed: 166 patients underwent sphincter pharyngoplasty and 67 patients with no history of velopharyngeal insufficiency comprised the control group. Among the pharyngoplasty cohort, 63.9% demonstrated improved and sustained speech outcomes after a single pharyngoplasty, with a median postoperative follow-up of 8.8 years (interquartile range [IQR], 3.6-12.0 years). One-third of pharyngoplasty patients required a revision surgery, with a median time to primary revision of 3.9 (IQR 1.9-7.0) years. Obstructive sleep apnea rates increased significantly among the pharyngoplasty cohort, from 3% preoperatively to 14.5% postoperatively ($p < 0.001$). The average time from sphincter pharyngoplasty to obstructive sleep apnea diagnosis was 4.4 ± 2.4 years. On multivariable analysis, sphincter pharyngoplasty surgery was independently associated with a fourfold increase in obstructive sleep apnea (OR 4.24, $p = 0.03$). Furthermore, patients who had histories of both sphincter pharyngoplasty and secondary Furlow surgery for velopharyngeal insufficiency were eight times more likely to exhibit obstructive sleep apnea compared to controls (OR 8.17, $p = 0.01$).

CONCLUSIONS: While sphincter pharyngoplasty remains successful in improving speech outcomes over long-term periods for the majority of patients, persistent obstructive sleep apnea is a complication that should be monitored for beyond the immediate postoperative period. This work underscores the importance of long-term follow-up of patients who undergo sphincter pharyngoplasty to monitor for velopharyngeal insufficiency reoccurrence, need for revision surgery, and persistent obstructive sleep apnea.

Traumatic Brain Injury in Patients with Frontal Sinus Fractures

Abstract Presenter
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BACKGROUND: Traumatic brain injury (TBI) associated with facial fractures is a significant public health concern worldwide. TBI has been reported to be as high as 86% in patients presenting with facial fractures. Our study is the first to evaluate the prevalence and risk factors of TBI in patients with frontal sinus fracture(s).

METHODS: We retrospectively reviewed patients who presented with traumatic frontal sinus fractures in 2019. Excluded were patients with no documentation of neurologic symptoms/signs on presentation. Our primary outcomes were prevalence of concomitant TBI on presentation and at >2 weeks after trauma. TBI on presentation was defined as having GCS<15 or any neurologic symptom/sign and categorized into mild (GCS=14-15), moderate (GCS=9-13), and severe (GCS<8). Persistent/incident post-traumatic neurologic symptoms were assessed at >2 weeks after injury. Bivariate analysis and logistic regression were performed.

RESULTS: Of n=62 patients, n=57 (91.9%) had concomitant TBI on presentation. Compared to patients with no concomitant TBI, patients with severe TBI were more likely to have had combined anterior and posterior table fractures (n=0 [0.0%], n=12 [85.7%]; P=.002), displaced fractures (n=1 [20.0%], n=12 [85.7%]; P=.036), and comminuted fractures of the frontal sinus (n=0 [0.0%], n=13 [92.9%]; P<.001). Of n=51 patients who were followed up for a median (interquartile range [IQR]) of 162 [23-970] days, n=41 (80.4%) had neurologic symptoms at >2 weeks following trauma. Combined anterior and posterior table fractures of the frontal sinus was associated with 7 times the odds [crude odds ratio (cOR) (95% confidence interval [CI]) 7.0 (1.3-38.6)] of having neurologic symptoms at >2 weeks after trauma compared to isolated anterior table fracture. This was not significantly associated with mechanism of injury, fracture displacement, or surgical repair.

CONCLUSION: Emergency physicians should maintain a high degree of suspicion of TBI, even when their primary concern is facial trauma with frontal sinus fracture. Head CT at presentation and close neurologic follow-up are recommended for frontal sinus fracture patients with combined anterior and posterior table fractures.

Comparative Outcomes Assessment of Velopharyngeal Insufficiency and Oronasal Fistula: Does Intravelar Veloplasty Predict Speech Outcomes?

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BACKGROUND: Controversy persists regarding postoperative speech outcomes and complications of different "straight-line" repair techniques such as the Bardach Two-Flap (BTF) and von Langenbeck (VL) palatoplasties with or without Intravelar Veloplasty (IVVP).[1,2] We hypothesized that levator muscle repair in the BTF with IVVP demonstrates similar rates of postoperative oronasal fistula (ONF) with decreased rates of velopharyngeal insufficiency (VPI) and secondary VPI surgery as compared to VL palatoplasty.

METHODS/DESCRIPTION: A retrospective cohort study was performed of non-syndromic subjects undergoing primary palatoplasty at a tertiary care pediatric hospital over a 20-year period. The VF procedure involved joining two mucoperiosteal flaps with minimal levator muscle dissection. The BTF procedure with IVVP incorporated a pushback technique with retropositioning of the levator musculature with an end-to-end repair while lengthening the soft palate. Subjects underwent palatoplasty by one of three fellowship-trained craniofacial surgeons prior to 20 months of age and had >2 years of postoperative speech evaluations. Speech evaluations were performed by a team of speech language pathologists using the Velopharyngeal Function Assessment Scale (VFAS) scoring system; a VFAS score >5 and subsequent need for secondary speech surgery indicated clinically significant VPI. Patient characteristics and postoperative outcomes related to ONF and speech surgery were collected. Predictors of postoperative complications were assessed, with $p<0.05$ denoting significance.

RESULTS: In total, n=80 subjects underwent BTF with IVVP repair at mean age of 12.4 months and n=47 subjects underwent VL repair at mean age of 12.8 months ($p<0.25$). There was an increased proportion of Veau II clefts in the BTF cohort (8.5% VL v. 26.3% BTF, $p<0.03$). The mean length of follow-up was 10.5 years in BTF and 7.7 years in VL ($p<0.001$). Mean age at initial postoperative speech assessment was 3.1 and 3.7 years in the BTF and VL cohorts, respectively ($p<0.03$). VFAS scores at initial assessment were not significantly different between cohorts (4.4 BTF versus 5.6 VL, $p<0.09$). The rate of postoperative ONF was significantly greater in the VL cohort (22% BTF v. 66% VL, $p<0.001$). The rate of secondary VPI speech surgery was significantly greater in the VL cohort (33% v. 57%, $p<0.01$). Veau classification did not correlate with postoperative ONF or VPI. On multivariate regression, VL repair type correlated with the development of postoperative ONF complications and need for speech surgery (Odds Ratio 8.4, $p<0.001$).

CONCLUSION: When compared to von Langenbeck palatoplasty, Bardach Two-Flap Palatoplasty with Intravelar Veloplasty may be associated with decreased rates of speech surgery without increased rates of ONF. With either technique, degree of muscle overlap and tension potentially serve as confounding variables for the occurrence of ONF, VPI, and need for speech surgery. Future directions include comparing this cohort to subjects undergoing modified Furlow palatoplasty.

REFERENCES

1. Sommerlad BC. A technique for cleft palate repair. Plast Reconstr Surg. 2003;112(6):1542-1548.
2. Agrawal K. Cleft palate repair and variations. Indian J Plast Surg. 2009;42 Suppl(Suppl):S102-S109.

Incidence and Outcomes of Postoperative Acute Telogen Effluvium After Facial Feminization Surgery

Abstract Presenter
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BACKGROUND: Facial feminization surgery (FFS) consists of a variety of procedures to treat gender dysphoria, including but not limited to hairline advancement and forehead contouring. Acute telogen effluvium, or "shock hair loss", is a known risk of major surgery, especially those involving the scalp region. 1 Hairline lowering procedures may be at particularly high risk due to high tension on the scalp tissue, reduced vascularization from galeal scoring techniques, or manipulation of the hair-bearing regions. 2 Post-operative hair loss in transfeminine patients may be exceptionally distressing for those who suffered from male-pattern hair loss prior to transitioning. Despite the known risk of telogen effluvium after FFS, there are very few studies in the literature describing its incidence, treatment, or outcomes. This is the first large-scale study examining the risks, outcomes, and treatments of shock hair loss after FFS.

METHODS: All patients who underwent primary facial feminization surgery between 2018 and 2022 at a single integrated healthcare system were evaluated in a retrospective analysis. Patient charts were reviewed for operation type, length of stay, surgery duration, complications, postoperative course, post-operative Emergency Department or Urgent Care (ED/UC) visits, readmissions, and demographic factors. Primary outcomes included post-operative telogen

effluvium, or diffuse hair loss outside of scar alopecia, and whether recovery of hair growth was observed. Chi square analyses and independent t tests were performed to compare groups and determine associations between outcomes.

RESULTS: A total of 242 patients ages 18 to 80 were included for analysis. A total of 14 patients were found to have postoperative alopecia. Patients with alopecia were not found to have significant differences in age, body mass index, estimated blood loss, follow up duration (mean 140 days), or surgery time compared to patients with no reported hair loss. Of these patients, all 14 patients received forehead contouring procedures (p=0.16), 11 (79%) received hairline advancement procedures (p=0.69), 10 (71%) received brow lifts (p=0.30), and 9 patients (64%) had FFS of both the upper and lower face (p=0.88). Eleven patients (79%) had galeal scoring during hairline advancement. The risk of telogen effluvium across all FFS patients was 5.8%. The risk of telogen effluvium amongst those who had bicoronal incisions was 6.5%. Five patients (36%) received treatments including minoxidil (14%) or steroids (21%). Twelve out of 14 patients (86%) demonstrated documented recovery of hair growth. The remaining 2 patients were awaiting hair regrowth at the most recent follow up.

CONCLUSIONS: Acute telogen effluvium after FFS is a relatively common phenomenon, affecting approximately 5.8% of patients. All cases were associated with hairline advancement or frontal bone contouring procedures, with a risk of 6.5% amongst those patients. The overwhelming majority of patients suffering from shock hair loss demonstrated recovery of hair growth over time, regardless of whether medical interventions were used. Although hair loss after FFS may be concerning for transfeminine patients, they should be counseled on the risk of telogen effluvium preoperatively and reassured that the natural course is typically recovery of hair growth over time.

REFERENCES:

1. Desai, S. P., & Roaf, E. R. (1984). Telogen Effluvium after Anesthesia and Surgery. Anesthesia & Analgesia, 63(1), 83.
2. Epstein, J., & Epstein, G. K. (2020). Hairline-Lowering Surgery. Facial Plastic Surgery Clinics of North America, 28(2), 197–203. https://doi.org/10.1016/j.fsc.2020.01.002

Management of Inpatient Pediatric Facial Infections at a Tertiary Care Center

Abstract Presenter
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BACKGROUND: Facial infections are common within the pediatric population and frequently occur due to trauma. There is a paucity of data investigating common microbiology, infection

presentation, and treatment among pediatric patients with facial injury and concomitant infection. Extensive research exists regarding adult facial infections, however there are known differences in microbiologic flora and infection manifestations between adults and children. This can contribute to antibiotic misuse in the setting of pediatric facial infections.
Objective: To evaluate common microbiology, presentation, and treatment options of pediatric patients admitted to a tertiary level care center with facial infection.
METHODS: A retrospective review of pediatric patients (<18yo) admitted to a tertiary care center with a diagnosis of a head or neck infection between 2012-2021 was performed. Plastic surgery was consulted on all patients. Patient factors evaluated included age, gender, comorbid conditions, diagnosis, mechanism of injury, time from onset of symptoms to presentation, prior evaluation at an outside center, prior antibiotic treatment for current condition, gram stain, culture RESULTS, and length of follow-up. Management factors evaluated included treatment type, empiric antibiotic administration by the emergency department (ED), inpatient duration, and discharge antibiotics.
RESULTS: Thirty-four children (mean: 6.6yo, 56% M) were admitted from the pediatric ED for management of facial infections. Most infections were caused by trauma (50%) with dog bites being most frequent, followed by falls. Infections after the development of acne vulgaris accounted for 41.1% of cases. The remainder were from unidentifiable causes. Over 70% of patients had failed oral antibiotic therapy prior to admission. On presentation, most patients were afebrile (85%), but nearly half of the patients had evidence of a leukocytosis. Imaging was completed in 48% of patients, with 24% receiving CT scan performed and 24% receiving ultrasound. The most common location of infection was the cheek/mandible (35%), followed by the nose, forehead/temple, lip, eye, chin, and ear. In the ED most patients were treated with IV clindamycin (44%) followed by Unasyn, Vancomycin, Zosyn and Zyvox. Almost all patients underwent incision and drainage in the ED, and two patients required formal operative intervention. Culture results varied by mechanism of injury with MRSA being the most common in the setting of acne vulgaris, and Pasteurella frequently associated with dog bites. Most cultures tested for gram stain were gram positive. Twenty-four percent of patients did not have cultures finalized by time of discharge. All patients were discharged on oral antibiotics with Clindamycin and Augmentin were most common. One patient required a PICC placement for IV antibiotics on discharge.

CONCLUSIONS: Facial infections are common in the pediatric population. These infections can be safely managed with IV antibiotics and bedside drainage with subsequent local wound care. There are disparities in empiric antibiotic utilization for these patients. As such, standardized protocols to help guide clinicians' treatment approaches are needed for the pediatric population.

Long-Term Appearance and Outcomes of Strip Craniectomy Compared with Cranial Vault Reconstruction in Sagittal Craniosynostosis

Abstract Presenter
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INTRODUCTION: Sagittal craniosynostosis is caused by premature fusion of the sagittal suture, which creates a scaphocephalic head shape and may lead to increased intracranial pressure.(1) Repair during the first year of life can help prevent social and neurodevelopmental complications. Common METHODS of repair are open cranial vault reconstruction (OCVR) and strip craniectomy with orthotic helmet therapy (SCOT). (2) However, although both SCOT and OCVR are considered to be efficacious for treatment of sagittal craniosynostosis, direct comparisons of cranial shape and appearance are lacking. The purpose of this study is to compare long-term cephalometric outcomes, and patient satisfaction between OCVR and SCOT.

METHODS: Patients who were non-syndromic and underwent OCVR or SCOT before 12 months of age for isolated sagittal craniosynostosis at our institution were included in the study. A chart review was conducted to record demographics and assess intraoperative outcomes. Preoperative anthropometric measurements were made using computed tomography to include cranial index (CI), frontal bossing(3), occipital bulleting(3), vertex-nasion-opisthocranion (VNO) angle(4), vertical height, and intracranial volume. Patients were recruited for 3D photography, and anthropometric measurements were made using Vectra software to include CI, auricular height, VNO angle and circumference. Scaphocephaly is defined as having a CI <76%.(5) Recruited patients were asked to complete a satisfaction survey. Blinded Whittaker classification ratings were made on 3D photographs. Descriptive statistics, t-test, and Fisher's exact test were calculated.

RESULTS: Forty-seven patients were included (18 SCOT and 29 OCVR), with a median age at the time of surgery of 3 months (2-4 months) and 7 months (6-8 months) in SCOT and OCVR patients, respectively. Follow-up at the time of recruitment was similar between groups (SCOT 6.7 +/-2.2 years, OCVR 7.0 +/-1.7 years). Patients who underwent SCOT had shorter operative times ($p<0.001$), less estimated blood loss ($p<0.001$), fewer blood transfusions ($p=0.045$), and shorter hospital stays ($p=0.01$). At baseline, the SCOT patients had more severe CI measurements (SCOT 67.29% vs. OCVR 73.1%; $p=0.02$) and occipital bulleting (SCOT 135.3° vs. OCVR 122.3°; $p=0.01$). There were no statistically significant differences in measurements on postoperative 3D photographs between OCVR and SCOT. More patients had a Whittaker classification rating of 1 in the OCVR group compared to SCOT with most patients receiving a score of 2 in both groups. OCVR and SCOT patients reported statistically similar satisfaction with the RESULTS of surgery ($p=0.30$) and appearance of the scar ($p=0.42$), and they were no more likely to report bullying ($p=0.37$)

CONCLUSIONS: Despite more severe CI and occipital bulleting measurements at baseline, SCOT patients had similar long-term morphological measurements to OCVR patients. Furthermore, patients reported similar satisfaction with their long-term healing, appearance, and appearance of the scar following SCOT compared with OCVR. However, Whittaker ratings

indicate that OCVR may lead to lower scores compared to SCOT. These data suggest that neither SCOT nor OCVR has generalizable superiority in terms of perioperative and outcome metrics. The optimal approach should be decided on a case by case basis.

REFERENCES:

1. Dempsey RF, Monson LA, Maricevich RS, et al. Nonsyndromic Craniosynostosis. Clinics in Plastic Surgery. 2019;46(2):123-139. doi:10.1016/j.cps.2018.11.001
2. Simpson A, Wong AL, Bezuhly M. Surgical Correction of Nonsyndromic Sagittal Craniosynostosis: Concepts and Controversies. Annals of Plastic Surgery. 2017;78(1):103-110. doi:10.1097/SAP.0000000000000713
3. Ou Yang O, Marucci DD, Gates RJ, et al. Analysis of the cephalometric changes in the first 3 months after spring-assisted cranioplasty for scaphocephaly. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2017;70(5):673-685. doi:10.1016/j.bjps.2016.12.004
4. Blum JD, Cho DY, Cheung L, et al. Making the Diagnosis in Sagittal Craniosynostosis-It's Height, Not Length, That Matters. Childs Nerv Syst. 2022;38(7):1331-1340. doi:10.1007/s00381-022-05518-3
5. Morritt DG, Yeh FJJ, Wall SA, Richards PG, Jayamohan J, Johnson D. Management of Isolated Sagittal Synostosis in the Absence of Scaphocephaly: A Series of Eight Cases: Plastic and Reconstructive Surgery. 2010;126(2):572-580. doi:10.1097/PRS.0b013e3181e09533

Do Race and Socioeconomic Status Affect Date of Initial Presentation and Repair of Patients with Cleft lip ± Palate and Head Shape Conditions?

Abstract Presenter
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INTRODUCTION: Socioeconomic status (SES) is a known risk factor for delayed care of congenital birth defects. Current literature is sparse regarding the effect of race and socioeconomic status (SES) on the timing of cleft lip and/or palate (CL±P), craniosynostosis, and plagiocephaly presentation to clinic and possible repair. The goal of this study is to quantify differences in when socioeconomic and racial minorities with craniofacial defects present to a single-institution hospital for evaluation as compared to pediatric populations with higher resources.

METHODS: A retrospective review of patients with CL±P and head shape conditions from Jan 2001 to Feb 2022 were included. Age at first plastic surgery clinic appointment, age at repair if

applicable, gender, race, and zip code were collected. The Validated Child Opportunity Index (COI) scale was calculated based on zip code as a measure of SES. Kruskal-Wallis tests and Dunn's procedures were used for continuous variables and post hoc pairwise comparisons.

RESULTS: 2733 patients with CL±P, 9974 with plagiocephaly/brachycephaly, and 59 patients with craniosynostosis were included. Among patients with CL±P, Black and Hispanic patients presented significantly later to both first plastic surgery clinic appointment and age at repair than White patients($p<.001$). White patients and higher SES were associated with a significantly earlier date of initial presentation to plastic surgery clinic for head shape conditions($p<.001$).

CONCLUSIONS: Race and SES may play an important role in the delay of first presentation to plastic surgery clinic and subsequent repair for these patient populations. Further educational efforts must be provided to ensure equitable care. This single institutional study may serve to encourage other academic centers to analyze the timing of care for our pediatric patients.

Histologic Analysis of Cadaveric Costal Cartilage After Implantation for Ear Reconstruction

Abstract Presenter
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BACKGROUND: Fresh Frozen cadaveric costal cartilage grafts have seen increased attention in the published literature. However, minimal efforts have been made to describe changes in histologic properties after implantation for reconstructive plastic surgery. In this study we assess cellularity of cadaveric costal cartilage samples before and after implantation for ear reconstruction.

METHODS: Cadaveric costal cartilage samples were collected before and five months after implantation for ear reconstruction surgery along with post implantation autologous rib, auricular remnant, and branchial vestige cartilage. All samples were stained with hematoxylin & eosin to determine percent occupied lacunae. A one-way ANOVA with Hochberg's GT2 post hoc test was used to compare mean percent occupied lacunae across all five groups.

RESULTS: Mean percent occupied lacune was not significantly different for cadaveric costal cartilage before (95% CI 16.82 – 34.70) and after (95% CI 21.59 – 36.18) implantation. Post implantation autologous costal cartilage had significantly higher lacunae occupancy (95%CI 52.81 – 62.16) compared to cadaveric cartilage ($p < .001$). The difference in mean was not significant between auricular remnant (95% CI 75.12 – 85.70) and the branchial vestige (95% CI 71.85 – 94.83) cartilage, although both had significantly higher occupancy than cadaveric cartilage ($p <.001$).

CONCLUSION: Cadaveric costal cartilage cellularity does not change five months after implantation for ear reconstruction, although it is overall lower than autologous and native cartilage. This suggests that the cartilage extracellular matrix effectively shields residual cells from the host immune system preventing further cartilage decellularization and inflammation.

Feasibility of Automated Auricular Framework Milling

Abstract Presenter
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OBJECTIVE: Using cadaveric costal cartilage may allow preoperative automated auricular framework production for ear reconstruction. To evaluate the feasibility of this approach, we used automated milling to create auricular frameworks based on a handmade 3-dimensional (3D) model.

METHODS: A Firmin type I auricular framework model was manually carved en bloc out of soap and scanned using a dental lab 3D scanner. CAD/CAM software was used to process scans and create a tool path to guide an automated mill. Polyethylene, potato, and human cadaveric cartilage were used to attempt to produce acceptable frameworks. Time to mill a complete framework, and framework dimensions were compared across materials.

RESULTS: Type I en bloc frameworks were milled from polyethylene and potato. The tool path was modified to produce an en bloc type II framework due to the limited size of the available cadaveric cartilage block. Frameworks deviated less than 1mm in all dimensions from the model. Milling time was determined by the pre-made tool path and therefore did not vary between materials. Milling time was 35 minutes for a type I framework and 23 minutes for a type II framework with helix, antihelix, and antitragus definition matching the scanned model regardless of material.

CONCLUSIONS: Framework milling can be done quickly and within a negligible margin of error. Cadaveric cartilage block size limits en block framework milling to type II/III frameworks; however, a tragus segment can also be milled and sutured in place intraoperatively.

Reduction Cranioplasty for the Treatment of Hydrocephalic Macrocephaly: A Systematic Review of Surgical Outcomes

Abstract Presenter
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PURPOSE: Macrocephaly occurs when a patient's head circumference is greater than 2 standard deviations above the population mean, and the most common etiology is hydrocephalus. Hydrocephalic macrocephaly RESULTS in significant morbidity that includes poor psychosocial development, positioning difficulties, skin breakdown, and poor cosmesis. Reduction cranioplasty (RC) is a surgical technique that has been applied to treat hydrocephalic macrocephaly. The primary objective of this systematic review is to report the surgical outcomes of RC for hydrocephalic macrocephaly, and secondarily, to synthesize the reported advantages and disadvantages of the various techniques for this procedure.

METHODS AND MATERIALS: A systematic review was performed using PubMed, Scopus, and Web of Science, following modified Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA). Two independent reviewers screened 350 studies and 25 studies reporting on RC for hydrocephalic macrocephaly were included. Data on study design, patient demographics, operative details, and surgical outcomes were collected. Levels of evidence were defined in accordance with the criteria set by the American Society of Plastic Surgeons.

RESULTS: In the 25 included studies, there was a total of 64 reduction cranioplasties with a mean cohort size of 2.6 (SD 2.5) patients. Sixteen (64%) studies presented level V evidence, 7 (28%) presented level IV evidence, and 2 (8%) presented level III evidence. Single-stage reconstructions were employed in 64% of studies, while 32% of studies presented multi-stage reconstructions and one study (4%) presented both single and multi-stage techniques. Improved postoperative head positioning after RC was reported in 92% of studies, improved postoperative aesthetics was reported in 88% of studies, and improved postoperative neurologic functioning was reported in 76% of studies. All studies that examined pre- and post-operative differences in head circumference or intracranial volume reduction were successful in head size reduction. There was a mortality rate of 4.7% in the 64 RCs.

CONCLUSION: Most studies on RC report improvement in head size, head positioning, cosmesis, and neurologic functioning. However, these studies have small cohort sizes and low levels of evidence due to the rarity of hydrocephalic macrocephaly. These findings suggest that

RC is a promising surgical technique for hydrocephalic macrocephaly that merits further investigation.

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Genetic Implications on Behavioral Outcomes in Non-syndromic Sagittal Craniosynostosis

Abstract Presenter
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BACKGROUND: Previous work has identified an association between de novo and transmitted loss of function mutations in genes under high evolutionary constraint (high pLI) with neurodevelopmental delays in non-syndromic craniosynostosis (NSC). In this study, we investigated the behavioral outcomes of sagittal synostosis patients with genetic lesions (high pLI) compared to sagittal synostosis patients without genetic lesions (non-high pLI).

METHODS: Parents of children ages 6-18 years old with surgically corrected sagittal synostosis were recruited nationally to complete the Child's Behavioral Checklist (CBCL), Conners-3, Social Responsiveness Scale-2 (SRS-2), and Behavior Rating Inventory of Executive Function-2 (BRIEF-2). CBCL assesses behavioral and emotional function, Conners-3 assesses features of ADHD, SRS-2 assesses features of autism spectrum disorder (ASD), and BRIEF-2 assesses executive function. Multivariate linear regression was used to determine the association of high pLI with behavioral scores, while controlling for sociodemographic factors, age at surgery, surgery type, and IQ. Additional sub-analyses were completed to evaluate factors associated with each score within each group (non-high pLI group and high pLI group).

RESULTS: Parents of 45 patients completed the behavioral assessments. Sixteen patients had a mutation in a highly constrained gene (high pLI). There was no significant difference in average age at assessment (8.29±1.87 vs 8.74±2.55 years, $p=0.31$) between non-high and high pLI groups. There was a greater proportion of children with high pLI that reached at or above borderline clinical levels for aggression (18.8% vs 0.0%, $p=0.05$) and externalizing problems (31.3% vs 3.7%, $p=0.02$) as assessed by the CBCL. Multivariate linear regression further showed that high pLI was associated with rule breaking ($p=0.05$) and aggression ($p=0.01$). Upon sub-analysis of children with high pLI, sociodemographic factors, age at surgery, surgery type, and IQ were not associated with worse scores in any of the assessments. However, in children with non-high pLI, greater age at surgery was associated with worse scores in rule breaking, aggression and externalizing problems domains ($p<0.05$) and ASD-related social cognition, social communication, social motivation and restrictive interests and repetitive behaviors symptom domains ($p<0.05$).

CONCLUSION: Children with sagittal synostosis and high pLI had worse problems in externalizing behaviors, including rule breaking and aggression. Among children with non-high pLI, greater age at surgery was associated with social difficulties and externalizing behaviors. High pLI may exacerbate externalizing behavioral problems, though when children do not have high pLI, other factors such as timing of surgery may become important.

Abbe Flap for Reconstruction of Secondary Cleft Lip Deformity: A Systematic Review

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BACKGROUND: The Abbe flap is a useful approach in the reconstruction of a secondary cleft lip deformity. In brief, this approach utilizes a full-thickness, vermillion-pedicled flap that is rotated from the lower lip to the upper lip for secondary cleft lip repair and allows the surgeon to create philtrum divots and ridges that can be combined with other surgical approaches.

METHODS: A literature review was established to review differing techniques, modifications, and combinations presented on the PubMed database. In total, about 88 papers resulted with 26 applicable after appropriate filters were applied. This was used to supplement a recent Abbe lip-switch flap conducted at Wake Forest Baptist Health for the indication of secondary cleft lip deformity. Of particular interest in this case is the presence of a concomitant nasolabial fistula repaired simultaneously at the initial Abbe surgery with a mucosal flap from the resected philtrum.

RESULTS: From the literature, twenty-six studies published from 2002 to 2020 were included for a total of 456 patients. Ninety-seven percent of surveyed patients reported satisfactory RESULTS. The complication rate necessitating revision surgery was 32 patients, or 7.0%. CONCLUSIONs: The Abbe flap for secondary cleft lip reconstruction has a high rate of patient satisfaction and low rate of complication. This poses an argument for its utilization and practicality beyond its current scope. Leftover tissue from the philtral skin at the time for Abbe can be utilized with columellar elongation and nasolabial fistula repair, as noted in some of the selected texts.

Abstract Presenter
Nina Mehta

Sociodemographic disparities affecting access to and outcomes after cleft lip repair: A systematic review of the literature

INTRODUCTION
Age-appropriate cleft lip repair (CLR) enhances speech and feeding performance, cosmetic appearance, and quality of life (QOL). However, there are differences in access to and experience with CLR, which can ultimately affect surgical outcomes. This study aims to review the current literature regarding sociodemographic disparities that impact access to CLR as well as surgical outcomes in the United States (US).

METHODS
A systematic review was conducted using Pubmed, Embase, and Medline databases. Studies discussing sociodemographic disparities regarding access to and outcomes after CLR were included. Studies performed outside the US, those published before 2000, epidemiologic studies, case reports and case series were excluded. Studies were sorted according to the PRISMA guidelines for systematic reviews and assigned a level of evidence using the GRADE system.

RESULTS
Out of the 3782 studies identified on our initial search, 31 met our inclusion criteria. Disparities discussed in these articles included access to care (n=10), missed appointments (n=3), use of preoperative nasoalveolar molding [NAM] (n=3), surgical timing (n=9), and surgical outcomes (n=10).

Four studies demonstrated that geographical location, particularly in rural areas and for American-Indian or Alaskan-Native populations, was associated with poor access to care. In addition, financial limitations, poor healthcare literacy, and logistical constraints, such as taking time off from work, also limited patients' access to care.

Predictors for missed appointments included low socioeconomic status (SES) as well as black race, public insurance, and unstable living conditions. Two studies found that decreased pursuit of NAM was associated with Asian race, long driving distance to care facilities, and multi-children households. Another study demonstrated that single parents and those with non-private insurance were more likely to have difficulty with NAM usage.

Factors associated with delayed CLR included non-white race, non-private insurance, non-English primary language, and non-urban setting. One study showed that Asian race and Child Protective Services involvement were also associated with delayed CLR. Surgical outcomes were assessed in many ways using various aesthetic, speech, and QOL measures. Factors linked to worse surgical outcomes included black, latin, or mixed race as well as non-private insurance. Furthermore, black race was associated with longer hospitalization after surgery, and medicaid insurance was linked to higher readmission rates.

CONCLUSION
Patients who are non-white, publicly insured, have a lower SES, and those living in geographically remote regions are impacted by disparities in access to and outcomes after CLR. State-affiliated care centers and statewide facial surgery mandates can help address these disparities. Future research should focus on developing other strategies to promote equity in the management of patients with cleft lip.

Abstract Presenter
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The Use of Supercharged Pedicled Colon Flap to Manage Anastomotic Leakage After Pharyngoesophageal Reconstruction Complicated with Preoperative Irradiation

Abstract Presenter
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INTRODUCTION: In patients with advanced cancers involving hypopharynx, cervical esophagus, or thyroid gland, pharyngoesophageal reconstruction after extensive ablation of tumor is necessary but sometimes afflicted with a variety of complications. Anastomotic leakage between cervical neo-esophagus and thoracic esophagus is not uncommon, especially in patients receiving preoperative radiation therapy. Herein, we presented a novel method using pedicled colon flap anastomosed with the cervical neo-esophagus to manage the leakage.

PATIENTS AND METHODS: Between 2004 and 2022, a total of 18 patients had pharyngoesophageal reconstructions due to advanced cancers involving hypopharynx, cervical esophagus, or thyroid gland, and received pedicled colon transposition connecting to the reconstructed cervical neo-esophagus for anastomotic leakage management. One group of them including 14 patients had already received preoperative irradiation, extensive tumor ablation, and immediate pharyngoesophageal reconstruction, but suffered from repetitive leakage from the anastomosis between cervical neo-esophagus and thoracic esophagus. The pedicled colon transposition method was used to treat the anastomotic leakage. Another group of them including 4 patients had received preoperative radiotherapy to reduce tumor burden before tumor excision. After tumor ablation, the remaining stump of thoracic esophagus appeared fibrotic and ischemic. The pedicled colon transposition method was used to prevent the anastomotic leakage. The pedicled colon flap was harvested via open laparotomy and based on middle colic artery. The cephalic end of colon flap was connected to the cervical neo-esophagus, and the caudal end was connected to jejunum. Blood supply of the colon flap was supercharged with anastomosis of its pedicles with neck vessels.

RESULTS: The average duration of flap harvest was 7 hours. No anastomotic leakage between cervical neo-esophagus and thoracic esophagus was noted postoperatively in either group. All patients can resume oral intake. Regarding the intra-abdominal complications, only transient

diarrhea was noted in 88% of patients for one month.

CONCLUSION: For patients receiving pharyngoesophageal reconstructions and preoperative radiation therapy, a pedicled colon transposition method would be a feasible method to treat or prevent the anastomotic leakage between cervical neo-esophagus and thoracic esophagus.

Free Fibula Mandible Reconstruction for Osteoradionecrosis is More Challenging than for Primary Cancer

Abstract Presenter
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INTRODUCTION: Osteoradionecrosis (ORN) of the mandible is an unfortunate possible sequela of radiotherapy for head and neck cancer. In advanced cases of ORN, mandibulectomy and free fibula flap reconstruction is required. We hypothesized that patients undergoing fibula free flap reconstruction of ORN mandibulectomy pose unique challenges and experience more complications than patients undergoing fibula free flaps after oncologic mandibulectomy.

METHODS: After IRB approval, we reviewed a database of all free fibula flaps for mandible reconstruction from April 2005 through October 2019. Patient and surgical characteristics and post-operative outcomes were compared between reconstructions for mandibular ORN versus reconstructions for advanced stage malignancy involving the mandible (non-ORN). Propensity-matching was performed based on age, BMI, smoking status, preoperative chemotherapy and virtual surgery planning (VSP) use to control for bias. Multivariate logistic regression analysis was performed to define the relationship between patient and surgical factors and postoperative outcomes.

RESULTS: 479 patients met inclusion criteria (168 ORN versus 311 non-ORN). Propensity-matching yielded 159 patients in each group. ORN patients received more double-skin-island fibula flaps compared to non-OR patients (20.8% vs. 5.7%, $p<0.001$). Recipient artery other than the facial artery was utilized more commonly in ORN patients (42.1% vs. 17.0%, $p <0.001$). In the unmatched cohort, ORN patients had higher rates of delayed wound healing (26.2% vs. 16.8%, $p=0.01$) and surgical site infections (21.4% vs. 13.2%, $p=0.02$). Rates of flap loss, return to operating room, hematoma, operative time, and length of stay were similar between the groups. Multivariate logistic regression analysis showed ORN to be an independent risk factor

for delayed wound healing.

CONCLUSION: Our analysis supports our hypothesis that free fibula flap mandible reconstruction for ORN is more challenging than reconstruction for de novo malignancy, often requiring two skin islands for both intraoral and extraoral resurfacing and unconventional recipient vessels due to previous history of neck dissection and radiotherapy. ORN patients also experience more delayed wound healing compared to non-ORN patients.

Alterations of Senescence-Associated Markers in Non-Syndromic Cleft Lip and Palate

Abstract Presenter
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BACKGROUND: Non-syndromic cleft lip and palate (NSCL/P) is one of the most common craniofacial anomalies with multifactorial genetic and environmental etiologies. Senescence, as indicated by senescence-associated markers, including Alu methylation, AGE, RAGE and p16 expressions may be the pathogenesis of NSCL/P. However, link between those senescence-associated markers and the severity of NSCL/P has not been investigated. Thus, the present study aimed to explore the association of senescence-associated markers and the severity of NSCL/P.

METHODS: Prospective cohort study was conducted from January 2022 to January 2023. The Alu methylation and aging marker, as indicated by AGE, RAGE and p16 expression, were examined in NSCL/P patients and their mothers. The NSCL/P white blood cells (WBCs)-Alu methylation were evaluated in three phases of patients, including 0-3 months old, 3-6 months old (cheiloplasty), and 9-12 months old (palatoplasty). WBCs-Alu methylation of mothers was examined only at the first visit. We also investigated for tissue specific Alu methylation, such as lip and palate from discarded tissues in cheiloplasty and palatoplasty.

RESULTS: 39 NSCL/P patients (cleft lip only (CLO: n=6); cleft palate only (CPO: n=9); cleft lip with palate (CL/P: n=24) and their mothers were enrolled. 48.7% of patients were male. Our RESULTS showed that an increase in RAGE expression of WBCs-patients was positively correlated with severity of cleft subtypes ($p<0.05$). In mother, an increase in WBCs-Alu methylation was observed in CL/P group, compared with CPO group, whereas WBCs-Alu

methylation was not different between CLO and CPO groups. However, mean WBCs-Alu methylation in patients were 64.3 +/- 2.9%, 66.0 +/- 1.8%, 61.8 +/- 6.0% for CLO, CPO, CLP, respectively (p >0.05). For tissue Alu methylation, mean Alu methylation were 62.2 +/- 4.1%, 66.1 +/- 5.3% for lip and palatal tissues, respectively, and there was not statistically significant between groups. We found no significant correlation between senescence-associated markers in tissues and cleft specific subtypes.

CONCLUSIONS: Our findings suggest a link between systemic aging-senescence-associated markers in patients, increased WBCs-Alu methylation in mothers, and the severity of NSCL/P. Therefore, NSCL/P pathogenesis may be influenced by the maternal aging process and senescence of the patients.

THE FOUR LINE ALGORITHM FOR THE TREATMENT OF UNILATERAL CLEFT LIP

Abstract Presenter
Franklin Paredes Garrido MD

Several factors affect the outcome of the treatment of the Unilateral Cleft Lip, some of these, like the surgeon`s expertise, are hard to evaluate, some others can be better evaluated objectively, such as the cleft severity index and the surgical technique used.

MATERIALS AND METHODS: This study includes the patients, both private and from Operation Smile, treated by the MD participants, and it has two parts. The retrospective part studies the medical records of 298 patients with unilateral cleft lip treated from January 2015 to December 2017, it correlates the photographs, surgical technique, and evolution of the patients. In the prospective part, we applied the Algorithm proposed in this paper in 136 patients treated from January 2018 to December 2019.

RESULTS: In the retrospective part, all the cases were correlated with the case-technique analysis. Using this results, we formulate the Four Line Algorithm. In the prospective part we applied the algorithm and, after the results analysis, we confirm its applicability and feasibility.

DISCUSSION: Even though the cleft severity in the Unilateral Cleft Lip is an important prognostic factor, the RESULTS of this study show that there are not universal surgical techniques. The Four Line Algorithm proposes to use a case specific surgical technique to achieve the best functional and esthetic result for our patients.

3 D Computer Navigation in Acute Zygomatic Complex Fractures: Does it Add Value?

Abstract Presenter
Atul Parashar MD

INTRODUCTION: Zygoma plays an important role in facial aesthetics by determining facial width and malar projection. Primary objective of Zygomatico -Maxillary Complex (ZMC) fracture management is to restore the facial contour by accurate reduction and fixation of ZMC. The accuracy of fracture reduction depends largely on the surgeon and can be potentially compromised by incomplete visualization of all ZMC articulations. 3 D surgical navigation is a tool which can be helpful in achieving accurate reduction of three-dimensional structure like ZMC. We evaluated the application of CT image-guided 3D navigation system in zygoma fractures

MATERIALS & METHODS: A prospective case control study was conducted among patients with unilateral zygoma fractures presenting in the acute setting to Level I trauma center. We divided the patients in study group, where fracture reduction was done under CT-image guided 3D navigation; and the control group, in whom, no navigation assistance was provided. HRCT scan of face with 3D reconstruction with 1 mm cuts was done preoperatively for Case and Control Group. However, virtual planning in BrainLAB iPLAN navigation software was done in the study group only This involved mirroring an individually defined 3D segment of the unaffected side into the affected side and defining a virtual correction, thus creating an ideal unilateral reconstruction. The points used for confirming accuracy were FMT (Most lateral point of the frontozygomatic suture), MP (Most anterior point of the zygoma) and ZTL (Most inferior point of the zygomatico-temporal suture). The accuracy of reduction was confirmed intraoperatively by using 3D navigation guide and only when path of navigation probe coincided with the fracture fragment edges in a desired position, reduction was considered to be accurate. In the control group, clinical judgement and experience were the only guides for accuracy of reduction intra-operatively. Study outcomes were assessed both radiologically and clinically. For radiological assessment, mean difference in the distance of selected points FMT, MP and ZTL on fractured side from normal side was calculated pre operatively and postoperatively in both the groups and analysed. For clinical assessment, standardised photographs were taken after 3-month post-operative period in both the groups. Scoring of photographs was done by trained blinded observer using Holmes and Mathews grading system of malar asymmetry and analysed.

RESULTS AND OBSERVATIONS: 16 patients in study group and 15 patients in control group completed three monthly follow up. The mean surgical deviation of all the three points i.e., FMT, MP and ZTL in both the groups preoperatively were similar. Hence both the groups had comparable displacement of ZMC. After surgical correction, there was no statistically significant difference between the reduction accuracy between both groups at all the three points (p-value 0.947,0.824 and 0.525 for FMT, MP and ZTL respectively). Similarly, no statistical difference (p- value 0.802) was found in photographic assessment of control and study group. CONCLUSIONs: In the present study, we did not find any additional advantage of using 3D navigation system in terms of accuracy of fracture reduction as confirmed by postoperative HRCT evaluation and photographic evaluation.

The Implementation of 3D Printing in Pediatric Craniofacial Surgery: A Systematic Review

Abstract Presenter
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BACKGROUND AND PURPOSE: Three-dimensional (3D) printing has demonstrated efficacy in areas such as surgical planning, intraoperative guide creation, and custom implant creation. As this technology becomes more accessible, its use in specific fields deserves further attention. We sought to perform a systematic review of the implementation of 3D printing in pediatric craniofacial surgery, as none had previously been performed, to determine how this technology is being used most often and if there are any demonstrable benefits to its use.

METHODS: A systematic review was conducted according to Cochrane and PRISMA guidelines. PubMed, Embase, Cochrane library and Clinicaltrials.gov were queried with combinations of the terms: 3D printing, craniofacial, surgery, pediatric. This returned 34 non-duplicate studies that underwent screening for inclusion. Inclusion criteria included all original human studies containing patients <18 years old implementing 3D printing to aid in craniofacial surgery. Of those screened, eight studies were deemed irrelevant to the topic and 19 studies were excluded for wrong study design, wrong patient population, and wrong intervention or outcomes. Seven studies were included in the final review. JBI Critical Appraisal Checklists were utilized for grading as only case reports and series had been published and met eligibility criteria during review, with risk of bias inheritably high. Study selection, data extraction, and grading were performed independently by two authors.

RESULTS: A total of seven studies (three case series and four case reports) were included. All were published between January 2017 to December 2022. The total population included was 73 patients. Average age was 6.76 years, and 50.7% of patients were male. The average length of reported follow-up was 16.32 months.

All studies addressed patients with different disease processes including craniosynostosis, cleft lip/palate, and mandibular hypoplasia. 3D printing was used to create models for mock surgery in two studies, custom intraoperative cutting guides (CGs) or molds in six studies, and to print custom cranioplasty implants in two studies. Most studies reported the specific 3D printing technology used.

All studies concluded that the use of 3D printing was beneficial, with no reported adverse events related to its use. Two case series directly assessed the accuracy of the 3D printed CGs and determined it was acceptable and within historical comparison. Four other studies included statements on improved accuracy due to the guides used. Five studies noted reduced operating time due to the implementation of 3D printed materials. One report estimated this led to cost savings of 10,800 €. Two studies noted reduced intraoperative blood loss, and one felt that the use of 3D printed materials led to a shorter hospitalization compared to previous cases.

CONCLUSIONS:
Despite the limitations of the current literature, all studies concluded that the use of 3D printing in pediatric craniofacial surgery was beneficial. The most common use in this population was for creating custom intraoperative guides. All studies included patients with different craniofacial diseases demonstrating a variety of applications. Definitive CONCLUSIONs on the benefits of 3D printing in pediatric craniofacial surgery cannot be made until further controlled research is performed.

Endoscopic approach with an innovative mini-trocar for forehead osteoma excision

Abstract Presenter
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Traditionally the forehead bony lesion is approached through either forehead skin directly or coronal incision, both incisions may leave prominent scar. Endoscopic approach may provide a minimal invasive way to deal with this disease while having a concern of potential soft tissue injury from the high-speed burr. We present a case of 35-year-old female with multiple frontal bone osteomas successfully removed via two small hairline incisions with the help of otorhinolaryngological system and an innovative mini-trocar. Significant improvement of forehead shape with minimal scars were observed at eighteen-month follow-up. This innovative and easily manipulating techniques may help surgeons to achieve better outcome when treating frontal bone osteoma endoscopically

(I am not able to upload Surgical Video which can show more clearly about the innovative procedure)

Congenital Orbital Anomalies: A Novel Classification Scheme

Abstract Presenter
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INTRODUCTION: Congenital orbital anomalies are challenging to characterize and manage due to the wide spectrum of pathology with variability in morphology, etiology, and severity. Multiple classification systems exist within the realm of craniofacial deformities and have been successful in helping organize the discussion pertaining to and treatment of these defects. A comprehensive classification system allows for more effective communication and helps direct treatment of congenital orbital anomalies. We propose a novel system for classification of congenital orbital anomalies.

METHODS: A systematic review of the literature was performed to identify previously proposed congenital orbital anomaly classification systems. Studies were identified using a standardized search string on PubMed and then reviewed by two independent reviewers. Congenital orbital anomalies were categorized by deformities of orbital size, position, and shape.

RESULTS: The initial literature review yielded 983 RESULTS published between 1966 and 2023. Thirteen RESULTS were identified for more detailed review based on title and abstract. REFERENCESs cited in these manuscripts provided three additional RESULTS for detailed review. Seven RESULTS were excluded given inability to access full manuscript, all of which were published in 1990 or earlier. Of the remaining RESULTS, none proposed a classification system for congenital orbital anomalies. A comprehensive classification system was then devised. Type 1 was defined as disorders of size: Macro-orbit e.g., neurofibromatosis type 1; or Micro-orbit e.g. craniofacial microsomia, anophthalmia. Type 2 was defined as disorders of position: Hypertelorism e.g. Apert syndrome or Tessier 0-14 cleft; Hypotelorism e.g. metopic craniosynostosis; Pseudohypertelorism e.g. nasal dermoid cyst, frontonasal encephalocele; Vertical Orbital Dystopia e.g. craniofacial microsomia; or Cyclopia e.g. holoprosencephaly. Type 3 was defined as disorders of shape: Exorbitism e.g., Apert and Crouzon syndromes; or Orbital Clefts.

CONCLUSIONS: Congenital deformities of the orbit are complex, variable and can include rare phenotypes. Surgical management requires an understanding of etiology and morphology to determine an approach that successfully corrects the specific anatomic differences. The proposed classification system is practical and comprehensive. It addresses distinct abnormalities in morphology as opposed to individual syndromes which more directly guides treatment.

Demographic Disparities in Surgical Outcomes of Patients with Craniosynostosis

Abstract Presenter
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PURPOSE: Craniosynostosis is a complex condition requiring interventions between three and nine months of age. Literature notes delays in craniosynostosis intervention in underserved communities, however the effect of these delays remain unclear (1,2). This study evaluates the impact of demographics on outcomes of calvarial vault remodeling (CVR).

METHODS: All patients undergoing open surgical intervention for craniosynostosis from 2015-2022 at an urban academic institution were retrospectively reviewed. Patient demographics, age at presentation, age at surgery, intraoperative complications, and long-term outcomes were collected. Statistical analysis was performed in R studio 4.2.1.

RESULTS: Upon review, 263 patients underwent surgical intervention for craniosynostosis. Patients with public insurance underwent CVR later than those with private insurance (9.46±6.00 vs. 7.64±4.34, p=0.051). Patients of Asian, Middle Eastern, Hispanic racial groups underwent CVR later than other races (p=0.015, Table 1). Delayed repair (>9 months) was correlated with higher blood loss (318.8cc vs. 262.7cc, p=0.024), less blood transfused (313.7cc vs 351.5cc, p=0.058), and higher rates of postoperative helmet therapy (48.6% vs. 23.1%, p=0.031) compared to repair before nine months.

CONCLUSIONS:
Our RESULTS demonstrated delayed calvarial vault remodeling in patients of color and patients with public insurance. This delay in care was associated with increased intraoperative blood loss, trending lower subsequent transfusion volumes, and increased burden of postoperative care. In underserved populations, awareness and access to specialized reconstructive care may help mitigate negative intraoperative outcomes and additional postoperative interventions.

REFERENCESS:
1. Hauc SC, Junn A, Dinis J, Phillips S, Alperovich M. Disparities in Craniosynostosis Outcomes by Race and Insurance Status. J Craniofac Surg. 2022;33(1):121-124. doi:10.1097/SCS.0000000000008100
2. Badiee RK, Maru J, Yang SC, Alcon A, Rosenbluth G, Pomerantz JH. Racial and Socioeconomic Disparities in Prompt Craniosynostosis Workup and Treatment. J Craniofac Surg. 2022;33(8):2422-2426. doi:10.1097/SCS.0000000000008815

Efficacy of rhBMP-2 and Allograft Cellular Bone Matrix in the Revision of Alveolar Bone Grafting

Abstract Presenter

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YONG JONG PARK

BACKGROUND: The failure of cleft alveolar bone grafting (ABG) can lead to persistent alveolar fistula and inadequate bone stock to support the maxillary arch, causing difficulty in tooth eruption. The incidence of ABG failure has been reported to be as high as 18% in unilateral cleft lip and palate (UCLP) and 32% in bilateral cleft lip and palate (BCLP).1 Parents often desire an alternative to ABG with an autologous iliac crest graft, and cleft surgeons are utilizing an increased number of non-autologous materials.2 This study presents and assesses a novel approach that utilizes recombinant human bone morphogenic protein 2 (rhBMP-2) and allograft cellular bone matrix (CBM) for revision ABG.

METHODS: Retrospective review of 14 UCLP and 4 BCLP patients who had failed secondary ABG with autologous iliac crest graft followed by revision rhBMP-2 and allograft CBM ABG. Cone beam CT (CBCT) was evaluated before and six months after the revision ABG. Cleft volume analysis was performed using CBCT manual segmentation of each slice of the cleft non-bone area from the pyriform aperture rim to the marginal gingiva of adjacent teeth.

RESULTS: Revision surgery was at 11.45 ± 1.20 years in UCLP and 11.30 ± 1.82 years in BCLP. The revision surgery was found to have decreased operative times compared to the secondary ABG reconstruction in both UCLP and BCLP. The estimated blood loss was significantly lower in the UCLP group ($p<0.001$). Hospital length of stay was similar between secondary and revision ABG. No postoperative complications were found in either group. Repeat ABG surgery was required in one patient. Bergland score improved from 3.86 ± 0.53 to 1.21 ± 0.80 in the UCLP group and from 3.75 ± 0.50 to 1.00 ± 0.00 in the BCLP group. The cleft volume significantly decreased by 83.62 ± 9.78% ($p<0.001$) in UCLP and by 86.73 ± 13.65% ($p<0.001$) in the BCLP group.

CONCLUSIONS: Revision ABG with rhBMP-2 and allograft CBM have been shown to be a successful and reliable approach. This method decreased operative time, no postoperative complications, or increased hospital length of stay. All patients achieved clinically successful grafting with canine eruption, and no patients required further ABG operative intervention. Both UCLP and BCLP groups saw a significant decrease in cleft volume.

REFERENCES:

1. Goudy S, Lott D, Burton R, Wheeler J, Canady J. Secondary alveolar bone grafting: outcomes, revisions, and new applications. Cleft Palate Craniofac J. 2009;46(6):610-612
2. Qamar F, Cray Jr JJ, Halsey J, Rottgers SA. A survey of bone grafting practice patterns in north american cleft surgeons. Cleft Palate Craniofac J. 2022; Online ahead of print.

The Surgeon is Not Obsolete: Management of Pediatric Vascular Malformations of the Face

Abstract Presenter
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BACKGROUND: Vascular malformations (VM) of the face and scalp can cause aesthetic and clinical concerns. While the majority of treatment is laser or medically based, there are opportunities for surgical intervention. We need to understand indications for surgical resection and reconstruction for pediatric facial VM.

METHODS: This is a retrospective review of pediatric patients with vascular malformations treated surgically at UTHealth Pediatric Plastic Surgery Department from 2015 to 2021. The CPT codes related to vascular resection and reconstruction were queried in our billing database and the records were reviewed for location of lesion, indication for surgery, any prior treatment, and outcomes.

RESULTS: 34 pediatric patients were included in this study as having surgery for a VM on the face or scalp. The average age at initial consultation at our department was 5.8, with a median age of 3. The major symptoms and reasons for surgical intervention at presentations were growth (53%), ulceration or bleeding (26%), residual erythema or scarring (11%), pain (5%), and difficulty speaking/oral incompetence (12%). Prior to surgery, 25 of 34 patients tried some form of medical therapy, including systemic and topical beta blockers, laser treatment, sclerotherapy, and topical steroids. 28 of 34 patients had a surgical resection of their vascular malformation. 13 of 34 patients underwent laser treatment. Of the 28 patients who had surgical resection, 5 needed primary closure, 16 needed local tissue rearrangement or complex closure, 1 needed a local flap, and 1 needed a graft. Complications were rare and consisted of skin necrosis, remaining vascularity, swelling, and numbness.

CONCLUSIONS: VA's are relatively rare, and an understanding of the approach to the cosmetically and functionally sensitive area of the face is important, as medical management is not always successful. The questions remain: how do we maximize medical therapy, when do we intervene, and how do we do this in the least invasive manner with the best outcome? Creating a database, evaluating treatments and outcomes, and creating an algorithm for the facial subunits will help provide this insight and further education on treatment, clinical course, and outcomes.

A Pandemic in Review: The Impact on Craniomaxillofacial Surgical Volume

Abstract Presenter
Robert Moody

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INTRODUCTION: Craniomaxillofacial surgeries for pediatric patients with cleft lip and/or palate are usually tightly coordinated to include optimal timing during the child's development for more favorable outcomes. However, with the emergence of the COVID-19 pandemic, hospitals were forced to cancel or postpone elective cases to allocate resources for the predicted increase in patients with SARS-COV-2 viral infection. Due to its non-emergent status, the volume for cleft lip and/or palate repair was expected to decline after the start of the pandemic. The PURPOSE of this study is to evaluate the financial impacts by measuring the magnitude of the potential decline in cleft lip and/or palate repair, comparing case volume and hospital changes experienced in a single tertiary academic medical center before and after the start of the COVID-19 pandemic.

METHODS: Upon Institutional Review Board approval, using the Augusta University Medical Center's Financial Billing Data, 83 patients that underwent cleft lip and/or palate repair were queried. A time horizon of March 2019 to February 2021 was used to determine the caseload and incurred charges one year prior to the COVID pandemic (March 1st, 2019 to February 29th, 2020 as the pre-COVID cohort) compared to the two years following the start of the COVID pandemic (March 1st, 2020 to February 28th, 2022 as the post-COVID cohort). Statistical analysis to compare one year pre-COVID, one year post-COVID, and two years post-COVID was conducted using paired t-test and the Wilcoxon signed-rank test.

RESULTS: From the year prior to the onset of COVID-19 (March 2019 to February 2020) to the year following the onset of the pandemic (March 2020 to February 2021), there was a decrease in the number of cleft lip and/or palate repairs performed per month (2.75 to 1.42 per month, p-value 0.021). Additionally, there was a decrease in the per-month charges from the AU Health system for cleft lip/palate repair for the same time period ($13,334.75 to $7,237.17 per month, p-value 0.036). However, when analysis of cases and charges is extended to encompass the two years post-COVID (March 2020 to February 2022), these differences lose statistical significance (p-value 0.25, p-value 0.34), suggesting a return to pre-COVID baseline.

CONCLUSION: There was a statistically significant decrease in craniomaxillofacial surgery for cleft lip and/or palate repair in the 12 months following the start of the COVID-19 pandemic. Both the caseload and total charges decreased after March 2020, with a subsequent return to baseline after two years, reflecting the short-term effects of the COVID-19 pandemic on

pediatric craniomaxillofacial surgical volume. These findings highlight the potential impact of future pandemic events and its transient effects with expected return to pre-event volumes which can guide future hospital planning of resource allocation. Additionally, this can allow for the detection of post-COVID surge in orofacial cleft and/or palate cases that are likely to occur due to maternal immune activation.

Bipedicled palatoplasty for closure of large anterior palatal defect in a wide Veau II: a case series

Abstract Presenter
Katie Brown MD

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Closure of wide palatal defects poses an operative challenge. Many operative techniques have been described for both soft and hard palatal defects. The primary goal of palate repair is palatal lengthening and re-orientation of the palatal musculature to achieve velopharyngeal competence. While closure of soft palatal defects in wide clefts is typically achieved with utilization of lateral relaxing incisions, a multi-layered closure of anterior defects is more challenging. Oftentimes, palatal length must be sacrificed to allow for tension free closure of the repair, especially when the cleft is wide. This can result in poor velopharyngeal functioning and the need for additional speech surgeries.

With the most common and dreaded complication following repair being development of fistula, water-tight and tension-free closure of both oral and nasal layers of the anterior palate is necessary. We present a novel bipedicled anterior palatal flap was utilized for complete and tension-free closure of the palatal defects.
After closure of the soft palate utilizing the Furlow palatoplasty technique, attention is turned to the anterior palatal defect. A releasing incision is made along the lingual alveolar ridge and hard palatal oral mucosal flaps are elevated with 360-degree dissection of the greater palatine neurovascular bundles to achieve maximum central advancement. Instead of completing the anterior palatal repair at the level of the anterior aspect of the cleft, the anterior attachment of the palate is raised in a subperiosteal manner and dissected free and detached from the anterior palate at the incisive foramen. Dissection is carried posteriorly until the greater palatine neurovascular bundles are encountered bilaterally. The anterior palatal flap is then freely mobile and "U-shaped" receiving dual blood supply from bilateral greater palatine vessels. It is then sutured together in the midline as a bipedicled mucoperiosteal flap for a tension free closure of the oral mucosa.

Complete palatal closure in patients with a wide U-shaped cleft palate is a challenge. It has been widely studied that incidence of fistula development after palatoplasty is higher in patients with

wide cleft palates. This is often due to significant tension on the anterior palatal closure. Multiple techniques have been described to offload this tension in order to achieve adequate closure; however, there is no general consensus or gold standard recommendation. Here, we present a novel technique where raising a bipedicled anterior palatal mucoperiosteal flap with complete detachment from the hard palate anteriorly allowed for water-tight and tension free closure of very wide hard palatal defects. To our knowledge, this technique has not yet been described in the literature. The complete release of the mucoperiosteal flap from the hard palate offloaded significant tension to allow for adequate medial apposition. Additionally, freeing of all other tissue attachments while leaving this flap bipedicled ensured dual arterial inflow for adequate perfusion. Another benefit of this technique is the ability to set back the anterior palatal closure to a more posterior location, preventing inadvertent shortening of the palate that can happen when attempting closure of the anterior palate, thereby hoping to limit negative speech outcomes. While allowing some posterior positioning of the soft palate, this primary closure technique is still limited in the amount of retroposition able to be achieved. This report is limited with regards to long term follow up and how this repair will affect both speech outcomes and maxillary growth. While any cleft surgeon aims to provide a functional palate repair in terms of speech and mastication while preserving maxillary growth potential, no surgical protocols have yet to completely circumvent the hypoplastic maxilla. The amount to which this specific surgical procedure will limit maxillary and premaxillary growth is unknown at present but is a consideration when proceeding with this method.

Correlation Between Cephalometric Values and Quality of Sleep Following Hypoglossal Nerve Stimulation Surgery for the Treatment of Obstructive Sleep Apnea

Abstract Presenter
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PURPOSE: Hypoglossal nerve stimulation (HNS) is a relatively new surgical treatment for obstructive sleep apnea (OSA) for patients that failed positive airway pressure therapy. It's a less invasive technique with less recovery time than orthognathic surgery. Although HNS has shown long-term reduction in apnea-hypopnea index (AHI) scores and improved subjective quality of sleep, 37% of patients do not respond to treatment. Optimized patient selection and pre-operative counseling is therefore needed. This study aimed to determine if cephalometric measurements were associated with objective and subjective improvement in OSA symptoms following HNS.

MATERIALS AND METHODS: A single-center retrospective cohort study of 24 adult patients who underwent HNS from 2019-2022. Standard cephalometric values were obtained using post-operative lateral neck x-rays. A combined validated and non-validated telephone

survey regarding quality of life and sleep including the Epworth Sleepiness Scale (ESS) and Functional Outcomes of Sleep Questionnaire-10 (FOSQ-10) was conducted. Univariate analyses utilized Wilcoxon Signed-Rank Test and Spearman's Rho.

SUMMARY OF RESULTS: The median patient age was 58.6 [IQR:48.8-66.5] years with BMI of 28.9 [27.1-31.9]. The median baseline AHI score was 29 [21.3-39.2], with a titration score of 17.9 [8.7-30.4] and a significant change of -8.6 [-28.3-0.2] (P=0.0441). Baseline median ESS score was 11 [5.5-15.0] with a titration score of 4 [3.0-7.2] and a significant change of -6 [-9.8-2.0] (P=0.0010). Post-procedure survey participation was 70.8% with median follow-up of 377 [258-594] days. The median survey ESS was 7 [5.8-8.2] with a change of -4 [-8.8-2.0] compared to baseline (P=0.0141). The median survey FOSQ-10 score was 16.7 [14.1-17.2]. Patients reported high satisfaction with surgery and improved quality of sleep with median scores of 8 [8.0-9.2] and 8 [7.0-9.2] on Likert-10 scales. Increased sella-nasion-B-point (SNB) and decreased sella-nasion-mandibular-plane (SNM) angles (median 78.5 [76.8-81.0] & 36.5 [33.5-39.2)] degrees) were associated with improved FOSQ-10 (R=-0.9 and R=0.9, P=0.0379 for both). Greater mandibular length (median 13.8 [12.9-14.5] cm) was associated with lower ESS at baseline (R=-0.4, P=0.0398), and greater improvement at titration (R=-0.6, P=0.0142), and survey (R=-0.6, P=0.0172). No cephalometric values were significantly associated with AHI.

CONCLUSIONS: Patients who underwent HNS had an overall significant improvement in both objective and subjective OSA symptoms. However, those with smaller SNB angles and shorter mandibles did not have a significant change in AHI. Retrognathic patients may benefit more from orthognathic surgery for OSA treatment. To better counsel patients with OSA on treatment options, lateral cephalometric x-rays should be obtained as part of their initial work-up.

Prenatal Ultraviolet Exposure and Risk of Orofacial Clefting: A United States Birth Analysis

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PURPOSE: The etiology of orofacial clefts is thought to be multifactorial, consisting of both genetic and environmental factors. Among the environmental elements, maternal ultraviolet (UV) exposure has not been shown to influence the risk of orofacial clefting in newborns. In this study, we investigated the associations between prenatal UV doses – during the first trimester and during the three months prior to conception – and the odds of cleft lip with/without cleft palate (CLP) and cleft palate only (CPO) in the U.S. after controlling for demographic and other risk factors.

METHODS: The U.S. 2014 and 2015 Natality Data were utilized (n = 7,986,908). Births with missing data or simultaneous diagnoses of both CLP and CPO were excluded. Mean daily county-level population-weighted erythemally-weighted daily UV dose (EDD) was calculated over two specific periods for each live birth, namely the first trimester and the three months prior to conception. Multivariable logistic regression models were created to control for household demographics, prenatal care, maternal health, infant characteristics, and socioeconomic factors.

RESULTS: Of 7,692,735 live births included, 3,895 (0.05%) had CLP and 1,483 (0.02%) had CPO. Higher mean daily UV dose during the first trimester was associated with statistically significantly lower odds of CPO (AOR = 0.99 [0.99, 0.99], $p < 0.001$); however, this effect was not significant for CLP (AOR = 0.99 [0.99, 1.00], $p = 0.596$). The odds of CPO (AOR = 0.99 [0.99, 1.00], $p = 0.117$) and CLP (AOR = 1.00 [0.99, 1.00], $p = 0.357$) were independent of the mean prenatal daily UV dose during the three-month pre-conception period. The models confirmed several known risk/protective factors for CLP, including higher maternal education level (protective, AOR = 0.75 [0.64, 0.87], $p < 0.001$ for holders of bachelors' degree or above compared to non-high school graduates), delayed prenatal care (risk, AOR = 1.40 [1.18, 1.65], $p < 0.001$ for initiation of care in the third trimester compared to the first trimester), and maternal obesity (risk, AOR = 1.25 [1.14, 1.38], $p < 0.001$). Likewise, several risk factors for CPO were re-demonstrated, such as presence of other congenital disorders (AOR = 21.2 [16.5, 27.1], $p < 0.001$) and maternal gestational diabetes (AOR = 1.26 [1.01, 1.58], $p = 0.039$).

CONCLUSIONS: Higher daily maternal dose of UV during the first trimester was associated with decreased odds of CPO, but not CLP, after controlling for a comprehensive list of known and potential risk factors for orofacial clefting. However, UV dose during the three months prior to conception did not appear to be significantly linked to the risk of orofacial clefting. Given that palatogenesis occurs in the first trimester, our study suggested that UV and UV-mediated metabolic processes may be implicated in the embryologic events that influence palatal development and integrity. Further studies are needed to confirm this association and elucidate its mechanism.

Superiorly Based Posterior Pharyngeal Flaps: Management and Outcomes in the Treatment of Velopharyngeal Insufficiency

Abstract Presenter
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PURPOSE: Excess nasal air emission resulting from velopharyngeal insufficiency (VPI) impairs production of intelligible speech. Pharyngeal flap (PF) surgery is effective at improving velopharyngeal sufficiency, but historical literature shows a concerning prevalence rate of obstructive sleep apnea (OSA), reported as high as 20%. The PURPOSE of this study is to determine whether a protocol developed and implemented by our institution is successful in minimizing the risk of postoperative obstructive complications following PF surgery. We hypothesize that (1) pre-operative staged removal of significant adenotonsillar tissue along with (2) multiview videofluoroscopy to guide patient specific surgical approach via appropriately sized pharyngeal flaps can result in excellent speech outcomes while limiting occurrence of OSA.

METHODS: This was a retrospective chart review of all patients with VPI (ages 2-20) seen at the University of Rochester from 2015-2022 who underwent PF surgery to correct VPI. Nasopharyngoscopy was used for surgical planning and airway evaluation. All patients with tonsillar and adenoid hypertrophy underwent staged adenotonsillectomy at least 2 months before PF. Multiview videofluoroscopy was used to identify anatomic causes of VPI and to determine pharyngeal flap width. Patients underwent polysomnography and speech evaluation prior to and at least 6 months following PF surgery. Sleep studies were scored using the American Academy of Sleep Medicine Manual for Scoring Sleep guidelines. Speech evaluation was performed according to the Great Ormond Street Hospital Cleft Audit Protocol for Speech and Modified Pittsburgh Weighted Values for Speech Symptoms Associated with Velopharyngeal Incompetence score.

RESULTS: 41 children aged 8.5±4.1 years (range 4 to 18 years) were identified who underwent posterior pharyngeal flap surgery for VPI. This included 10 patients with 22q11.2 deletion and 4 patients with Pierre Robin Sequence. 39 patients had both pre- and post-operative speech data and underwent both a pre- and post-operative sleep study. Polysomnography showed no significant difference in obstructive apnea hypopnea index (O-AHI) following posterior pharyngeal flap surgery (O-AHI pre-op 1.3±1.2 events/hour; post-op 1.7±2.1 events/hour; $p=0.111$). Significant improvements in speech outcome was seen in patients who underwent PF (modified Pittsburgh score pre-op 11.52±1.37; post-op 1.09±2.35; $p<0.05$).

CONCLUSIONS: Utilization of preoperative staged adenotonsillectomy as well as patient specific pharyngeal flap dimensions RESULTS in effective resolution of velopharyngeal insufficiency and a low risk of OSA.

About Her: Understanding Facial Fractures in Women

Abstract Presenter
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BACKGROUND: Fractures of the facial bones in women are less common than in men in the United States. However, little is known about the epidemiology and characteristics of women who sustain facial fractures. Our aim was to describe the patient population of women who seek emergency care for facial fractures in the United States as well as the type and cost of care received in this setting.

METHODS: This is a retrospective cohort study using the 2019 National Emergency Department Sample. The inclusion criterion was a principal or secondary diagnosis of facial fracture. The primary outcome was the patient characteristics. The secondary outcomes were emergency department (ED) characteristics, discharge disposition, and total visit charges. Diagnoses and procedures were identified using the appropriate ICD10-CM codes. Outcomes were compared to men with adjustment for confounders using multivariate regression analysis.

RESULTS: 180,407 women presented to the ED with facial fractures, comprising 37% of all facial fracture encounters. Facial fracture was the principal diagnosis in two thirds of encounters, 31% of which were on weekends. Facial fractures rarely occurred during pregnancy (0.3%), but 16% were due to physical assault. The most common facial fracture locations were the nasal bones (29%), mandible (11%), maxillary/malar/zygoma (9%), orbit (8%), and skull and facial bone combination (5%), similar to men (p=0.55). The mean age was 53 years, which was significantly older than men (42 years, adjusted mean difference (aMD): 11.6 (11.0-12.0), p<0.01). Most women had Medicare insurance (40%, Private 27%, Medicaid 19%, self-pay 10%, other 4%), whereas most men were privately insured (29%, Medicaid 23%, self-pay 20%, Medicare 18%, other 8%, p<0.01). Similar to men (p>0.05), most women were adults (93%), from the lowest income quartiles ($1–$45,999: 30%, $46,000– $58,999: 24%, $59,000–$78,999: 23%, $79,000 or more: 22%), Caucasian (71%, African American 13%, Hispanic 10%, Other 4%, Asian 2%), and presented to large metropolitan area (53%, small metropolitan 33%, micropolitan 8%, other 5%), teaching (67%), southern (40%, midwest 23%, northeast 19%, west 19%), non-trauma (45%, trauma Level 1 24%, trauma Level 2 18%, trauma Level 3 13%), private nonprofit emergency departments (51%). Mortality rate was 1% and similar to men (p=0.84), but women were more likely to be discharged home (71% versus 65%, p=0.02). The average total ED charges were $9,740, which were less than men (aMD: $650 ($865 - $434) p=<0.01). The overall ED healthcare cost was $1.6 billion for 2019.

CONCLUSIONS: 37% of all ED facial fractures were encountered in women. Both women and men were most likely adult, Caucasian, from the lowest median income quartile, sustained nasal bone fractures, and presented to a southern, metropolitan, private nonprofit, non-trauma EDs. Women were older, more likely insured by Medicare and less likely by private insurance, discharged home, and had lower total ED charges than their male counterparts. However, the financial burden of emergency care for facial fracture among women was $1.6 billion.

Incidence and Characterization of Facial Lacerations in Emergency Departments in the United States

Abstract Presenter
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BACKGROUND: Facial laceration repairs are one of the most common procedures performed in the emergency department (ED). The goal of this study was to describe the patient's characteristics and healthcare cost associated with ED encounters for facial lacerations using the largest nationally representative database in the United States.

METHODS: This is a retrospective cohort study using the Nationwide Emergency Department Sample. The data was collected between January and December of 2019. Patients with either a primary or secondary diagnosis of facial laceration were included. The primary outcome was patient characteristics. The secondary outcomes were ED characteristics, number and type of procedures performed and total encounter charges. Diagnoses and procedures were identified using ICD-10 CM codes.

RESULTS: There were 2,518,758 ED encounters for facial lacerations in the United States. Of those, laceration was the chief complaint in 75%. 81% of lacerations were unintentional, 8% were due to assaults, and 4% due to suicidal attempts. The most common laceration location was the scalp (42%) followed by the lip (22%) and eyelid (21%). The mean patient age was 38 years. Most patients were adults (69%), male (62%), Caucasian (64%, African American 14%, Hispanic 14%, Other 6%, Asian 2%), from low income levels ($1–$45,999: 29%, $46,000–$58,999: 24%, $59,000–$78,999: 24%, $79,000 or more: 23%), with private insurance (32%, Medicaid 25%, Medicare 24%, self-pay 12%, other 6%). Most encounters were during summer (June, July, August) at large metropolitan areas with at least 1 million residents (52%, small metropolitan: 31%, micropolitan: 10%, other: 6%) at teaching hospitals (65%) located in the southern region of the United States (37%, Midwest: 23%, west: 21%, northeast: 19%). Almost half of the encounters were at non-trauma-designated hospitals (48%, Level 1 trauma center: 21%, Level 2 trauma center: 17%, Level 3 trauma center: 13%). The number of procedures during each encounter was: none: 4%, one: 17%, two: 23%, three: 11%, four: 11, five or more: 34%. The most frequent laceration repair was a simple repair of superficial wounds of the face, ears, eyelids, nose, lips, and/or mucous membranes 2.5 cm or less, followed by simple repair of superficial wounds to the scalp, neck, axillae, external genitalia, trunk, and/or extremities 2.5 cm or less. Most emergency department visits were billed as a Level 3 encounter, followed by Level 2 then Level 4. CT scan of the head was the most common imaging modality. Of all patients, 8% were admitted to the hospital and 87% were discharged home. The average total emergency department charges were $5,730.

CONCLUSIONS: Facial laceration is a common complaint in the emergency department. It is costly, and disproportionately affects the impoverished. Most lacerations are classified as simple, less than 2.5 cm, involving the scalp, unintentional, with the discharge disposition being home. Thus, exploring pathways to treat facial lacerations outside of the ED can potentially reduce both healthcare cost and ED crowding.

Close

Predictive Risk Factors for Postoperative Complications Among Cleft Lip and Cleft Palate Patients

Abstract Presenter
Alice Yau

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BACKGROUND: Although complication rates after primary cleft procedures are low, the potential for life-threatening risks still exists. We sought to understand how predictive risk factors for complications differ between cleft palate patients and cleft lip patients. We hypothesize that longer operative and anesthesia time and presence of comorbidities will increase the risk for postoperative complications in both groups of patients.

METHODS: The 2016-2021 ACS NSQIP® Pediatric database was utilized to identify all patients between 0-2 years of age with a postoperative diagnosis of cleft palate or cleft lip. Risk factors studied included demographics, presence of comorbidities, and anesthesia/operative times. Outcome variables included reintubation, wound complications, unplanned readmission, and reoperation. Multivariable logistic regression assessed risk factors associated with postoperative complications, controlling for multiple variables.

RESULTS: A total of 8,283 patients were included, of which 61% were cleft palate patients. Among cleft palate patients, 85.7% underwent palatoplasty, 46% had at least one comorbidity, and mean age was 1 year. Longer anesthesia time was significantly associated with increased risk for wound complications (OR 1.007, p=.003), reintubation (OR 1.008, p=.003), and reoperation (OR 1.007, p=.01). Preoperative ASA Class 3 classification was significantly associated with unplanned readmissions (OR 2.34, p=.02), and Native Hawaiian or Pacific Islander ancestry was significantly associated with reoperation (OR 11.477, p=.002). Among cleft lip patients, 81.5% underwent repair of cleft lip, 24.8% had at least one comorbidity, and mean age was 5.5 months. Presence of comorbidities was associated with increased risk of readmissions (OR 2.228, p=.016), and older age was associated with increased risk of reoperation (OR 4.26, p=.003). There were no risk factors predictive for wound complications or adverse airway events in cleft lip patients.

CONCLUSION: Among these subgroups of cleft patients, differing risk factors are predictive for postoperative complications. Longer anesthesia time leads to increased postoperative complications in cleft palate patients while presence of comorbidities and older age leads to increased postoperative complications in cleft lip patients. Minimizing anesthesia time and optimizing the patient's surgical status may improve safety and outcomes for cleft palate and cleft lip patients.

Predictive Factors for Outcomes in Alloplastic Cranioplasty: A Review of 101 Cases

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PURPOSE: Alloplastic cranioplasty is a common procedure in cranial reconstruction, yet factors related to success and failure have been incompletely characterized [1,2]. Further, few robust studies exist specifically for alloplastic cranioplasty, and literature is scant regarding aesthetic outcomes [3-5]. The PURPOSE of this study is to describe factors related to both functional and aesthetic outcomes in alloplastic cranioplasty.

METHODS: The authors conducted a large-scale retrospective review of patients who underwent alloplastic cranioplasty between 2014 and 2021 at a single institution. Information was collected regarding demographics, wound healing comorbidities, indications for surgery, and outcomes. A multivariable regression analysis was used to determine variables associated with operative complications, implant explantation, and contour defects.

RESULTS: One hundred and one patients underwent alloplastic cranioplasty. Fifty-seven percent of patients had at least one wound healing comorbidity. The most frequent indications for surgery were trauma (44%), cerebrovascular accident (18%), and cancer (18%). The operative complication rate was 24%. Thirty-six percent of patients had a postoperative contour deformity, and 16% underwent additional surgeries related to cosmesis. At a median follow-up of 1.5 years, 99% of patients maintained either a primary (84%) or secondarily placed (15%) implant. On multivariable analysis, level four ASA classification (OR 5.9, 95% CI [1.03, 33.1], $p = 0.05$) and heavy alcohol use (OR 6.2, 95% CI [1.5, 25.5], $p = 0.01$) were significantly associated with complications. Cerebrovascular accident (CVA) was associated with contour defects (OR 6.1, 95% CI [1.2, 30.7], $p = 0.03$). The only factor associated with explantation was heavy alcohol use ($p = 0.05$).

CONCLUSION: This study reviews predictive factors for complications, implant explantation, and poor contour outcomes after alloplastic cranioplasty in a large cohort. RESULTS indicate that alloplastic cranioplasty can have a high success rate with reasonable aesthetic outcomes.

Bibliography:
1. Zanotti B, Zingaretti N, Verlicchi A, Robiony M, Alfieri A, Parodi PC. Cranioplasty: Review of Materials. J Craniofac Surg. 2016;27(8):2061-2072. doi:10.1097/SCS.0000000000003025
2. Johnston DT, Lohmeier SJ, Langdell HC, et al. Current Concepts in Cranial Reconstruction: Review of Alloplastic Materials. Plast Reconstr Surg Glob Open. 2022;10(8).
3. Satapathy D, Nadeem M, Shukla DP, Prabhuraj AR, Devi BI. Cosmetic Outcome of Cranioplasty After Decompressive Craniectomy-An Overlooked Aspect. World Neurosurg. 2019;129:e81-e86. doi:10.1016/j.wneu.2019.05.027
4. Bader ER, Kobets AJ, Ammar A, Goodrich JT. Factors predicting complications following cranioplasty. J Cranio-Maxillofac Surg. 2022;50(2):134-139. doi:10.1016/j.jcms.2021.08.001
5. Reddy S, Khalifian S, Flores JM, et al. Clinical Outcomes in Cranioplasty: Risk Factors and Choice of Reconstructive Material. Plast Reconstr Surg. 2014;133(4):864. doi:10.1097/PRS.0000000000000013

A Deeper Understanding of the Subplatysmal Anatomy with Aging: A Longitudinal Imaging Study

Abstract Presenter
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PURPOSE: The subplatysmal structures, such as the submandibular gland (SMG) and paired anterior digastric muscles (ADM), play an essential role in submandibular fullness with aging. Subsequently, this has resulted in various targeted procedures to enhance and rejuvenate the aging neck. However, the current understanding of the volumetric changes is limited, with findings isolated to individual structures. Therefore, this study aimed to expand the current knowledge of the age-associated changes to the SMG and ADM by comprehensively examining the changes in the surrounding anatomy while longitudinally incorporating patient-related factors to improve the aesthetic surgeon's understanding, foster shared decision-making and optimize outcomes.

METHODS: This retrospective, longitudinal study utilized MRI segmentation (Vitrea) to calculate the SMG's total and inframandibular volume, along with the ADM and mandibular volume. Additionally, various morphological measurements were obtained and analyzed along

with patient demographics to track their longitudinal effects on the SMG and ADM comprehensively. Subjects with at least two prior MRIs of the head and neck separated by a minimum of four years were used for analysis. Those with pathology or artifact compromising the anatomy of interest were excluded.

RESULTS: The study included 75 subjects (Females n=41; Males n=34) with a mean age of 51.9 (range 7-81) and 59.3 (range 16-89) at time point one and two, respectively (mean difference 7.4; range 4-15). Mean total SMG and inframandibular SMG volume increased from 8.34 ml and 7.01 ml to 9.03 ml ($p < 0.001$) and 7.81 ml ($p < 0.001$), respectively. The inframandibular SMG volume had a mean rate of change of 0.12 ml/year, with the majority of growth occurring before 60 years. The total and inframandibular height of the gland increased from 33.93 mm and 26.21 mm to 34.82 mm and 27.91 mm ($p < 0.0001$). The mean ADM volume increased from 2.41 ml to 2.43 ml, while the length of the ADM (digastric fossa to hyoid bone) increased from 37.12 mm to 39.42 mm ($p = 0.0072$). The mean vertical distance between the inferior border of the mandible and the hyoid bone increased from 22.80 mm to 24.44 mm ($p = 0.83$). Male gender and overweight or obese BMI class were associated with significantly higher SMG and ADM volumes.

CONCLUSION: Our findings suggest that the SMG increases in volume, with most growth occurring before age 60 and greater than 70% of the gland below the mandible in subjects 50 years and older. Further, while the volume of the ADMs did not increase with age, the length of the ADM and the distance between the mandible and hyoid bone did, which may contribute to the perceived bulkiness of the muscle belly. Rejuvenating the aging neck has been and will continue to be a timeless pursuit sought out by many. As we deepen the current understanding of the age-related changes to the deep subplatysmal structures, the plastic surgeon may approach each patient with increased insight to develop a patient-centered operative plan, ideally targeting their less-than-ideal anatomy and optimizing outcomes following cervical rejuvenation.

Concurrent Clefts of the Lip and Secondary Palate: Systematic Review, Early Description, and Classification

Abstract Presenter
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PURPOSE: Cleft lip and palate (CLP) are typically continuous, extending from the lip through the primary and secondary palate. Concurrent clefts, which we define here as a cleft lip and incomplete cleft of the hard and soft palate, are a distinct and uncommon pattern of orofacial clefts.

METHODS AND MATERIALS: An IRB approved retrospective review of all patients with orofacial clefts at a single institution between October 2015 to June 2022 was completed. Patients with CL and an incomplete cleft of the soft and hard palate were included. Children with complete CLP were excluded. Data collected comprised demographics, descriptive cleft information, and events of pregnancy.

A systematic review of the literature by PRISMA guidelines was completed from 2015-2022 using PubMed.

SUMMARY OF RESULTS: Of 421 children managed, thirty-three (7.8%) had concurrent clefts; 25(76%) male, 23(70%) non-Hispanic, and all conceived naturally. Three had a family history of clefting, three diagnosed with associated syndrome, and four had maternal drug or medication exposure. Twenty-seven (82%) children were conceived in Oregon spanning 14 counties with the highest commonality being Marion County (n=7, 22%). Concurrent clefts were classified as:
Unilateral or Bilateral, complete, or incomplete CL with:
Type I: Submucous cleft
Type II: Soft palate cleft
Type III: Incomplete cleft of the soft and hard palate
Within our study, 30.3% (n=10) were Type I, 33.3% (n=11) were Type 2, and 36.4% (n=12) were Type 3.

Upon review of 356 articles, three were identified with data regarding concurrent clefting. Two articles investigated potential genetic links in this population, without incidence rate reported. One article analyzed velopharyngeal function in submucous cleft patients, reporting 28.99% with associated CL, fitting our description of Type I.1

CONCLUSIONS:
Concurrent clefts are a rare presentation whose existence is increasingly being recognized. Larger studies are needed to further understand this entity of orofacial clefts and potential etiology.

REFERENCES:
1. Heng Y, Chunli G, Bing S, Yang L, Jingtao L. Hua Xi Kou Qiang Yi Xue Za Zhi. 2016;34(5):488-492. doi:10.7518/hxkq.2016.05.011

The Nasal Morphological Changes After Secondary Rhinoplasty In Cleft Lip And Palate Patients: An Anthropometric Analysis

Abstract Presenter
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INTRODUCTION: The soft tissue, cartilage and bone structures are affected as a whole in secondary rhinoplasty of cleft lip and palate patients, which is final step of rehabilitation in this group. The aim of this study is to evaluate the postoperative anthropometric changes of nose in patients with cleft lip and palate undergoing secondary rhinoplasty.

MATERIAL AND METHODS: The study included patients with unilateral cleft lip and palate who were older than 18 years and underwent secondary rhinoplasty between 2020 and 2022. Patients with bilateral cleft lip and palate and patients with surgeries affecting nasal morphology, such as distraction osteogenesis, were excluded from the study. Nasofrontal angle was measured by the Goode method, and projection, nasal root length with alar width values, and columella length were measured from cephalometric points using the ImageJ program on preoperative and postoperative photographs. Data analysis was performed with the SPSS v22.0. Paired-t test was used to analyze and a value of $p<0.05$ was considered statistically significant.

RESULTS: Totally 21 patients (7 males, 14 females) enrolled in study were found to have left unilateral cleft lip in 12 and right in 9. Mean age of patients was 21.81±2.48 years and mean postoperative follow-up time was 14.33±8.08 months. Mean preoperative and postoperative nasofrontal angles were 140.43±1.48, and 132.14±1.64 degrees. Mean preoperative nasal projection percentages were 58.10±1.63% whereas postoperative were 67.00±2.18%. Preoperative and postoperative ratios of nasal root and nasal alar width distances were 53.71±1.34% and 46.48±1.28%, respectively. Preoperative and postoperative means of columella lengths were 9.62±0.34 mm and 13.00±0.38 mm, respectively and there was a statistically significant difference for all preoperative and postoperative mean values in between each two groups.

DISCUSSION: All patients were operated on by a single surgeon using standard open rhinoplasty technique. It was observed that mean value of nasofrontal angles decreased from 140 degrees to 132 degrees, approaching normal values, but RESULTS did not reach the range of 115-130 degrees, which is considered as normal mean value in the literature. Reduction in the ratio of distance of nasal root and width of nasal base indicates that a narrower and symmetrical nasal structure is achieved in postoperative period when dorsal aesthetic lines are taken into account. With the effect of medialization and narrowing of nostrils which are more lateralized and wider especially on cleft side, columella distances increased postoperatively, and nostril asymmetry was eliminated. According to measurements with Goode method, better nasal projection was obtained with an increase of approximately 10% in the postoperative period (1).

CONCLUSION: Secondary rhinoplasty surgery in young adult patients with cleft lip and palate is a very important step in a long treatment process that lasts for years for these patients, as it allows elimination of external deformities of the nose, ensuring nasal harmony and achieving a more symmetrical and natural appearance of nose, as well as eliminating breathing problems.
1-Huempfner-Hierl H, Hemprich A, Hierl T. RESULTS of a prospective anthropometric and

functional study about aesthetics and nasal respiration after secondary rhinoplasty in cleft lip and palate patients. J Craniofac Surg. 2009;20 Suppl 2:1863-1875

Risk Factors and Outcomes of Paediatric Facial Fractures Associated with Dental Injuries

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Pediatric craniofacial fractures associated with dental injuries present a complex challenge to the surgical provider. This study sought to perform a thorough epidemiologic review of pediatric craniofacial fractures associated with dental injuries in order to outline their most common clinical presentation, stratify their risk factors and analyse their outcomes.

Following a review of 4,451 pediatric patients with craniofacial fractures who received their care at a single institution between 2005 to 2021, 377 patients (8.4 % of patients overall) were identified to suffer from concomitant dental injuries. Demographic indicators, clinical details, imaging results, and outcomes data were reviewed and compared to those of patients without dental injuries. P-values <0.05 were considered statistically significant.

In summary, patients were 10.8 years old on average at the time of presentation, with a statistically significant change in the age distribution due to an equal representation of children aged 6 to 12 years and 12 to 18 years (40.3 % respectively). Neither the distribution of sex (65.2 % male) nor that of race (81.2 % Caucasian, 16.2 % African American) significantly differed from that of patients without associated dental injuries. The most common mechanisms of injury were distinct from the group of comparison, with an overrepresentation of motor vehicle accidents and non-motorized vehicle accidents (21.8 % and 19.4 %, respectively). 10.3% of patients were diagnosed with a concussion during their stay. The most commonly obtained imaging was CT (20.7%). As anticipated, the most common locations of craniofacial fractures associated with dental injuries were the mandible (49.3%) and maxilla (43.2 %), followed by the orbit (14.1%) and skull (9.5%). A significantly larger number of children had discernible soft tissue injuries (69.2%). Most dental injuries were maxillary (59.1%), with only 1.9% of patients being diagnosed with combined maxillary and mandibular dental injuries. The most common dental injuries were root fractures (26.5%) and crown fractures (24.9%). Of interest, a significantly larger proportion of patients with facial fractures and concomitant dental injuries were transferred to our trauma centre from an outside hospital (41.4 %) and admitted (58.6 %). The number of children requiring an ICU admission however was not influenced (5.8 %). A

smaller percentage of the patients affected by concomitant dental injuries received surgical intervention for their fractures (31.6% vs. 48.4%).

In summary, pediatric patients with craniofacial fractures and associated dental injuries proved to be distinct in both epidemiology and management. Our study was able to highlight a feature of dentition-related fracture locations that we believe may impact the classification of compound fracture patterns (specifically Le Fort fractures) in the future. Despite their relative infrequency, our study highlights the requirement for continued review of the triaging and management of craniofacial fractures associated with dental injuries in the future.

Microvascular Free Flap Head and Neck Reconstruction: The Utility of the Modified Frailty Five-Item Index

Abstract Presenter
Sammy Othman MD

BACKGROUND: Microvascular free tissue transfer is a common tool for the reconstruction of oncologic head and neck defects. Adequate pre-operative assessment can aid in appropriate risk stratification for post-operative complications. The modified five-item frailty index (mFI-5) is a validated for risk-assessment scale, however, its utility in head and neck free flap reconstruction is unknown when compared to other common risk factors.

METHODS: A retrospective, single institution chart review (2017-2020) was performed. Patient demographics, defect and repair characteristics, pre- and peri-operative factors, and flap outcomes were recorded. A "high" modified five-item frailty index score was defined as greater than 2. The total score, as well as other patient factors, were correlated to post-operative flap complications.

RESULTS: A total of 214 subjects were deemed appropriate for conclusion. The mean age was 64.5 ± There were an even number of males (52.8%) and females (47.2%). A fifth of subjects (20.8%) underwent pre-operative radiotherapy. There were 21 cases (9.8%) of complete flap loss. A total of 34 patients (29.4%) experienced any post-operative complication related to flap outcomes. An elevated mFI-5 was significantly associated with a higher overall rate of postoperative complications (39.7 vs. 29.4%, $p< 0.019$) and total flap loss (16.7% vs. 6.6%, $p<0.033$). Preoperative radiation was found to be associated with an increased complication rate. ($p<0.003$).

CONCLUSION: The mFI-5 may be a potentially significant tool in the risk stratification of patients undergoing head and neck free flap reconstruction as opposed to commonly utilized risk factors. Appropriate pre-operative assessment may help tailor patient care pre-operatively.

Assessment and Validation of Preoperative Three-Dimensional Volumetric Analysis to Predict Bone Graft Success in Alveolar Cleft Reconstruction

Abstract Presenter
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PURPOSE: The success of alveolar bone grafting (ABG) can be attributed to many factors, such as graft type, preoperative cleft size, cleft phenotype, and timing of repair. We aim to identify the best predictor for successful bony bridge formation in ABG.

MATERIALS AND METHODS: A retrospective review evaluated patients undergoing ABG from 2009-2022. Patients with genetic syndromes, bilateral clefts, and missing postoperative cone beam computed tomography (CBCT) were excluded. Cleft width and 3-dimensional volumetric defect sizes were calculated using preoperative CBCT scans. Alveolar cleft volume was calculated based on a trapezoidal pyramid model. The area under the curve (AUC) using receiver-operating characteristic analysis was used to determine the strongest predictor of graft success among age at ABG, preoperative cleft width, and volumetric size. AUC>0.700 was the marker of adequate sensitivity and specificity.

RESULTS: Of the 517 patients screened, 70 met inclusion criteria and underwent ABG with ICBG (n=32) or rhBMP-2/DBM (n=38). There was no significant difference in failure of bony bridge formation between graft types (ICBG: 25.0%, rhBMP-2/DBM: 39.5%; p=0.768). Across both cohorts, preoperative volumetric cleft size had a significantly larger AUC (0.843) compared to preoperative cleft width (0.695; p=0.007) and age (0.649; p=0.024). Individually, volumetric cleft size strongly predicted graft failure among both ICBG (AUC: 0.953) and rhBMP-2/DBM (AUC: 0.780) cohorts. The average follow-up time after ABG among all patients was 26.9±15.9 months.

CONCLUSION: Our findings identified preoperative volumetric cleft size as the strongest predictor for successful bony bridge formation in ABG. Clinicians can prioritize volumetric analysis via CBCT to better predict graft failure among clefts of varying sizes.

“Prevalence of risk factors associated with the development of facial ulcers in patients pronated by COVID-19”

Abstract Presenter
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INTRODUCTION: The prone position is a postural adjunctive therapy, which improves ventilation in patients with ARDS and is widely used to treat severe COVID-19. However, its prolonged use generates a sustained mechanical load on bone structures, causing the origin of facial ulcers, multiple factors are involved in this mediate complication.
Goals: Describe the prevalence and the most important risk factors for developing facial pressure ulcers in prone patients with severe COVID-19.

METHODS: An observational, cross-sectional, retrospective and descriptive study was carried out in patients who were treated with the prone position as an adjuvant for severe COVID-19, in the Plastic and Reconstructive Surgery service of the ISSEMYM Toluca Medical Center, in a period of 2 years.

RESULTS: 54 patients included. The most affected site was the malar eminence 52%. The associated factors were diabetes, smoking and obesity. A positive linear correlation was observed between ulcer grade and C-reactive protein, D-dimer and norepinephrine dose ($p<0.001$). The use of norepinephrine was significantly associated with the development of ulcers 95.7% vs 14.3% in those who did not use it ($p<0.001$); OR 6.7.

CONCLUSION: Multiple risk factors contributed to the development of facial ulcers. It is necessary to perform clinical guidelines for prevention and early treatment, recommending the application of pressure redistributing devices and prophylactic dressings to protect these patients in an early and timely manner. As well as the adequate dosage of the metabolic and pharmacological requirements.

A Novel Algorithm for Pediatric Microsurgical Maxillary and Mandibular Reconstruction Using Custom Endoprosthesis

Abstract Presenter
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BACKGROUND: Treatment of pediatric maxillary and mandibular tumors can cause significant morbidity due to post-resection disfiguration and masticatory dysfunction. The need to balance restoration of form and function without compromising growth at both the recipient and donor sites poses a particular reconstructive challenge. This study evaluates reconstructive outcomes of custom endoprosthesis (CE) compared to stock reconstructions and introduces an algorithm using CE to optimize available free tissue transfer.

METHODS: An IRB-approved retrospective review of all patients undergoing maxillary or mandibular reconstruction at a tertiary care pediatric hospital between 2016 and 2022 was performed. The following variables including demographics (ie. age at surgery, gender, race), pathologic diagnosis, reconstructive details (ie. volume of resection, reconstruction type) and postoperative outcomes (ie. hardware exposure, hardware failure, major complications, revisions) were collected. Patients undergoing mandibular reconstruction were analyzed separately from maxillary reconstruction. Patients were compared based on reconstruction type.

RESULTS: During the study period, 51 patients (37 mandible, 14 maxilla) underwent CE/stock reconstruction combined with osteocutaneous, fasciocutaneous, and axial patterned local flaps. 37.2% (n=19) of patients received CE. Overall, the rates of hardware failure and exposure were 25.5% (n=13) and 27.5% (n=14), respectively. Of patients undergoing mandibular reconstruction there were significantly lower rates of hardware exposure (14.3% vs. 47.8%, p=0.018), failure (7.1% vs. 43.5%, p=0.048), major complications (28.6% vs 78.2%, p=0.008), and revisions (11.1% vs 50.0% , p=0.002) in the CE cohort compared to the stock reconstruction cohort. The rates of hardware failure, hardware exposure, major complications and revisions did not significantly differ based on reconstruction type in the maxilla cohort. However, CEs reconstructed significantly larger defects (179.5 cm3 vs 74.6 cm3, p = 0.020) than stock reconstructions. The average follow up time was 1.90 ± 1.80 years.

CONCLUSION: Pediatric maxillary and mandibular masses present a reconstructive challenge that could benefit from CE with free tissue transfer, optimizing the reconstructive ladder. Deviating from stock reconstructions, we propose an algorithm based on surgical practice patterns considering anatomical location, extent of resection, and patient age for free tissue selection. This algorithm yielded improved mandibular reconstructive outcomes and insignificant differences in maxillary reconstruction despite larger resection defects. Overall, incorporating

CE into pediatric maxillary and mandibular reconstruction may facilitate improved form and function following pediatric maxilla and mandible tumor ablation.

Aesthetic outcomes of primary cleft lip repair utilizing 2-octyl cyanoacrylate liquid and a self-adhesive polyester mesh

Abstract Presenter
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BACKGROUND: The method of epidermal closure during cleft lip repair is important to consider, as it may affect both cosmetic outcomes as well as patient comfort. Historically, this has most commonly been performed with permanent suture that requires subsequent removal, which is not well tolerated in infants. Previous studies have demonstrated comparable scar outcomes with the use of 2-octyl cyanoacrylate topical skin adhesive (Dermabond) in lieu of permanent suture.1,2 Tissue glue provides the benefit of avoiding patient discomfort during suture removal. This study investigated the use of an alternative product, 2-octyl cyanoacrylate liquid with a self-adhesive polyester mesh (Dermabond Prineo). To our knowledge, no previous study has investigated the outcomes of Dermabond Prineo for cleft lip repair closures. The PURPOSE of this study is to compare the aesthetic outcomes and the complication rate between Dermabond Prineo and typical suture techniques.

METHODS: In nine consecutive cleft lip repairs, the epidermal closure was performed with permanent suture, and in the subsequent nine consecutive cleft lip repairs, the epidermal closure was performed with Dermabond Prineo. Rates of complications, including incisional dehiscence, scar hypertrophy, and scar widening, were compared between the two groups. Aesthetic scar outcomes were investigated via photographic analysis. All post-operative photographs were taken as part of the patients' routine post-operative care. Photographs were graded by a panel of plastic surgeons utilizing the Manchester scar scale, a validated scar scoring system that has previously been used to assess the appearance of cleft lip repair scars. Fischer Exact Tests were performed to determine significance for rates of complications between the two groups. Wilcoxon Rank-Sum tests were performed to determine significance for the photographic analysis.

RESULTS: Three patients in the permanent suture group had documented scar-related complications, including one instance of incisional dehiscence, two instances of scar hypertrophy, and one instance of scar widening. One patient in the Dermabond Prineo group had documented scar-related complications, including incisional dehiscence and scar hypertrophy. No statistically significant difference was found in complication rates between the two groups. Average post-operative photographs that underwent review were taken 3.1 years after the cleft lip repair. One patient in the permanent suture group was lost to follow up and did not have post-

operative photographs available for review. No statistically significant difference was found in aesthetic scar scores between the two groups.

CONCLUSION: Overall, the use of Dermabond Prineo offers a comparable outcome to the use of permanent suture in epidermal closure of cleft lip repairs. The RESULTS of lip closure were found to be equivalent for both scar-related complication rates as well as for aesthetic outcomes.

REFERENCES:
1. Magee WP, Ajkay N, Githae B, Rosenblum RS. Use of octyl-2-cyanoacrylate in cleft lip repair. Ann Plast Surg. 2003;50:1–5.

2. Spauwen, PH, de Laat WA, Hartman, EH. Octyl-2-cyanoacrylate tissue glue (Dermabond) versus Monocryl 6 x 0 Sutures in lip closure. The Cleft palate-craniofacial journal: official publication of the American Cleft Palate-Craniofacial Association; 43(5): 625-627.

Updated Reasons for Unplanned Hardware Removal from the Craniofacial Skeleton: A 20-Year Retrospective Study

Abstract Presenter
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BACKGROUND: The reasons for hardware removal from the craniofacial skeleton continue to evolve alongside advancements in surgical technique and hardware technology. The University of Michigan experience delineating the reasons for removal of rigid internal fixation devices from the craniofacial skeleton were originally published in a highly referenced article 25 years ago. The PURPOSE of this study is to compare past (1989-1995) and present (2000-2020) reasons for unplanned hardware removal from the craniofacial skeleton among patients treated by the University of Michigan Section of Plastic Surgery.

METHODS: A retrospective review study was designed and approved by the University of Michigan Institutional Review Board. Patients who underwent craniofacial hardware removal by the University of Michigan Section of Plastic Surgery between 2000-2020 were included. Patients who underwent planned craniofacial hardware removal (i.e. arch bars) were excluded. Patient demographics, indication for hardware placement and removal, and length of hardware time in situ were documented. Data from the original paper was obtained1. A descriptive

statistical analysis was performed using Microsoft Excel.

RESULTS: One hundred fifty-five patients were included in this study. The gender profile remained similar between time periods (51.6% male from 1989-1995 compared to 52.7% from 2000-2020). The average age at hardware placement reduced from 32.3 + 17.3 years (1989-1995) to 28.0 + 19.9 years (2000-2020). Importantly, the length of time with hardware in situ increased from 12.6 + 17.1 months (1989-1995) to 25.1 + 54.2 months (2000-2020). The most common reasons for hardware placement from 1989 to 1995 were motor vehicle accidents (50.9%) and congenital deformity (20.0%), compared to congenital deformity (31.5%) and motor vehicle accident (28.2%) from 2000 to 2020. Moreover, the most common reasons for hardware removal shifted from palpable/prominent hardware (34.5%) and pain/paresthesia (29.1%) in the original patient series to exposure (33.7%) and palpable/prominent hardware (27.2%) in the recent patient series.

CONCLUSIONS: Reasons for craniofacial hardware removal substantially changed over the last 10 – 15 years. Patients who underwent open reduction and internal fixation of the craniofacial skeleton between 2000 and 2020 also retained hardware for two times longer than patients who underwent open reduction and internal fixation between 1989 and 1995. Potential contributors to the increased length of hardware time in situ and the differing reasons for hardware removal over time include improved surgical technique, increased emphasis on irrigation, decreased size of plates and screws, advent of self-tapping and self-drilling screws, and increased surgeon experience. Further studies are warranted to correlate preoperative risk factors and subsequent reasons for hardware removal.

REFERENCE:

1. Orringer JS, Barcelona V, Buchman SR. Reasons for removal of rigid internal fixation in craniofacial surgery. J Craniofac Surg. 1998;9:40-44

Evaluating Hearing Outcomes in Microtia Reconstruction: A Comparison Meta-Analysis Study Using Bone Anchored Hearing Aids (BAHA) versus Canaloplasty with Middle Ear Ossicular Reconstruction

Abstract Presenter
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BACKGROUND: Binaural hearing restoration after external ear reconstruction in patients with microtia continues to be sought by patients and families. The optimal surgical method for

hearing restoration using either bone anchored hearing aids (BAHA) or canaloplasty with middle ear ossicular reconstruction (MEOR) remains understudied.

METHODS: A retrospective metanalysis evaluating hearing outcomes after BAHA implantation or MEOR was performed using PUBMED, EMBASE and MEDLINE following PRISMA guidelines (79 studies). Primary predictor variables were auricular reconstruction method (alloplastic vs. autologous) and type/timing of hearing intervention. Primary outcomes were hearing outcomes, and postoperative complications. Hearing success was defined as postintervention pure tone average (PTA), air-bone gap (ABG) <30 dB, hearing gain >30 dB. Standard statistical analysis was performed with SPSS27 software.

RESULTS: Twelve studies (n=847 hearing procedures) with a mean MINORS score of 12.67 (10-16) met inclusion criteria. BAHA implantation was associated with two times greater odds of obtaining a successful hearing outcome than canaloplasty (OR 2.07, 95% CI, 1.69-2.53). Of the 60 cases with comparable complication outcome data, the median number of complications was 1 for canaloplasty cases (n=17) vs. 0 for BAHA cases (n=43) (p=0.001). In subset analysis, mean hearing gain after BAHA implantation (n=17) was 37.4 dB (95% CI, 32.9- 41.9) vs. 24.9 dB (95% CI, 18.3- 31.5) for canaloplasty cases (n=17) (p=.002).

CONCLUSION: BAHA implantation after microtia reconstruction was associated with superior hearing outcomes and lower complications than canaloplasty in a large retrospective meta-analysis cohort study. Subset analysis also identified superior hearing improvement and overall improved hearing using BAHA

Wegener's (Polyangiitis) Granulomatosis Nasal Reconstruction: Lasting Structural Support with Cadaveric Cartilage

BACKGROUND: Granulomatosis with polyangitis (Wegener's) is known to cause progressive nasal collapse related to the dissolution of septal and other nasal cartilage resulting in nasal obstruction and severe central face deformity. It is not known whether structural reconstruction with cadaveric cartilage is comparable to traditional rib cartilage grafting. To investigate this, we compared the 2 reconstructive groups for long term stability.

METHODS: Patients suffering from Granulomatosis with polyangitis (Wegener's) were divided into 2 groups: 1) Costocartilaginous and 2) Cadaveric cartilage (MTF) based on reconstructive grafts (''L-strut', alar rim, spreaders, tip grafts) used for structural reconstruction (n=55) performed consecutively over an 18-year period. Outcome assessment was based on perioperative complications, long term stability (1-year), need for revisions, and patient-reported functional and aesthetic outcomes using the SCHNOS validated questionnaire (Student's T-test used).

RESULTS: Perioperative complications (infection, exposed cartilage, need for take-back) was similar in the 2 groups (9% and 7%) and related to preoperative severity (increased SCHNOS score); all with scores more than 40)-likely related to soft tissue contraction. With patient

reported outcomes, cadaveric cartilage was slightly superior (lower scores) to costocartilaginous with postoperative scores: (11.1+2 vs 19.2+4) and improvement (greater difference between preoperative to postoperative scores (36.3+9 vs 29.9+7). Donor site morbidity was a concern postoperative pain after costocartilaginous grafts. Cost matrix analysis showed costocartilaginous cases were 9% more costly due to increased operative time, despite the additional cadaveric cost.

CONCLUSIONS: Cadaveric cartilage structural reconstruction was comparable to traditional rib cartilage for Polyangiitis Granulomatosis nasal reconstruction and provided patients with major functional and cosmetic improvement.

Abstract Presenter
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Safety of intubation METHODS in patients with LeFort pattern facial trauma

Abstract Presenter
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BACKGROUND: Patients with complex facial trauma often require surgical intervention to restore facial height, width, and occlusion. There is some uncertainty regarding safety of nasotracheal intubation in this patient population. This investigation compares complications and surgical outcomes in complex facial trauma patients across prevalent intubation METHODS.

METHODS: A retrospective chart review was conducted for patients who were surgically treated for LeFort I-III fractures between 2018-2022. Data collection included age, fracture pattern, intubation method, performing surgical service, and any complications. Data on cribriform plate fractures and CSF leaks were also collected. Complications specific to intubation method were examined between fracture type and intubation method. Statistical analysis included equivalence testing with one-sided t-tests, F-distribution tests, and Chi-squared analysis. Binomial multivariate regression was performed to investigate relationships of patient variables in relation to patient outcomes, including having at least one complication, and having to return to the OR. Model selection was performed using Akaike Information Criterion with a backward selection method. P-values less than 0.05 were considered statistically significant.

RESULTS: 60 patients were identified who were surgically treated for LeFort I-III from 2018-2022. Intubation-related complications included bleeding from airway site, malocclusion, and need for hardware removal. There were 21 complications total, with 11 complications related to intubation method utilized on individual patients. 14 patients had cribriform plate fractures, suggesting skull base instability, and 12 patients had a CSF leak at some point in their treatment course. 68% of patients who received tracheostomy had evidence of either cribriform plate fracture or CSF, while the remaining 32% had evidence of neither sign of skull base instability. The pooled complication rate in patients who had tracheostomy and nasotracheal intubation were proved to be statistically similar (p-value =0.019), a trend maintained when examining only patients with LeFort II or III fractures (p-value=0.040). There was no difference between overall complications and surgical service. However, the likelihood of a complication requiring a return to OR was significantly higher in tracheostomy compared to other intubation METHODS (p=0.043). Further, RESULTS of the binomial multivariate regression demonstrated that tracheostomy was a significant predictor for a complication requiring return to the OR (p=0.0250) when accounting for age, Le Fort fracture pattern, number of fractures, CSF leak, and cribriform plate fracture.

CONCLUSION: Nasotracheal intubation had statistically equivalent complication rates to tracheostomy, demonstrating safe use in patients with complex facial trauma. Tracheostomy has an associated cosmetic scar burden, and complications more frequently required an OR return. Nasotracheal intubation could present an equally safe alternative, with lower morbidity than tracheostomy.

Propeller Buccal Myomucosal Flap: anatomical study and preliminary experience in 25 primary cleft palate reconstructions.

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PURPOSE: Buccal artery myomucosal (BAMM) flap has been well-described for cleft palate (CP) reconstruction. However, anatomic investigation and application of an islanded propeller flap have not been reported in the literature.

METHODS: Anatomical study was performed using Indocyanine green, red and blue latex injected directly into the buccal pedicle of 22 fresh hemifacial cadavers. Then, clinical analysis of the senior authors' (BBG, AR) experience with 25 consecutive primary cleft palate reconstructions utilizing a propeller islanded BAMM flap was conducted to assess palatal healing and flap outcomes.

RESULTS: Mean buccal artery diameter was 0.95±0.29mm. Neurovascular pedicle entered the flap 11.38±2.87mm anterior to the pterygomandibular raphe. Buccal artery advanced inside the flap as much as 66.8%±6.0% of the total flap length. All reconstructions were performed using Furlow palatoplasty. 36 flaps were utilized in 25 patients (mean age 478d). The mean maximum cleft width was 11.7 mm. Mean BAMM flap width was 1.2 cm and 11 cases utilized bilateral flaps. The flap always reached the contralateral pillar and the buccal nerve was always preserved. Mean follow-up was 400 days. There were 2/36 flap loss. In both flap losses, pedicles were aggressively dissected. 4/36 flaps underwent revision surgery for flap debulking.

CONCLUSIONS: This study shows that the buccal pedicle is the main blood supply to the flap and this modification allows preservation of the sensory innervation. The contralateral pillar could always be reached improving the traditional advancement and inset. Traditional extensive propeller flap dissection should be avoided in these neonates to avoid vascular compromise.

Prolabium Mucose Flap for Enhancing Volume at Buccal Sulcus in Bilateral Cleft Lip Repair. A 5-year experience and description of surgical technique.

Abstract Presenter
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INTRODUCTION: Bilateral cleft lip is the most severe manifestation of orofacial clefts. Due to its complexity, it is a surgical challenge to obtain good aesthetic and functional RESULTS. Dr. Mario Mendoza surgical technique was described by Pérez and Arámburo in 2018. [1-4] This technique was adopted by our institution as a standard of surgical care in bilateral cleft lip repair. Prolabium mucose flap for enhancing volume is obtained by the dissection of the remaining of mucosa from the prolabium and premaxilla. It combines remaining tissue that previously was trimmed off and now we use it to project a more aesthetic lip.

MATERIALS AND METHODS: Our group reviewed 50 cases of bilateral cleft lip repair with our Institution surgical technique from 2018 to 2023 at the Plastic and Reconstructive Surgery

Department at Dr. Manuel Gea González Hospital in Mexico City. Medical records and patients preop and postop photographies were reviewed retrospectively. We divided our RESULTS in a subjective manner as "Fair", "Good" and "Excellent" RESULTS. Evaluation of RESULTS were measure by a plastic surgeon and cleft lip surgical expert.

RESULTS: 50 patients were analyzed 33 male (66%) and 17 women (33%). We did not experience any complication during surgical intervention. 45 patients out of the 50 (90%) were evaluated as "Excellent result", 3 (6%) as "Good" result and 2 (4%) as "Fair" result.

CONCLUSION: This addition to previously described "Mendoza" surgical repair for bilateral cleft lip by Pérez and Arámburo is an example on how a good surgical tecnique can be improven for a better aesthetic and functional outcome. Using prolabium mucose flap can add volume, better projection for the lip and lenghtens buccal sulcus in bilateral cleft lip repair.

REFERENCES:
Pérez González A, Arámburo-García R. Anatomical Reconstruction in Bilateral Cleft Lip With Mendoza Technique. J Craniofac Surg. 2018 Sep;29(6):1452-1456.
Zhang JX, Arneja JS. Evidence-based medicine: the bilateral cleft lip repair. Plast Reconstr Surg 2017;140:152e–165e
Germec-Cakan D, et al. Interdisciplinary treatment of a patient with bilateral cleft lip and palate and congenitally missing and transposed teeth. Am J Orthod Dentofacial Orthop 2014;145:381–392
Queiroz SB, et al. Bilateral incomplete cleft lip. J Craniofac Surg 2016;27:e288–e289

What are the Most Important Criteria for a Successful Craniofacial Surgery Fellowship Match?

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PURPOSE: Characteristics of successful craniofacial surgery fellowship candidates is limited amongst the literature. This study aims to highlight the criteria that successful applicants met and the characteristics that influenced their craniofacial surgery fellowship match.

METHODS AND MATERIALS: An anonymous 24-question survey was distributed in 2021 to ACGME-accredited craniofacial surgery fellowship match applicants who successfully

secured a position. The electronic survey was prepared using the online Qualtrics survey platform. The questionnaire elucidated factors that influenced the application process including, demographics, any previously completed fellowships, society memberships, degrees held, academic productivity, interview numbers, rank order, COVID-19's influence, debt accrued, any offers of employment, and future career plans.

RESULTS: A total of 18 out of 30 responses were received from craniofacial surgery fellowship applicants for a response rate of 60%. Respondents were mostly male (67%), non-Hispanic Caucasian (39%), and from integrated residency programs (67%). The large proportion of respondents did not complete a previous fellowship (67%), belonged to multiple national societies, and held no additional degrees (61%). With respect to academic productivity, the median (IQR) manuscripts published at the time of application were 25 (5-35), conference publications at time of application 10 (4-45), and h-index at time of application 9 (9-10). Five (28%) respondents completed a research year during their time in residency. A total of 6 (33%) applicants completed an away rotation, with 28% completing one or two away rotations. COVID-19 impacted the ability to visit in 61% of cases and reduced clinical exposure to elective cleft and craniofacial surgery for 50% of applicants. Craniofacial surgery fellowship applicants applied to a total of 5-10 programs in 8 (28%) cases with the same proportion applying to 15+ programs (28%). Applicants applying identified a desire for an academic career (10, 56%) and hybrid career (8, 44%). With regard to employment offers after graduation, 7 (39%) had received offers. Financial debt was as high at $400,000 in 2 (11%) cases and between $50,000-400,000 in 8 (44%) cases.

CONCLUSIONS: This study provides characteristics of successful craniofacial surgery fellowship applicants. We highlight some of the criteria important to programs when it comes to selecting qualified applicants. Given the limited data available, we hope that applicants, fellowship directors, and residency programs find this information useful as they prepare for the craniofacial surgery match.

Six-year Long-term Outcomes of Computer-Designed Polyetheretherketone (PEEK) Implants in Cranial Defect Reconstruction

Abstract Presenter
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BACKGROUND: In cranial defect reconstruction, the goals are to re-establish mechanical protection of the brain, restore normal appearance, and in some cases, normalize intracranial

pressure. The choice of material used to remodel the cranium (cranioplasty) has changed throughout the years. The use of autologous bone was thought to result in less complications and risk for infection than alloplastic materials; however, recent studies have reported difficulty with shaping, limited donor site availability, donor site morbidity, and higher infection and bone resorption rates when compared to alloplastic materials. As a result, the use of alloplastic materials (such as polyetheretherketone (PEEK)) has risen in popularity. Computer-designed PEEK implants are patient specific implants designed to precisely match the skull defect, have thermal conductivity, chemical resistance, are light weight, stiff, durable, do not intervene with radiographic imaging, and require minimal to no intraoperative shaping. While there have been several studies comparing and analyzing PEEK implants to other techniques, long-term outcomes remain to be studied. The aim of this study was to report six-year long-term clinical outcomes after PEEK implant cranioplasty.

METHODS: A retrospective chart review of patients undergoing PEEK cranioplasty was performed. Inclusion criteria included patients of at least 18 years of age, follow-up time of at least 24 months, and cranioplasty with a PEEK implant between January 2007 and January 2023.

RESULTS: Twenty-three patients who underwent PEEK cranioplasty between June 2008 and March 2023 by a single surgeon were included in this study. Mean postoperative follow-up was 75 months (range 29.60-173.87). Indications for PEEK cranioplasty included loss of an infected autologous bone flap (12), infected methyl methacrylate (2), infected titanium mesh (1), secondary reconstruction (3), and primary reconstruction (5). The average time between latest cranial procedure and PEEK cranioplasty was 10.5 months. Mean surgical time was 152 minutes. Additional intraoperative shaping of the PEEK implant was necessary in three cases, but there was no difference in time from CT model creation to PEEK cranioplasty between patients who required intraoperative shaping and patients that did not (70 days vs. 89 days; $p = 0.69$). The mean postoperative hospital stay was 4 days. One patient developed an open wound secondary to direct trauma to the scalp with subsequent implant infection one month post-operatively. This patient underwent a second PEEK implant 12 months later with no complications to this date. A second patient underwent two PEEK implant insertions- both complicated by development of subdural hematomas (mean of 2.5 days post-operatively) and implant infection (mean of 7.5 months post-operatively). A third patient presented with a delayed infection four years post-operatively. Three patients who preoperatively presented with syndrome of the trephined improved in neurological function after PEEK cranioplasty.

CONCLUSIONS: In this study, most complications occurred within a year of PEEK implant placement. At a mean follow-up of 6 years, PEEK implants continued to provide durable and stable protection while maintaining aesthetics.

Scope of Practice: A Survey of ASMS Members Regarding Opinions on Necessary Qualifications to Perform Orthognathic Surgery

Abstract Presenter

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INTRODUCTION: Debates surrounding scope of practice are ongoing in numerous medical disciplines and are especially controversial regarding fields where such scope of practice overlaps between those of different certifications. While in recent years these discussions have largely centered on the process and integrity of board certification regarding cosmetic procedures, there is ongoing controversy in other specialties, namely reconstructive surgery. There are no agreed upon "ideal" qualifications for those who perform orthognathic surgery, and debates surrounding the issue remain intense–something evidenced by the strong opposition of the American Society of Plastic Surgeons (ASPS) to efforts by the American Board of Oral and Maxillofacial Surgery (ABOMS) to join the American Board of Medical Specialties (ABMS), the largest physician-led specialty certification organization in the United States. Some argue that those who are trained in oral surgery, or are "double boarded", possess greater qualifications to perform orthognathic procedures than plastic surgeons who are not formally trained in oral surgery, even though their scope of practice and training overlaps significantly with their aforementioned counterparts. The PURPOSE of this study was to gather opinions regarding overall competency in orthognathic procedures from a population of surgeons practicing in this field with diverse training backgrounds.

METHODS: A voluntary online survey, without offer of incentives, was sent out to active members of the ASMS. This 26-question survey, of which, gathered demographic information including level of experience, credentials, training (dental, oral, and/or surgery), etc., was intended to address ASMS member opinions on whether qualification to perform orthognathic surgery differs depending upon if an individual trained in plastic surgery or oromaxillofacial surgery. RESULTS were obtained using a 5 degree scale (strongly agree, agree, somewhat agree, somewhat disagree, strongly disagree) and analyzed for statistical significance.

RESULTS: Survey responses were collected from 77 (23.3%) of the 330 active members of the ASMS, however, three responses were missing from the questions pertaining to orthognathic surgery qualification opinions. Subdivided by degree, 1 respondent (1.3%) obtained a degree of dental surgery (DDS), 21 respondents (27.3%) obtained both a DDS and medical degree (MD), and 55 respondents (71.4%) obtained a MD. While 100% of DDS holding surgeons and 77.4% of MD/DDS surgeons agree, to at least some extent, that single-boarded surgeons do not understand teeth and how they are to be optimally positioned in orthognathic surgery, only 30.8% of MD surgeons at least somewhat agree. Additionally, 0% of DDS surgeons, and 9.62% of MD surgeons believed that it is impossible for single-board plastic surgeons to achieve consistently good orthognathic surgery RESULTS, as opposed to 57.1% of MD/DDS surgeons.

Finally, 0% of DDS surgeons, 15.4% of MD surgeons, and 52.4% of MD/DDS surgeons believe patients who see a single-board plastic surgeon should obtain a second opinion from a double-boarded or oral surgeon.

CONCLUSIONS: Given the survey data, the large majority of respondents believe that oral surgery training or plastic surgery training does not give an individual greater qualification to perform, or succeed in, orthognathic surgery. However, there is a discrepancy in opinions between double-boarded degree holders and single-boarded degree holders. These RESULTS provide insight into the opinions of ASMS members on qualifications for orthognathic surgery and suggest that quality is the most important aspect of training. Future studies can look to redress ASMS members in hopes of improving survey response rate, keeping opinions up to date, and include a larger number of double boarded and DDS surgeons.

Orbital Dysmorphology Corrects after Endoscopic Strip Craniectomy in Metopic Craniosynostosis

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PURPOSE: Children with metopic craniosynostosis have distinct orbital morphologies that include perceived hypotelorism and a symmetric, elliptical orbital aperture canted toward the synostosed suture. Though less commonly seen than in unicoronal craniosynostosis, this can result in strabismus and other ocular imbalances.1 The PURPOSE of this study is to quantify the anthropometric changes in the orbits of children with metopic craniosynostosis after endoscopic strip craniectomy (ESC).

METHODS: A retrospective, cohort study was performed at a single center over a three-year (2020 – 2023) period. Using Slicer (slicer.org) software, a three-dimensional craniometric analysis was performed on preoperative and one-year postoperative CT images of children with metopic craniosynostosis. All participants were treated with ESC and orthotic helmet therapy. All patients had post-operative CT scans documenting complete suturectomy. Eleven craniometric parameters were obtained. The modified orbital index (MOI),2, 3 a measure of severity of the Harlequin deformity in unicoronal synostosis, is used to quantify changes in the minor and major axes of the symmetric ellipse-shaped orbital apertures in metopic synostosis.

RESULTS: Nine children (5 males, 4 females) were included in the study. The mean age at pre-operative CT scan was 69.3 days (± 9.5 days). The mean age at post-operative CT scan was 14.8 months (± 0.5 months), for a mean follow-up of 11.4 months after ESC. 36 orbits were analyzed. MOI improved from 0.83 (± 0.01) pre-operatively to 0.93 (±0.01; $p<0.0001$) post-operatively.

Over the study period, the greater axis of the orbital aperture increased in length by 8.50%; the lesser axis increased by 24.1% ($p < 0.0001$). There were no significant differences in the vertical orbital cone, horizontal orbital cone, or zygomaticofrontal angles. Intercanthal (dacryon-dacryon) distance increased from 13.39 mm (± 0.71 mm) to 17.34 mm (±0.75 mm; $p=0.0002$), orbital volume increased from 11910 mm3 (± 515 mm3) to 18490 mm3 (± 526 mm3; $p<0.0001$). These latter parameters follow a normal trajectory when compared to historical data.4 No patients in our series had pre- or post-operative strabismus.

CONCLUSIONS: Endoscopic strip craniectomy allows for differential growth of the orbits, favoring the lesser axis of the ellipse, such that the two axes approximate the same length. This creates a more symmetric, square-shaped orbital aperture at one year post-operatively. Further study is required to compare to age- and sex-matched controls and to better understand the impact of ESC on intercanthal distance as well ocular muscle imbalances in this patient population.

REFERENCES:
1. Nguyen, T.B., Shock, L.A., Missoi, T.G., Muzaffar, A.R. (2016). Incidence of amblyopia and its risk factors in children with isolated metopic craniosynostosis. Cleft Palate-Craniofacial J., 53(1), e14-e17.
2. Beckett, J. S., Persing, J. A., & Steinbacher, D. M. (2013). Bilateral orbital dysmorphology in unicoronal synostosis. Plast Reconstr Surg, 131(1), 125-130.
3. Showalter, B. M., David, L. R., Argenta, L. C., & Thompson, J. T. (2012). Influence of frontosphenoidal suture synostosis on skull dysmorphology in unicoronal suture synostosis. J Craniofac Surg, 23(6), 1709-1712.
4. Hoyte, D.A. (1997). Growth of the orbit. In Dixon, A.D., Hoyte D.A. & Ronning O. Fundamentals of craniofacial growth. CRC Press.

Association Between Pulmonary Embolism Rates and BMI Greater Than 25 In Patients Undergoing Free Flap Reconstruction of The Head and Neck Region

Abstract Presenter
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PURPOSE: To evaluate the impact of body mass index (BMI) on pulmonary embolism (PE) rates within 30 days of surgery in patients undergoing head and neck reconstruction with free tissue transfer and receiving prophylactic enoxaparin.

METHODS: This retrospective cohort study included patients who underwent head and neck reconstruction with free tissue transfer and received enoxaparin 30 mg twice daily prophylaxis. Patients with renal insufficiency were excluded. The cohort was divided into patients with BMI less than 25 (group A) and patients with BMI more than 25 (group B). PE within 30 days of surgery was retrospectively recorded. Statistical analysis was performed using chi-square and binary logistic regression, accounting for Caprini score.

RESULTS: 676 patients were included, with a mean BMI of 26.69 ± 8.35. PE rates among all patients were 2.7%. PE rates in group A (n=319) were significantly lower than in group B (n=357) (1.3% vs. 3.9%, p=0.031). After accounting for Caprini score, BMI more than 25 was independently associated with nearly three times increased PE risk (OR, 3.12; 95% CI, 1.004-9.697).

CONCLUSIONS: BMI more than 25 is associated with an increased risk of PE within 30 days of head and neck reconstruction with free tissue transfer, even after adjusting for Caprini score. This may indicate insufficient anticoagulation in this group. Limitations of the retrospective study design and potential biases should be considered.

Close

Disruptive Mood Disorders Impact on Pediatric Facial Trauma: A Multidisciplinary Approach to Care

Abstract Presenter
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INTRODUCTION: Disruptive mood disorders are psychiatric conditions characterized by impulsivity, and include common diagnoses, e.g., attention deficit hyperactivity disorder (ADHD), as well as less common disorders, e.g., oppositional defiant disorder (ODD). Children with these disorders may have different risks of sustaining facial trauma; additionally, their mechanisms of injury, management, and outcomes have the potential to be influenced by their diagnosis. The objective of this retrospective study was to identify the risks associated with facial fractures in pediatric patients with psychological comorbidities.

METHODS: A retrospective review was conducted of all pediatric facial fractures seen at a single, level I pediatric trauma center from 2006 to 2021. Patient charts were reviewed, and all patients with documentation of ADHD or ODD were included. Variables including type of injury, mechanism of injury, type of medical intervention, and outcomes, were compared in patients with and without positive history of these psychiatric conditions.

RESULTS: Of 3,334 children with facial fractures, 198 (6%) patients had a prior diagnosis of ADHD and 20 (1%) patients had prior diagnosis of oppositional defiant disorder (ODD). Patients with a diagnosis of ADHD or ODD were significantly older than the rest of the cohort (13.6 years vs. 11.2 years, $p<0.05$). Compared to children without prior diagnosis of a disruptive mood disorder, violence was significantly more likely to cause injury (30% vs 11%, $p<0.05$). In fact, violence was the leading primary cause of injury in patients with ODD. Patients with ADHD or ODD were found to have significantly more concomitant injuries compared with the overall patient cohort (76% ADHD, 90% ODD, 67.1% overall $p<0.05$). The most common of these were soft tissue injuries (64.3%) and neurologic injuries (20.1%). These patients were more likely to be admitted (45% vs. 32%) but were less likely to receive surgical management for their fracture compared with the overall pediatric facial fracture population ($p<0.05$).

CONCLUSION: In conclusion, the presence of psychological conditions is a barrier to optimal clinical management of pediatric facial fractures. The impact of psychiatric impulsivity is associated with more violent injuries requiring more hospitalizations yet less surgical intervention. Craniofacial surgeons, pediatricians, and emergency department physicians should use this data to inform clinical efforts, advocate, and improve treatment outcomes for pediatric patients impacted by the complexities of psychological comorbidities.

Forehead Flap Simplified by Avoiding the Tube

Abstract Presenter
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BACKGROUND: Nasal reconstruction utilizing the forehead flap has undergone many modifications. Early techniques inset the flap along the nose and did not create a tube. Presently, tubing of the flap base is consistently described as part of the flap creation. This report involves a direct inset of the forehead flap without tubing of the base.

METHODS: Patients with defects of the nose requiring reconstruction with a paramedian forehead flap underwent the technique. A local anesthetic solution (0.05% xylocaine with 1/200,000 concentration) was liberally injected across the forehead and nose. The flap was designed and incised as a central column over the forehead, limiting the incision on the side of

the supratrochlear vessels supplying the flap. On the opposite side, the incision was carried directly on the lateral aspect of the nose down to the defect. The flap was elevated with a scalpel, assisted by electrocautery, and blunt dissection was utilized to free the adhesions at the base of the flap around the vessels. The long incision along the nose was widened slightly with subcutaneous dissection to accommodate the width of the flap. The flap was then rotated inferiorly and sutured distally to cover the defect. The forehead site was closed in a straight line and the entire flap, with the turnover bulge, inset and sutured. Secondary surgery included excision of the flap-base bulge and dorsal irregularities, and cartilage grafting at 3 to 8 weeks.

RESULTS: Twenty-seven patients over a twelve-year period underwent a forehead flap reconstruction of the nose without tubing of the flap base. The group was comprised of 17 women and 10 men. Flap extension or distal reach was considerably increased by avoiding the tubing of the flap base. Thirteen large defects required a second local flap to close the wound. No primary cartilage grafting was utilized as alar reconstructions in eight patients were achieved with island naso-labial turnover flaps. Five patients had secondary cartilage grafting for alar support which involved a return to the operating room. Flap base revisions and small skin excisions in twenty-two patients were performed with simple local anesthesia in an office procedure room. The flap inset did not significantly widen the nose as the flap and nasal skin contracted and re-draped. No flap loss occurred, and distal-tip necrosis was minimal and self-limiting.

DISCUSSION: Contemporary forehead flap techniques include tubing of the base and extension over intact skin. The forehead flap need not become an interpolated flap with bridging causing potential problems with vascularity, congestion, and length limitation. Extension of the tube over the thickness of the forehead tissue physically limits the flap. With direct inset the flap reach is extended, and the flap will cover distant defects with less tension. Secondary surgery dividing the tube is obviated and revision of nasal dorsal irregularities under local anesthesia more likely. Nasal width is minimally impacted. Direct Inset of the paramedian forehead flap, along the length of the nose, is a simple and valuable modification that should be considered for nasal reconstruction.

Barriers To Obtaining Orthodontic Care For Patients With Orofacial Clefts: A Survey Of Orthodontists And Families

Abstract Presenter
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PURPOSE: Orofacial clefting (OFC) is one of the most common birth defects in the United States. Patients with OFC need long term, multi-disciplinary treatment. Orthodontic care is critical in the management of patients with OFC, as it optimizes the dentition for feeding, speech and for future surgery. Nationally, orthodontic care is difficult to access for patients with OFC due to limited numbers of specialized providers, high rates of insurance denials, as well as disparities between the number of patients with state-funded insurance and the number of providers accepting these forms of coverage. The federal and state governments have attempted to enforce insurance coverage for these patients, but barriers to care still persist due to funding shortfalls. An attempt was made to assess the barriers to obtaining orthodontic care for patients with OFC in a Florida-based cleft/craniofacial center from both a family and orthodontic provider perspective.

METHODS: A 4-question multiple choice question (MCQ) survey was sent to orthodontic members of the Florida Orthodontic Association. Guardians of patients who attended the JHACH cleft and craniofacial clinic were administered a 17 question MCQ survey.

RESULTS: The orthodontist survey was completed by 38 participants. The survey showed that 71% of orthodontists treated cleft/craniofacial patients. None underwent a dedicated cleft/craniofacial fellowship and majority (55%) had limited experience treating craniofacial patients during residency. Only 37% of orthodontists accepted Medicaid, 55% have provided pro-bono care, while self-pay and private insurance were the most commonly accepted (89% and 87% respectfully). Poor reimbursement was the most common barrier to providing care (58%), while lack of relationship with a cleft team (47%) and lack of referrals (42%) were also common. Lack of comfort with providing care to this population was the least common barrier (18%). The survey of patients' guardians was completed by 48 participants, 29 (60%) had initiated care with an orthodontist outside of the cleft team setting. The majority were insured by Medicaid (67%). Majority of patients (55%) were charged out of pocket expenses for their orthodontic care with most being charged for braces or palatal expanders/other appliances (44% each). For patients that had to pay out-of-pocket for care, most (31%) had to pay in the range of $2000-$5000 US, with 25% being charged greater than $5000 out of pocket for their care.

CONCLUSION: Despite both federal and state mandates, many barriers still exist in accessing orthodontic care and majority of patients experience significant out-of-pocket expenses despite statutorily mandated insurance coverage for these services. Solutions would include building relationships between orthodontists and cleft teams, promotion of orthodontists into full time roles in hospital cleft teams as well as additional federal policies and oversight bodies to advocate for these patients and ensure access to care.

The effect of Insurance status and Medicaid expansion on timing of Alveolar Bone Grafts in patients with Orofacial Clefts: A cohort study utilizing the Pediatric Health Information System (PHIS) Database

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PURPOSE: Success of Alveolar Bone Grafting (ABG) is dependent on appropriate timing of the procedure related to dental eruption. Up to 50% of patients with orofacial clefts (OFC) are dependent on Medicaid. Accessing care through Medicaid funding may be difficult due to low provider participation in Medicaid and added administrative burdens. The Affordable Care Act (ACA) sought to lower systematic costs and improve access to timely care by expanding coverage to millions. Only 38 states expanded their Medicaid programs. An attempt was made to assess the impact Medicaid expansion has had on cleft care by assessing the demographics of patients undergoing ABG in states with and without Medicaid expansion.

METHODS: The Pediatric Health Information System (PHIS) database contains clinical data from 49 children's hospitals across the United States. The database was queried using selected International Classification of Diseases (ICD) 9 and 10 procedural codes for patients with an OFC who underwent an ABG between 1/6/2010 – 7/5/2022. Demographic data and variables related to their surgical encounter were identified. Two Tailed T tests were performed to assess the effect of insurance on the timing of ABG.

RESULTS: In total, 1,233 ABG procedures were identified. Procedures done after the announcement of the Corona Virus pandemic were removed (48), leaving 1,185 procedures (Figure 1). 57% of patients were white, 5% were African American, 19% were Asian and 14% identified as other. 17% identified as Hispanic. 59% of patients had private insurance and 31% had Medicaid. The average age at which the procedure was performed was 123.4 months (9.8 years). Patients with Medicaid insurance had procedures done at a later age compared to those with Private insurance (128.1 > 120.4 months; p=0.002).
Sub-analysis was completed of patients in the 38 states that underwent Medicaid expansion comparing procedure details before and after expansion (Figure 2). Again, patients with Medicaid insurance had procedures done at a later age compared to those with Private Insurance (126.3 > 119.6 months; p=0.02). Patients undergoing ABG with private insurance exhibited no statistically significant change in the in the age at which these procedures were performed (117.3 vs 121.3 months; p=0.2). At the same time, patients whose procedures were funded by Medicaid exhibited a significant increase in the age at which ABG was completed (118.0 vs 131.1 months; p=0.01).

CONCLUSIONS: ABG is a time sensitive procedure which requires coordinated care between orthodontics and surgery. Delayed care may impact outcomes as ideal treatment protocols necessitate grafting prior to dental eruption. Our data indicates patients with Medicaid funding underwent ABG 7.7 months later than those with private insurance funding. Interestingly, in expanded states patients with Medicaid experienced worsening delay in the time of ABG, after expansion, by 13.1 months. We hypothesize that increased access to care without administrative reforms or increased reimbursement rates resulted in more patients attempting to access an already strained system and increased delays in management.

A Review of Socioeconomic Disparities in Submucous Cleft Diagnosis and Outcomes

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BACKGROUND: Submucous cleft palate (SMCP) is a congenital anomaly, affecting 1 in 1200 live births. Early detection facilitates proactive speech therapy and development of compensatory speech mechanisms. However, SMCP is a subtle exam finding, contributing to delays in diagnosis. Though the timing and necessity of repair remains controversial, literature suggests an increased risk of persistent velopharyngeal insufficiency (VPI) with delayed care. This study aims to analyze the relationships between patient demographics, age of diagnosis and repair, and post-operative outcomes in patients with SMCP.

METHODS: A retrospective review was conducted of patients with surgical indications for SMCP who underwent palatoplasty at an urban academic children's hospital from 2003-2022. Patient socioeconomic characteristics, medical history, and postoperative outcomes were collected. Patients were compared based on insurance type and government assistance utilization. Statistical analyses including Independent T-test, Wilcoxon Ranked Sum test, Chi-Squared analyses, Fisher's Exact Test, and Univariate/Multivariate logistic regression were performed using RStudio version 4.2.1.

RESULTS: Upon review, 1,552 patients were identified with cleft palate, of which 105 had a SMCP. Among those with SMCP, 69.5% (n=73) had public insurance and 30.5% (n=32) private insurance. Patients with public insurance were diagnosed later (5.5±4.6 vs. 2.6±2.4 years old; $p<0.001$) and underwent palatoplasty later (7.3±4.1 vs. 4.4±3.4 years old; $p<0.001$) than those with private insurance. Patients receiving government assistance experienced higher rates of post-surgical persistent VPI (74.5% vs. 44.8%; $p=0.006$). The average length of follow up was 3.9±3.8 years.

C**ONCLUSION**: Our results suggest a disparity in the recognition and treatment of surgical

SMCP. Hence, financially vulnerable populations may experience an increased risk of inferior speech outcomes and subsequent therapies and procedures.

Nasoalveolar Molding versus Neonatal Cleft Lip Repair: A Comparison of Revision Rates in Patients with Wide Clefts

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PURPOSE: Historically, patients with wide clefts would have undergone nasoalveolar molding (NAM) pretreatment; however, the INTRODUCTION of early cleft lip repair (ECLR) has challenged the efficacy of the traditional technique and its impact on improving nasal symmetry for these patients. This study compares the revision rate between ECLR and TLR with NAM (TLR+NAM) among patients with the most severe cleft width ratio (CWR).

METHODS & MATERIALS: A retrospective review was conducted on patients with UCL who underwent cleft lip repair from 2011-2022. Patients with craniofacial syndromes were excluded. Demographics corrected gestational age, cleft phenotype, NAM use, revisions, and follow-up time were collected. Patients with a pretreatment cleft width ratio (CWR) greater than 0.5 (classified as severe) were included. Fisher exact, independent t-test, and Kaplan-Meier analysis were performed.

RESULTS: Upon review, 236 patients with UCL and nasal deformities were identified, of which 131 (55.5%) underwent ECLR and 105 (45.5%) TLR+NAM. Thirty-two ECLR and 24 TLR+NAM patients were identified to have a severe CWR (0.59±0.08 vs. 0.54±0.06; p=0.003). Average age of repair was 1.0±0.5 months and 3.6±0.9 months for ECLR and TLR+NAM cohorts, respectively (p<0.001). Average follow-up time was 4 and 7 years for each group, respectively. Additionally, 9.4% of patients undergoing ECLR underwent revision compared to 45.8% in the TLR+NAM cohort (p=0.004). The five-year revision rate of the TLR+NAM cohort (42.0%) was significantly higher compared to the ECLR cohort (10.3%; p=0.042). Overall follow-up time was 4.9±2.7 years.

CONCLUSION: These results demonstrate that despite more severe cleft phenotypes, ECLR is

associated with a lower revision rate compared to TLR+NAM.Access to and execution of ECLR when feasible could contribute to improved outcomes and decreased burden of care for families and patients with UCL, as well as facilitate a more expedient repair.

Optimal Timing to Minimize Complications of Alveolar Bone Grafting in Cleft Care

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BACKGROUND/PURPOSE: Alveolar bone grafting (ABG) is a procedure utilized in alveolar cleft repairs that promotes maxillary arch stabilization, facilitates closure of oronasal fistulae, and corrects the nasal alar bases. Traditionally, ABG has been classified according to chronological age as primary ABG (~2 years), early secondary ABG (2-5 years), secondary ABG (6-12 years), and tertiary/delayed ABG (12+ years). Ideal timing of ABG has yet to be standardized for patients with cleft lip and palate. This study aims to investigate the impact of the timing of ABG on the incidence of adverse postoperative events.

METHODS/DESCRIPTION: A retrospective review using the National Surgical Quality Improvement Program-Pediatric (NSQIP-PEDS) database was performed. Patients who underwent ABGfrom 2012 to 2020 were included. Patient characteristics, comorbidities, complications, readmission rates, and reoperations rates were collected and analyzed. Pearson's chi-squared, independent t-test, and multiple logistic regression were used for statistical analysis. Additionally, receiver operating characteristic (ROC) curve analysis was performed to determine the appropriate cutoff values for patient subgroups.

RESULTS: Among 863,860 patients in the database, 5,719 patients underwent ABG, of which 103 (1.8%)
had documented postoperative complications. Analysis of the data indicated that patients who had complications were older compared to those that did not (10.8±3.6 vs 10.1±2.8 years, p=0.021). A ROC curve analysis indicated a cutoff age of 12 years (AUC 0.57, p=0.044). Patients above the 12-year cutoff had higher rates of postoperative complications compared to those younger than 12 years of age (1.7% vs. 1.0%; p=0.030).

CONCLUSION: Appropriate timing of ABG is essential for the successful management of alveolar clefts. This analysis demonstrates a unique age-dependent rise in postoperative complications beyond 12 years of age. Surgeons performing ABG should consider early surgical

intervention. A 12-year threshold should be considered for patients with alveolar clefts to reduce the risk of complications. Future studies should assess additional factors such as postoperative bone quality to further characterize the optimal timing.

Measurement and Diagnosis of Lambdoid Craniosynostosis

Abstract Presenter
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INTRODUCTION: Lambdoid craniosynostosis (LC) RESULTS in a classically trapezoid-shaped cranium. Cephalometric study in these individuals has largely remained in areas with well-defined landmarks such as the face and skull base. Detailed analysis of the smooth calvarium remains limited. With the implementation of automated systems which can better measure a smooth surface, better cranial shape measurement is possible. Understanding preoperative morphology will allow for improved pre- and post-operative evaluation as well as differentiation of this population from the morphologically similar but benign pathology, positional plagiocephaly (PP).

METHODS: The Wake Forest Cranial Imaging Database, a multicenter imaging database, was used to identify individuals with lambdoid craniosynostosis (n=53). A control group was established using 200 consecutive patients with positional plagiocephaly. A single preoperative CT or 3D-photograph was used to create a cranial surface model of each individual which was then mirrored as needed so that posterior flattening was oriented on the left in all individuals. Cartesian grids were created on the scalp's surface based on the head's length, width, and height. To control for head size, length, width, and height at each point were measured relative to an individual's total cranial length, width, or height. Population averages at each point were calculated and compared so that regional trends could then be analyzed using population trends. Finally, these trends were captured in a succinct tool to create an index that could differentiate between the two groups. Diagnostic performance was evaluated using Area Under the Curve Analysis (AUC).

RESULTS: On the side of posterior restricted growth, individuals with LC have more severely restricted length, width, and height. Restriction increased at more lateral points but was relatively unaffected by height. On the contralateral posterior side, this leads to compensatory growth measured as increases in length, width, and height which occur to a greater extent at more superior regions as the distance from the fused suture increases. In the anterior cranium, individuals with LC were relatively longer, wider, and taller in all regions with the exception of ipsilateral to posterior restriction where width is relatively similar to that of individuals with positional plagiocephaly. Overall, in LC, posterior restriction is more severe leading to

compensatory growth that is largely contralateral in both the anterior and posterior cranium. By measuring anterior compensatory growth and differences in posterior width asymmetry, the most effective tool for differentiating LC and PP was created. Of note, performance lessened with measurement of posterior length, thus indicating that while restriction is greater in craniosynostosis, those with the most severe plagiocephaly obtain a similar morphology. This final index functions near the level of CT imaging (AUC: 0.999, Sensitivity: 100%, Specificity: 98.5%).

CONCLUSION: By aiding clinicians in the objective measurement of lambdoid craniosynostosis, physical exam, operative planning and post-operative follow-up can be augmented by a tool that accurately measures the abnormality. This detailed measurement functions near the level of CT imaging without the need for sedation or radiation.

Dual "Babysitter" Procedure: How to preserve Facial Muscles before Cross-Face-Nerve Graft

Abstract Presenter
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INTRODUCTION: Facial muscles viability declines as time progresses in patients with facial paralysis, thereby making facial reanimation a time-sensitive procedure. Wallerian degeneration leads to degradation of intramuscular nerve fibers, resulting in a decrease in motor-units, muscle atrophy and an increase in connective tissue. As a RESULT, reinnervation becomes increasingly difficult over time. Therefore, providing re-innervation to the facial muscles after facial nerve injury of any kind, is of high importance. In 1984, Terzis presented the 'babysitter' procedure, which uses 40% of the fiber of the hypoglossal nerve to sustain muscle tissue, as the axon fibers grow along the Cross-Face-Nerve-Grafts (CFNG). This technique gained great popularity ever since. In recent years however, dual nerve reinnervation techniques have emerged, slowly replacing the traditional single nerve procedures. In particular, the hypoglossal nerve and the masseter nerve are frequently utilized for facial reanimation. The aim of this study was to compare two different surgical techniques of dual innervation using the masseter and hypoglossal nerve.

METHODS: Twenty-one patients with facial paralysis underwent the dual "babysitter' procedure with the masseter branch of the trigeminal nerve and hypoglossal nerve prior to CFNGs. In one group, the masseter branch was coaptated to the upper division of the injured facial nerve, whereas the lower division was sutured to 35% of the hypoglossal nerve fibers. In the second group, the masseter branch was coaptated to only the zygomatic branch of the facial nerve and 45% of the hypoglossal nerve fibers were sutured to the entire facial nerve trunk. Surgical outcomes of both groups were evaluated after 6 months, 9 months and 12 months by

utilizing automated facial landmark recognition (Emotrics) and by assessing the severity of facial paralysis using the House-Brackmann score.

RESULTS: This retrospective study included 21 patients, 12 female and 9 males, with an average age of 35 years (+/- 20 years). The youngest patient included was 7 years old. Group one consisted of 8 patients, whereas group two included 13 patients. The etiology of facial paralysis varied from bell's palsy, intracranial malignancy, intracranial bleed, cavernous malformation and traumatic injury. The average time of denervation in group one was 13 months (+/- 5 months) and in group two 15 months (+/- 4 months). Both METHODS yielded satisfying outcomes and presented with different advantages and disadvantages.

CONCLUSION: Both dual- "babysitter' procedures showed promising RESULTS as they increased symmetry, facial tone and facial movement. This study provides crucial information comparing two different METHODS for achieving reinnervation in facial paralysis patients.

Do Lower Frontal Osteotomies Affect Frontal Sinus Pneumatization?

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BACKGROUND: Disruption of the growth plate of long bones is known to affect normal development, but it is unknown how osteotomies of the newborn skull might affect development of certain features, such as the frontal sinus. The purpose of this study was to compare frontal sinus volume in children who underwent lower frontal osteotomies vs those who did not undergo cranial osteotomies.

METHODS: Retrospective study was conducted of children with maxillofacial CT scans older than 5 years of age. The experimental group included patients who previously underwent lower frontal osteotomies for frontoorbital advancement in early childhood, whereas the control group included patients who had never undergone cranial vault surgery.

RESULTS: There were 7 pediatric patients older than 5 years returning for a CT scan after previous surgery for craniosynostosis; these patients were 6.2 months old at surgery, and their CT scan was 5.01 years after surgery. There were 80 control patients older than 5 years undergoing CT scan for other indications with no prior cranial surgery.

Patients with previous lower frontal osteotomies have significantly smaller frontal sinus volume than control patients without cranial osteotomies (p=.021, 1431 mm3 vs 4020 mm3). Over half of the patients (57.1%, n=4 of 7) with previous cranial vault surgery with lower frontal

osteotomies developed no appreciable pneumatization of the frontal sinus, whereas only a few control patients (8.8%, n=7 of 80) developed no appreciable pneumatization of the frontal sinus ($p<.001$).

CONCLUSIONS: Patients with previous lower frontal osteotomies are associated with significantly lower pneumatization of the frontal sinus than patients without lower frontal osteotomies.

Titanium mesh is not an adequate long-term option for patients undergoing complex cranial defect reconstruction: a multi-institutional study

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BACKGROUND: Composite cranial defects RESULT from pathological conditions that lead to loss or sacrifice of scalp soft tissue in addition to the underlying calvarium.1 Reconstruction of these defects is particularly challenging and there is currently no consensus on the ideal approach to the management of this more difficult subcategory of cranial defects.2, 3 We investigated the outcomes of composite cranial defect reconstruction with alloplastic material or autologous bone, with scalp reconstruction by adjacent tissue transfer or microvascular free flap coverage in three high-volume institutions.

METHODS: An IRB-approved chart review was performed on patients 6 years old and older undergoing cranioplasty with scalp reconstruction in the last 35 years. Patients were divided in three groups, those who underwent calvarium reconstruction using titanium mesh, other alloplastic material or autologous bone. In addition, scalp reconstruction was analyzed depending if soft tissue reconstruction was accomplished with locoregional flaps or with distant free tissue transfer. Predictive variables including demographics, comorbidities, risk factors and defect etiology and characteristics were collected. Retention and complication rates were compared among groups.

RESULTS: A total of 298 cranioplasties with scalp reconstruction were performed in 202 patients across all institutions between January 2010 and December 2020. The most common

reason for cranioplasty was relief if intracranial pressure (34%). 103 patients had calvarium reconstruction using titanium mesh (n=28), other alloplastic material (n=59), or a combination of both (n=16). Autologous bone was used in 194 cranioplasties. Overall, 121 patients had scalp reconstruction with loco-regional flaps while 81 had free flaps. Calvarial reconstruction with titanium mesh had worse retention rates than other alloplastic material and autologous bone, (56% vs 69% vs 88%, respectively) ($p<0.05$). There was no difference in retention rates when comparing scalp reconstruction among groups ($p = 0.12$).

CONCLUSION: Successful reconstruction of composite cranial defects remains a challenge, owing to high rates of postoperative wound breakdown, with the risk of associated infection and CSF leak. This study supports our previous work, in a larger, multi-institutional scale, and helps elucidate the best clinical practice in patients requiring cranioplasty with scalp reconstruction.

REFERENCES:

1. Goldstein JA, Paliga JT, Bartlett SP. Cranioplasty: indications and advances. Current opinion in otolaryngology & head and neck surgery. 2013;21(4):400-409.
2. Zanotti B, Zingaretti N, Verlicchi A, Robiony M, Alfieri A, Parodi PC. Cranioplasty: review of materials. Journal of Craniofacial Surgery. 2016;27(8):2061-2072.
3. Kwiecien GJ, Rueda S, Couto RA, et al. Long-term outcomes of cranioplasty: titanium mesh is not a long-term solution in high-risk patients. Annals of Plastic Surgery. 2018;81(4):416-422.

Extracorporeal Shockwave Therapy Improves Outcomes Following Secondary Alveolar Bone Grafting

Abstract Presenter
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BACKGROUND: Alveolar bone grafting remains a challenge in the reconstructive sequence for children suffering from unilateral or bilateral clefts. In many instances, children may require multiple procedures to create a stable bony foundation for eruption of teeth adjacent to the cleft.1 Extracorporeal shock wave therapy (ESWT), which consists of targeted acoustic waves, has been utilized as adjunctive modality to increase bone mineral density, trabecular thickness and increase expression of growth factors during mandibular distraction osteogenesis.2,3 Here, we look at the efficacy and safety of applying ESWT as an adjunct to secondary alveolar bone grafting.

METHODS: A retrospective review was conducted of all children that underwent secondary alveolar cleft bone grafting with adjunctive ESWT between 2019 and 2021. All patients were

treated with ESWT intraoperatively, and twice post-operatively. Patient variables abstracted from the medical record included age, gender, cleft type, cleft width, pre-operative cleft dentition, volume of bone graft placed intraoperatively, and ESWT settings. Primary outcome of interest was percentage of viable graft volume as a percentage of initial graft placed, as measured by cone bean computed tomography (CBCT). Secondary outcomes included pain medication utilization, length of stay (LOS), and incidence of complications.

RESULTS: Twenty patients met inclusion criteria. Mean age at surgery was 9.9 years (range 8-16). Four (20%) patients were female; 16 (80%) were male. Eight (40%) patients had bilateral alveolar clefts; 12 (60%) had unilateral clefts. Mean energy applied was greatest intraoperatively (5136 mJ), followed by second and third applications at an average of 9 and 25 days post-operatively, respectively (~2000 mJ). First CBCT performed at an average of 106 days post-operatively found an approximate 19.5% take, when compared to initial graft volume. Second CBCT performed at an average 291 days post-operative, measured a mean of 29.0% graft take, representing a 50% increase in volume from initial measurement. All patients (100%) were discharged on the day of surgery. Only twelve (60%) patients required narcotic medication post-operatively, for an average of 2 doses of narcotic medication in the entire cohort (range 0-6.5). Three (15%) patients experienced minor complications.

CONCLUSIONS: This preliminary report describes a protocol for safely implementing perioperative ESWT for children undergoing alveolar bone grafting harvested from the iliac crest using a minimally invasive approach. Initial outcomes suggest that this therapy may expedite visualization of bone consolidation without any associated increase in complications. The utility of ESWT has been advocated by other surgical specialties and may represent an opportunity to improve care and outcomes in craniofacial surgery. Pertinent considerations, the role of standardized assessment protocols, and future directions will be reviewed.

REFERENCES

1. Weissler EH, Paine KM, Ahmed MK, Taub PJ. Alveolar Bone Grafting and Cleft Lip and Palate: A Review. Plast Reconstr Surg. 2016;138(6):1287-1295. doi:10.1097/PRS.0000000000002778
2. Ginini JG, Maor G, Emodi O, et al. Effects of Extracorporeal Shock Wave Therapy on Distraction Osteogenesis in Rat Mandible. Plast Reconstr Surg. 2018;142(6):1501-1509. doi:10.1097/PRS.0000000000004980
3. Ginini JG, Emodi O, Sabo E, Maor G, Shilo D, Rachmiel A. Effects of Timing of Extracorporeal Shock Wave Therapy on Mandibular Distraction Osteogenesis: An Experimental Study in a Rat Model. J Oral Maxillofac Surg. 2019;77(3):629-638. doi:10.1016/j.joms.2018.07.018

The impact of geographic and socio-demographic factors on the incidence of orofacial clefts in the United States

Abstract Presenter

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BACKGROUND: Orofacial clefting (OC) is the most common congenital anomaly affecting the face (1). OCs are variable in presentation and require multidisciplinary care from infancy to facial maturity to fully restore form and function. Rates of OC have historically varied among different regions and ethnic groups. However, many prior reports have been limited in scope and studied a homogenous population that is not reflective of the diverse United States (US) population. Therefore, this study aims to better define the US incidence, identify the geographic variability, and clarify the impact of sociodemographic factors of OC.

METHODS: Aggregated and de-identified data was sourced from EPIC CosmosTM, a data collective that amalgamates patient records from 180 participating institutions in the US that utilize EPIC medical records. Patients born between November 2012 and November 2022 were included in this study. Data was sourced directly from the Cosmos pre-built interface (SlicerDicerTM), in which categorical variables are reported as counts, and continuous variables are reported as means and standard deviations. In this study, eight cohorts of OC patients were identified using a combination of ICD codes. Following cohort identification, descriptive analyses of demographic variables including race, sex, ethnicity, regional and temporal incidence trends, and social determinant associations were conducted. The Social Vulnerability Index (SVI), developed by the CDC and initially intended for identification of at-risk communities, was used to identify social determinants of health among the included cohorts. Univariate analysis, Student t-tests, and Cochrane Armitage tests were used to evaluate differences in trends of SVI variables.

RESULTS: There were 15,697,366 patients identified between November 2012 and November 2022, of which 31,216 patients were diagnosed with any OC, for an incidence rate of 19.9 (95% CI: 19.7-20.1) per 10,000 live births. Incidence rates of OC were observed to be highest among Asian (27.5 CI:26.2-28.8) and Native American (including native Hawaiian, Alaskan and Pacific Islanders) patients (32.8 CI:30.4-35.2) and lowest among Black patients (12.96 CI:12.5-13.4). Male and Hispanic patients exhibited higher OC incidence than female and non-Hispanic patients. There were no differences in incidence rates among metropolitan (20.23 per10,000), micropolitan (20.18 per 10,000), and rural (20.02 per 10,000) populations.
When stratifying SVI analysis by three different racial/ethnic groups (White, Black, Hispanic), RESULTS were largely similar. Notably, however, socioeconomic metrics, including uninsured status, poverty, and unemployment, were correlated with OC primarily among White and Hispanic patients while these variables were less significant among Black patients. Further,

communities with a higher proportion of minority language speakers correlated with decreased OC incidence, and this correlation was most notable among Hispanic identified patients.

CONCLUSIONS: This study examines the largest cohort of oral cleft patients reported to date and reports the contemporary US OC incidence rates, which demonstrate a marginal increase from previous estimates. Importantly, we found that percent below the poverty line was most strongly correlated with OC, reinforcing the impact of social determinants on health. These findings can help to screen and counsel expectant families and direct future research.

REFERENCES

1. Middleton W, Kurtz A, Hertzberg B. Fetal Central Nervous System: Head and Spine. In: Ultrasound. 2nd ed. Elsevier; 2004:374-413.

Diagnostic Workup And Surgical Approach to Facioscapulohumeral Muscular Dystrophy Presenting As Initial Congenital Facial Weakness

Abstract Presenter
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PURPOSE: Few studies reported on the surgical treatment outcomes of early-onset Facioscapulohumeral Muscular Dystrophy (FSHD). There is no unified diagnostic approach for these patients prior to undergoing facial reanimation surgery. This study aims to standardize the workup protocol for congenital facial weakness and discuss the possible limitations of current standard surgical approaches to facial reanimation in this pediatric population.

METHODS: We conducted a literature review on current surgical techniques for facial reanimation in pediatric patients with FSHD.

RESULTS: The recommended diagnostic approach for congenital facial paralysis includes a genetic workup, MRI, and EMG, all reviewed by a multidisciplinary treatment team of a pediatrician, pediatric craniofacial surgeon, neurologist with expertise in neuromuscular disorders, geneticist, and ophthalmologist. The three current standard techniques for facial reanimation are gracilis muscle transfer, temporalis myoplasty (Labbé procedure), and tensor fascia lata (TFL) sling. Although the gracilis muscle transfer is considered the gold standard, recent FSHD cohort studies have noted fatty infiltrate in the gracilis muscle, which could make the gracilis muscle an unfavorable flap candidate. Patient presentation of bilateral temporalis muscle atrophy could also indicate that a temporalis myoplasty may have unfavorable results if used, including possible trismus and occlusal changes. Static procedures like TFL slings may be

the most appropriate technique in patients with FSHD-related facial paralysis.

CONCLUSION: Early-onset FSHD is a pediatric progressive disease that does not have a delineated protocol for diagnostics and pre-surgical treatment for reanimation surgery. We suggest a multidisciplinary approach to have the patient be properly evaluated by a neurologist, pulmonologist, and a craniofacial surgeon. The most promising surgical reanimation for early-onset FSHD patients may be the TFL sling due to the decreased secondary complications post-operation. Surgeons who treat patients with facial paralysis need to be aware of FSHD as a possible etiology, provide a thorough work-up, and consider potential long-term complications based on the type of tissue transfer for facial reanimation.

Oh How Far You'll Go: A Geospatial Analysis of Travel Burden to Certified Craniofacial Teams in the United States

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BACKGROUND: Multidisciplinary team-based care provides comprehensive, long-term treatment for children with craniofacial differences. American Cleft Palate and Craniofacial Association (ACPA)-certified "Craniofacial Teams" meet stringent standards to gain and maintain ACPA approval. Despite the existence of American Cleft Palate and Craniofacial Association-approved Craniofacial Teams, access to care remains challenging for patients from rural areas, leading to disparities in care. We investigated the geospatial relationship between US counties and ACPA-approved craniofacial centers.

METHODS: The geographic location of all ACPA-approved craniofacial centers in the U.S. was identified. Distance between individual US counties (n=3,142) and their closest ACPA-approved craniofacial team was determined. Counties were mapped based on distance to nearest craniofacial team. Distance calculations were combined with demographic data from the Small Area Income and Poverty Estimates to model the number of children served by each team and economic characteristics of families served. These relationships were analyzed using independent t-tests and ANOVA.

RESULTS: Over 40% of counties did not have access to one of the ACPA-approved craniofacial teams within a 100-mile radius (n=1,366). 89% of these counties had a population <75,000 (n=1,213) and 47% had a child poverty rate greater than national average (n=640; P<.001). Counties with the highest birth rate and >100 miles to travel to an ACPA team are in the Mountain West, with Primary Children's Hospital in Salt Lake City, Utah, serving the

greatest number of children traveling >100 miles.

CONCLUSIONS: Craniofacial teams serving many rural patients face challenges associated with prolonged travel distance, magnified by limited available financial resources. Given the the time sensive nature of operative intervention the lack of equitable distribution in craniofacial teams is concerning. Centers may better serve families from distant areas by establishing sallelite clinics, nonprofit partnerships, telehealth visits, and training local primary care providers in referral.

Early Results of the Effect of Demineralized Bone Matrix, Bone Morphogenic Protein, and Freeze-Dried Bone Chips in Alveolar Cleft Repair

Abstract Presenter
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PURPOSE: The most widely accepted treatment for alveolar bone grafting (ABG) is with an autologous iliac crest bone graft (ICBG). However, autologous bone grafting may be less than ideal in those undergoing early ABG concurrently with palate repair. Our institution uses a combination of demineralized bone matrix (DBX), bone morphogenic protein (rfBMP-2), and freeze-dried bone chips (FDBC) in early concurrent ABG as well as secondary ABG. Given the paucity of literature examining the efficacy of early concurrent ABG and the optimal combination of existing allografts, we sought to investigate the feasibility of DBX, rhBMP-2, and FDBC on ABG at a single institution.

METHODS: Consecutive patients undergoing early concurrent and secondary ABG utilizing DBX, rhBMP-2, and FDBC were identified from August 2018- June 2022. Postoperative CT images were reviewed and scored by two independent reviewers with discrepancies settled by a third reviewer. Alveolar graft height (GH) and graft thickness (GT) were recorded. A standardized scoring system was developed with a score of 0 representing no graft take and 3 representing best possible graft take. Descriptive statistics were obtained, and cohorts were stratified by early concurrent versus secondary ABG, and initial versus salvaged ABG. One way ANOVA were used to determine statistical significance.

RESULTS: Seventy-two clefts (54 patients) were identified as having undergone ABG. Of these, 59.5% underwent early concurrent ABG, 37.5% underwent secondary ABG. 26.4% underwent salvage procedures after failed ICBG. Median age was 5 years old. The mean follow-up time to CT after ABG was 13.3 months. Only 1 patient (1.8%) required salvage after

placement of DBX, rhBMP-2, and FDBC. The mean GH and GT recorded for all clefts was 2.4 and 2.0, respectively. When comparing early concurrent versus secondary grafting, mean GH was 2.3 vs 2.6 (p=0.14) and mean GT was 2.1 vs 2.0 (p=0.08). When stratified by age groups, no statistically significant differences were identified in regard to GH (p=0.27) and GH (p=0.63) between those in 0-3, 4-6, 7-9 age groups who underwent early concurrent ABG. When comparing those who received a first-time graft to those who required salvage after a failed ICBG, the salvage cohort had a higher graft height (2.6) when compared to first time grafts (2.4; p=0.82) and both groups had a graft thickness of 2.0 (p=0.45).

CONCLUSION: Our early RESULTS evaluating the efficacy of primary ABG using DBX, rhBMP-2, and FDBC suggest feasibility in regard to graft height and thickness. Those who underwent early ABG with concurrent hard palate repair demonstrated acceptable graft take in regard to height and thickness from ages 0-9. Additionally, those who underwent secondary ABG after hard palate repair demonstrated equally favorable in outcomes in regard to graft take, suggesting that DBX, rhBMP-2, FDBC may act as an acceptable substitute to autologous bone grafting. Further study is needed to determine long-term outcomes in regard to graft resorption and effects of early repair on maxillary growth.

Integrating Artificial Intelligence in Craniosynostosis Management: A Systematic Review of Potential Applications

Abstract Presenter
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INTRODUCTION: Craniosynostosis is a medical condition in which one or more of the sutures of an infant's skull close prematurely, leading to problems in normal brain and skull growth in infants. Early intervention of the disease is crucial for better clinical outcomes, and the development of an objective algorithm using artificial intelligence (AI) can potentially enhance the accuracy and efficiency of diagnosing craniosynostosis through automated analysis of medical images, such as CT scans and MRIs. This systematic review aims to analyze different approaches to utilizing AI, such as deep learning and convolutional neural networks, and the use of 2D and 3D imaging techniques.

METHODS: Two independent reviewers systematically reviewed PubMed/MEDLINE, Scopus, OVID, and Web of Science databases using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA). One hundred thirty-one studies evaluating the role of artificial intelligence and machine learning in diagnosing and treating craniosynostosis were screened, and 11 studies met the inclusion criteria. Data on study design, modality of artificial intelligence, level of accuracy, and outcomes were collected.

RESULTS: Deep learning, a branch of AI, can analyze and categorize craniosynostosis without human assistance. Of the AI studies, 36.4% used convolutional neural networks (CNN), a type of artificial neural network widely used for image/object recognition and classification, vs. 63.6% used machine learning to automatically identify and classify craniosynostosis cases based on various features and measurements. While 63.6% of studies were based on 3D photographs, 36.4% relied on 2D imaging. Only two studies focused on the use of AI in non-syndromic craniosynostosis. The RESULTS of these studies show that the CNN and machine learning models performed with promising accuracy of ≥90.6% and≥93.3% in detecting and classifying craniosynostosis, respectively. 3D photogrammetric scans are a promising alternative to computed tomography scans in cases of single suture or non-syndromic synostosis for diagnostic imaging. However, the diagnosis is often not automated and relies on additional cephalometric measurements and the surgeon's experience. Nevertheless, recent studies have shown that AI-based facial analysis can match the diagnostic capabilities of expert clinicians in syndrome identification with an accuracy of 99.98%. These systems use 2D images and analyze texture and color, making them unsuitable for medical imaging modalities such as ultrasound, MRI, or CT.

CONCLUSION: Overall, the integration of AI technology in the diagnosis and treatment of craniosynostosis has the potential to improve outcomes for patients with this condition by enabling earlier and more accurate diagnosis, personalized treatment planning, and more comprehensive monitoring of long-term development. Our review highlights that further research is warranted to develop novel AI technologies and confirm their diagnostic potential in craniosynostosis. Once validated, the goal is to apply the AI models in the clinical environment.

Inferior Alveolar Nerve Location Predicts Persistent Numbness Following Bilateral Sagittal Split Osteotomy

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INTRODUCTION: Bilateral sagittal split osteotomy (BSSO) for mandibular repositioning is performed in close proximity to the inferior alveolar nerve (IAN). Transient lower jaw paresthesia post-operatively is common, however direct nerve injuries can result in persistent sensory deficits. Pre-operative imaging can provide valuable information on IAN location to minimize the risk of nerve injury. We hypothesized that proximity of the nerve to the mandibular cortex at certain locations was associated with increased risk of persistent post-operative

numbness.

METHODS: All patients undergoing a Lefort I and BSSO advancement with a single surgeon between 12/1/2020 and 10/7/2022 were included. Pre-operative surgical planning was performed using PROPLAN CMF ™ Online, DePuy Synthes. Pre-operative IAN location was obtained from CT imaging bilaterally at the 1st, 1st-2nd, and 2nd molar. Patients with less than 60 days of follow-up were excluded. Patient characteristics and outcomes measures were collected. Statistical analysis using chi-squared, Schapiro-Wilk, and Wilcoxon-Mann-Whitney tests compared sensate versus insensate patients at their last follow-up visit.

RESULTS: N=61 patients were included. Mean (SD) age at the time of procedure was 26.4 years (10.07) and mean length of time (days) from procedure to longest follow-up was 216 days (147.17). 56% patients reported ongoing numbness at 187 days (4.7). In general, all pre-operative measurements from nerve to mandibular cortex were smaller among patients who reported persistent numbness compared to sensate patients. The distances between the nerve and lateral cortex at the left and right 1st molar and right 2nd molar were significantly smaller among patients who reported persistent numbness compared to sensate patients ($p=0.02$, $p=0.017$, $p=0.032$, respectively).

CONCLUSION: Lateral location of the IAN at the molars is a predictable risk factor for higher rates of persistent post-operative numbness among patients undergoing BSSO advancement.

3D Printing of Orbital Floor Stamps: Feasibility and Efficacy in Reconstruction of Orbital Floor Fractures

Abstract Presenter
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INTRODUCTION: Three-dimensional (3D) printing is widely used in craniofacial surgery to enhance pre-operative planning, surgical precision, and patient outcomes. However, this technology comes with high costs and lengthy turnaround times that hinder its broad application in acute craniofacial trauma cases. Industry-printed orbital floor implants cost $8,000 on average and require several days of production time. We previously innovated a novel approach using in-house 3D printers to create contour models to generate patient-specific orbital floor implants. This method enables trauma centers to create patient-specific anatomical implants in a few hours and we hypothesized that this could be done a fraction of the cost of industry-produced implants.

METHODS: A retrospective cohort study was performed for 14 patients who have undergone orbital floor reconstruction using either in-house or industry-printed 3D models at our institution

from 2019 to 2022. Demographic information (age, sex, comorbidities, type of trauma, and BMI), perioperative data (operative length, blood loss, and length of hospital stay), and postoperative RESULTS (complications, functional outcomes, and subjective aesthetic outcomes) were collected. In-house orbital floor 3D stamps were designed using mirrored patient CT scans and printing costs were retrieved from our in-house 3D printing lab.

RESULTS: In-house 3D-printed stamps were used as contour models to press absorbable plates (Sonicweld®, KLS Martin) into patient-specific implants, and associated costs were compared to those for industry-created custom implants. Implants created with the help of in-house 3D printing costed 85% less than industry 3D printing ($998 and $6,701, respectively). In-house 3D printing averaged a turnaround time of 3.5 hours and was quicker than the industry average of several days. There were no significant differences found in complication rates and no patients in either group required re-operation.

CONCLUSIONS: This new method of in-house 3D printing to treat orbital floor fractures is rapid, low-cost, and as clinically effective as industry 3D-printed implants. Due to its quick turnaround time, this approach contributes unique value in acute trauma settings where patients may require urgent operation. With greater adoption of this technology, we hope that trauma centers can offer more patients access to custom orbital floor implants, shaped to their own individual anatomy.

OBJECTIVE: Each learner will be able to identify a novel, cost-effective, and rapid approach in utilizing in-house 3D printers to repair acute orbital floor trauma.

Unpacking Pediatric Nasoorbitoethmoid Fractures: Characteristics, Management, and Outcomes at a Single Institution

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BACKGROUND: Nasoorbitoethmoid (NOE) fractures are among the least common pediatric craniofacial fractures, accounting for between 1% and 8% of all pediatric facial fractures. While

pediatric anatomy lends to lower frequency of NOE fractures in children than in their adult counterparts, these anatomic differences also necessitate a close examination of the impact of NOE fractures on growth of the craniofacial skeleton, as well as their association with other sites of injury. This study describes characteristics, management, and outcomes of pediatric NOE fractures seen at a single institution.

METHODS: A retrospective review of patients under 18 years of age who presented to our institution from 2006 to 2021 with facial fractures was conducted; patients with NOE fractures were included. Patients were subdivided into three age groups: younger than 6 years, 6 to 12 years, and 13 to 18 years. These age groups were selected primarily on differences in dental maturity, though additional characteristics are reflected by this division. Data collected included demographics, injury details, associated fractures, mechanism of injury, management, and outcomes. NOE fractures were divided into type I, type II, and type III fractures in accordance with the Markowitz and Manson classification system and were evaluated using CT scans and operative notes.

RESULTS: 58 patients met inclusion criteria and mean age at presentation was 12.48 +/- 0.96 years. A majority (77.6%) of patients presented with Type I fractures; 17.2% presented with Type II fractures, and 5.2% presented with Type III fractures. The most common causes of injury were motor vehicle accidents (MVAs, 39.7%) and sports (31%). Glasgow Coma Score (GCS) and injury mechanism were not predictive of injury severity in the pediatric population ($p=0.353$, $p=0.493$). Secondary orbital fractures were the most common associated fractures across all NOE fracture subtypes (n=55, 94.8%). Concomitant parietal bone fractures were more likely in Type III fractures ($p=0.047$), while LeFort III fractures were more likely in type II fractures ($p=0.011$). Soft tissue and neurological injuries were the most common associated injuries regardless of NOE fracture type (81% and 58.6%, respectively). Most patients (40 patients, 69.0 percent) required operative management, while 31.0 percent of patients underwent non-operative management. A multivariate regression revealed that after correcting for confounders (e.g., GCS, age), only type III fractures were predictive of operative intervention (C-statistic = 0.80; $p = 0.0003$). Type III fractures were predictive of longer length of stay ($p = 0.0021$); however, there was no significant difference in the rates of adverse outcomes between types of NOE fracture ($p>0.05$).

CONCLUSIONS: These findings suggest that pediatric NOE fractures, though rare, present differently from adult NOE fractures and that revisiting predictive heuristics and treatment strategies is warranted in this population.

The Legal Burden of Cleft Lip and Palate: A Comprehensive Overview of the Legal Landscape for Patients and Practitioners

Abstract Presenter
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PURPOSE: Patients with cleft lip and/or palate (CLP) often experience many medical and psychosocial challenges due to their condition. The medicolegal implications of this diagnosis are not well documented. The purpose of this study was to explore the frequency and types of litigation that children and adults with CLP are involved in within a modern timeframe.

METHODS: A retrospective review of the Westlaw Campus Research legal database for cases involving individuals with a CLP between January 2015 and October 2022 was performed. Cases were excluded if there were not any specific individuals with CLP or if there was limited documentation. The reason for litigation as well as gender, age, and vital status (alive or deceased) of the individual with CLP was determined. The state where the case took place and case outcomes were also collected. Descriptive statistics were calculated.

RESULTS: A total of 81 cases were included. 50.6% (N=41) of the individuals were male and 79% (N=64) of the cases involved children with CLP. 66.7% (N=54) of the individuals involved had a cleft palate, 9.9% (N=8) had a cleft lip, and 23.5% (N=19) had both cleft lip and palate. Only one case involved a medical malpractice claim for wrongful birth. This case arose based on a prenatal care provider's failure to timely inform the patient that her child would be born with congenital anomalies, including a cleft lip. The majority of the cases were parent custody cases that involved children or a parent with a diagnosis of CLP (N=43, 55.1%). Other reasons for litigation included supplemental security (N=16, 20.5%) and product liability (N=3, 3.8%). All of the supplemental security cases were either awarded in favor of the defendant, instead of the individual with the cleft lip and/or palate or remanded.

CONCLUSIONS: The risk of being involved in medical malpractice litigation initiated by patients with CLP is very low. The majority of litigation focuses on child custody issues, in which CLP may factor in as a variable indicating a chronic condition for the involved child or parent. Healthcare providers can aid individuals with CLP as well as parents of children with CLP by providing proper referrals to social supports and collaborating with medical-legal partnerships.

Condyle Resection and Patient Reported Outcomes After Free Flap Reconstruction of Lateral Mandible Defects: A Preliminary Analysis Using the Face-Q

Abstract Presenter
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BACKGROUND: Patient reported outcome measures (PROM) in oncologic head and neck reconstruction have yet to be thoroughly evaluated and incorporated into patient care. Tumor involvement of the posterior mandible often necessitates resection of the condyle and associated soft tissue elements, thereby increasing complexity of the ensuing reconstruction and rehabilitation. While previous studies have focused on clinical assessments of postoperative morbidity and functional status1, this study compares FACE-Q scores of patients whose condyles were sacrificed versus those whose condyles were preserved prior to free flap reconstruction of lateral mandibulectomy defects.

METHODS: Patients who underwent lateral mandibulectomy and free flap reconstruction between 2000-2021 and completed at least one postoperative FACE-Q were retrospectively reviewed. Cohorts were divided based on whether the mandibular condyle was included in the resection. Baseline patient and treatment characteristics were compared. FACE-Q responses were divided into appearance, functional, and stress domains scored from 0-100, where higher scores represent better outcomes.

RESULTS: A total of 117 patients underwent free flap reconstruction of a lateral mandibulectomy defect and subsequently completed a FACE-Q survey; of these, 51 patients had condyle resection, and 66 patients had condyle preservation. Patients within the condyle preserved group were more likely to have received a bony free flap, and those in the condyle resected group were more likely to have received a soft tissue flap (p=0.001). Condyle preserved patients reported significantly greater satisfaction with their overall appearance score (p=0.017), swallowing (p=0.018), and eating and drinking (p=0.015) function. Condyle preserved patients also reported significantly greater satisfaction with their appearance distress (p=0.022) and eating and drinking distress (p=0.016). Condyle resected patients reported significantly better cancer worry distress (p=0.002).

CONCLUSION: A preliminary analysis of FACE-Q outcomes for lateral mandibulectomy with and without condyle resection found that patients who had their condyles preserved reported greater post-reconstructive satisfaction in multiple domains. As expected, surgical involvement of the temporomandibular joint is associated with decreased satisfaction in more PROM domains.
Studies with larger cohorts and longer follow-up interval could provide valuable information for surgeons when counseling patients on expected outcomes after mandible resection.

REFERENCES

1. Wang L, Liu K, Shao Z, Shang ZJ. Management of the condyle following the resection of

tumours of the mandible. Int J Oral Maxillofac Surg. 2017 Oct;46(10):1252-1256. doi: 10.1016/j.ijom.2017.04.029. Epub 2017 Jul 5. PMID: 28688540.

A Retrospective Cohort Study of Maternal Infectious Disease Status and Risks of Cleft Lip and Palate Using United States Birth Data

Abstract Presenter
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PURPOSE: Cleft lip and/or palate (CL/P) is a common congenital anomaly, and maternal infectious disease (ID) status during pregnancy has been suggested to be a risk factor for CL/P [1]. However, there is a dearth of evidence establishing the association between various types of ID and CL/P status. Previous studies have reported an association between maternal influenza and herpes simplex virus [2] , but evidence for other common types of infectious diseases, particularly sexually transmitted diseases (STD), have been limited. To address gaps in research, we examine the association between various IDs and CL/P in the United States.

METHODS: This is a population-based retrospective cohort study using data from the Centers for Disease Control and Prevention (CDC) natality data from 2016 to 2021 [3]. We examined the prevalence of (1) cleft lip with or without palate and (2) cleft palate-only and their associations with maternal gonorrhea, syphilis, chlamydia, Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) present and/or treated during pregnancy. We further adjust for a range of maternal demographic and health conditions previously reported to be associated with CL/P (e.g., age, smoking, obesity, pregestational diabetes) in multivariate modeling. Logistic regression models were used to estimate the odds ratios and 95% confidence intervals from the analysis. Significance was set at <.05.

RESULTS: Of 22,669,736 births included in our study, 11,341 had cleft lip with or without cleft palate and 5,145 had cleft palate only. In both univariate modeling and models accounting for maternal demographic variables, the following associations emerged as significantly associated with cleft lip with or without palate (adjusted values presented): (1) Chlamydia, Odds Ratio (OR) = 1.255 (1.114,1.414); (2) HCV, OR = 1.390 (1.124,1.721); (3) Any maternal infection, OR = 1.200 (1.118, 1.276); the following emerged as significantly associated with cleft palate-only: (1)

HCV, OR = 2.907 (2.351,3.596); (2) Any maternal infection, OR = 1.307 (1.204,1.396). After controlling for maternal demographics and health conditions, Syphilis was found to be associated with cleft lip with or without palate, OR = 13.188 (1.828,95.127).

CONCLUSIONS: Our results demonstrate that maternal chlamydia and HCV are associated with orofacial clefts and other maternal health conditions examined in our study. Our findings also revealed an interesting suppression effect of syphilis where it was found to be significantly associated with cleft lip with or without palate only after controlling for maternal demographic and health condition variables. The strongest univariate effect size was observed between HCV and risk of cleft palate-only. The mechanisms by which maternal infectious diseases may increase the risk of CL/P are not well understood. Suggested explanations include inflammation and immune dysregulation which interferes with normal fetal development, but further research is needed to elucidate these findings and to better understand the underlying mechanisms. To our knowledge, our study is the first in the literature to document these important findings.

REFERENCES:

1. Barrera, C., & Mezarobba, N. (2016). Maternal risk factors associated with cleft lip with or without cleft palate: a review. International Journal of Odontostomatology, 10(2), 359-368.
2. Zhang X, Zheng Y, Zhu J, Yan J, Wei Z, Yang X, et al. Maternal infection during pregnancy and risk of fetal congenital anomalies: a systematic review and meta-analysis of cohort studies. Journal of Maternal-Fetal & Neonatal Medicine. 2018;31(17):2252-63.
3. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Natality on CDC WONDER Online Database. Data are from the Natality Records 2016-2021, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/natality-expanded-current.html.

A National Database Perspective On Pediatric Gunshot Wounds, Plastic Surgery Involvement, And Outcomes Related To Demography

Abstract Presenter
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PURPOSE: The Pediatric Health Information System (PHIS) database collects admissions, diagnostic, and treatment data from 44 children's hospitals across the U.S. Gunshot wounds (GSW) are a significant mechanism of pediatric injury, accounting for an estimated 13,000 injuries each year. Of the total cases of recorded GSW, 13% required plastic surgery

involvement. Despite their increasing prevalence and the significant morbidity and mortality associated with this mechanism of injury, a paucity of literature underlines the national surgical burden of these injuries. The PURPOSE of this study is to characterize the geographical distribution of non-accidental GSW in the US and identify socioeconomic risk factors that impact patient length of stay (LOS); in particular, this analysis focuses on the relationship between length of stay and the Child Opportunity Index (COI), a composite measure of neighborhood resources that aid in healthy child development and for which higher COI indices correspond to more severe deprivation and unfavorable socioeconomic conditions.

METHODS: A retrospective review was performed after querying the PHIS database for ICD codes pertaining to pediatric firearm injuries. Patient demographics, clinical data, and Child Opportunity Index were analyzed. Univariate analysis, two-sample t-tests, and multinomial logistic regressions were performed using R statistical software (Version 1.3.1093).

RESULTS: 16,543 patients were pulled from PHIS and met inclusion criteria. Among these patients, 14,467 (87.5%) were male and 11,447 (69.2%) were Caucasian. Mean age at presentation was 13.03± 0.029 years (range 0-18 years). Each mile increase in distance from the hospital was associated with a 43-minute increase in patient LOS ($p< 0.0001$). Additionally, each 1% increase in childhood opportunity index (COI) was associated with an additional nine hours spent in the hospital ($p< 0.0001$). Non-white patients had a significantly higher LOS compared to white patients ($p<0.0001$) and hailing from a rural town with a significant proportion of commuters to a nearby area was associated with a two-day increase in the average LOS ($p<0.01$).

CONCLUSIONS: This study provides a detailed characterization of pediatric patients admitted to U.S. hospitals for management of GSW related injuries. Higher distances from the hospital, higher COI, and non-white race were associated with increased LOS in this patient cohort.

Socioeconomic Status and Radiation History in Fibular Free Flap Head and Neck Reconstruction: Impact on Surgical Complications

Abstract Presenter
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INTRODUCTION: Free tissue transfer is the gold standard for reconstruction of complex head and neck defects following major resection. Data regarding risk factors for post-operative complications such as reoperation and readmission rates have been elucidated, but

socioeconomic considerations remain poorly investigated. The PURPOSE of this study was to determine the impact of patient demographic factors and socioeconomic status (SES) on patient outcomes following fibula free flap repair.

METHODS: A retrospective study of patients who had a fibula free flap repair following head and neck cancer resection at a single institution was performed from 2016-2022. Patient demographics including sex, race, median household income (MHI), insurance type, and patient history including pre-operative radiation treatment were collected. Primary outcome variables included 30-day, 90-day-and 180-day surgical complications, 30-day re-admission rates, and number of operative revisions following the initial procedure. Bivariate analyses using Chi-square tests and linear regression were performed for outcome measures and p-value of < 0.05 was considered significant.

RESULTS: Sixty-three patients (39 male, 29 female) were included in this study. Most patients (76.2%) underwent fibula free flap repair for oncologic reconstruction. Thirty-two patients (50.8%) underwent radiation treatment to the surgical site pre-operatively. Patients who underwent radiation treatment pre-operatively were at an increased risk of developing surgical complications 30- and 180-days following surgery ($p=0.021$, $p=0.036$). The most common surgical complications in our patient cohort included recipient surgical site infection and dehiscence. Furthermore, patients with a lower MHI (below first quartile range of $55,000 per year) were more likely to be re-admitted 30 days post-operatively ($p=0.045$) and have a higher number of operative revisions following the index procedure (median: 2; IQR: 2; $p=0.011$). Sex and insurance type did not significantly impact the primary outcome variables investigated.

CONCLUSION: Pre-operative radiation treatment and lower MHI were associated with worse outcomes following fibula free flap repair. This finding suggests that socioeconomic status may exert a similar impact on patient outcomes as pre-operative radiation treatment. Therefore, identification of these risk factors is critical, as it can inform preoperative counseling and postoperative management to improve outcomes for patients undergoing head and neck reconstruction. Efforts to address socioeconomic disparities in access to care and treatment should be made to optimize patient outcomes.

Virtual Surgical Planning in Craniosynostosis Reduces Operative Time and Intraoperative Need for Transfusions

Abstract Presenter
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INTRODUCTION: Cranial vault reconstruction (CVR) with and without frontal orbital advancement (FOA) for craniosynostosis is a complex procedure. Virtual surgical planning (VSP) for pre-operative planning has been increasing in use and has been shown to optimize workflow. However, little is known regarding the impact on the peri-operative course with conflicting reports on the impact on blood loss. In this study, we aimed to evaluate the impact of VSP on operative time and peri-operative transfusions in patients with craniosynostosis undergoing CVR.

METHODS: A retrospective chart review from 2014 to 2023 was conducted of patients with craniosynostosis who underwent open cranial vault remodeling. Patient demographics, peri-operative variables, use of virtual surgical planning, and complications were obtained. Peri-operative variables collected include operative time, length of stay, intraoperative transfusions, and post-operative transfusions. An independent t-test was used to compare variables from patients who had surgery with VSP and patients who did not have surgery with VSP.

RESULTS: There were 126 infants with craniosynostosis who underwent open cranial vault remodeling, 79 (62.7%) of which used VSP. There was no difference in average age at surgery (9.26 ± 5.67 months vs 13.22 ± 31.09 months, p=0.39). Compared to those who did not use VSP, surgeries with VSP had on average a shorter operative time (3.68 ± 1.07 hours vs 5.03 ± 1.05 hours, $p<0.001$) and shorter length of stay (3.91 ± 1.27 days vs 4.60 ± 1.69 days, p=0.01). There was a lower volume per weight of intraoperative transfusion for surgeries that utilized VSP (29.16 ± 12.45 mL/kg vs 50.17 ± 27.59 mL/kg, $p<0.0001$). Post-operatively, patients who did not use VSP required more transfusions (59.5% vs 19.0%, $p<0.001$). These trends were similar in patients who underwent FOA. Among those who underwent FOA (44 with VSP, 27 without VSP), surgeries with VSP had a shorter operative time (3.88 ± 1.08 hours vs 5.57 ± 1.00 hours, $p<0.001$), lower intraoperative transfusion volume per weight used (30.83 ± 12.98 mL/kg vs 53.32 ± 32.79 mL/kg, $p<0.001$) and required fewer post-operative transfusions (18.2% vs 55.6%, $p<0.001$). There was no difference in complications rates of dehiscence, infection, return to the operating room and 30-day readmission.

CONCLUSIONS: In addition to decreasing operative time for open cranial vault remodeling and CVR with frontal orbital advancements, VSP was found to decrease the volume transfused during surgery and the need for post-operative transfusions. These findings suggest that VSP is effective in reducing anesthetic exposure in infants and decreasing estimated blood loss.

Increased Social Vulnerability is Associated with Non-syndromic Cleft Lip and Palate in the United States—a CDC Vital Statistics Review of 2,876,892 Live Births

Abstract Presenter
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INTRODUCTION: Social determinants of health may be associated with non-syndromic cleft lip with or without palate (CL/P) and cleft palate (CP). Exposing these effects can help target resources and bring awareness to vulnerable populations within the US.

METHODS: CL/P and CP incidence rates from 2016 - 2020 were extracted from the Centers for Disease Control and Prevention (CDC) Vital Statistics Database and combined with CDC Social Vulnerability Index (SVI) by county. SVI domains, reported as percentile rank, include socioeconomic status (SES), minority status and language (MSL), household composition/disability, and housing type/transportation. Multiple linear regressions evaluated the incidence of CL/P and CP as a function of individual and composite SVI domains.

RESULTS: There were 1,292 CL/P births per 2,876,892 live births (incidence of 0.45/1000 births) and 181 CP births per 690,662 live births (incidence of 0.26/1000 births). For CL/P, the SVI composite index coefficient estimate (CE) was -0.35 (p-value = 0.029), SES CE was -0.24 (p-value = 0.096), MSL CE was -0.43 (p-value = 0.015), and housing type and transportation CE was -0.67 (p-value = 0.003). For CP, the SVI composite index CE was -1.95 (p-value = 0.005), SES CE was -1.39 (p-value = 0.034), and MSL CE was -3.67 (p-value < 0.001), and housing type and transportation CE was -0.98 (p-value = 0.297). Household composition/disability CE were not significant.

CONCLUSION: Social vulnerability was significantly correlated with increased incidences of non-syndromic CL/P and CP. These indexes can be utilized to direct state and national resources to target these areas of need.

REFERENCES:
https://journals.lww.com/plasreconsurg/Abstract/2022/01000/Poverty_and_Risk_of_Cleft_Lip_and_Palate__An.28.aspx

CT-based 3D-Printed Occlusal Splints for Repair of Acute Occlusal Trauma: A Feasibility Study

Abstract Presenter
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INTRODUCTION: Mandible fractures account for a large percentage of craniofacial trauma. In complex orthognathic and mandibular cases, virtual surgical planning (VSP) and patient-specific models are frequently used to reduce operative times and improve accuracy of reconstruction. These models often include occlusal splints, which can stabilize the occlusion and aid with osteotomies. However, occlusal splints often require supplemental intraoral scans and several days of production time. This study explores the feasibility of rapid in-house design of occlusal splints using only CT imaging, without the supplementation of high-resolution intraoral scanners.

METHODS: For two patients with acute occlusal trauma, DICOM files were obtained from CT scans and imported into Materialise Mimics for bone thresholding. The maxilla, mandible, and damaged fragments were individually segmented and subsequently exported to Geomagic for virtual surgical reduction. If occlusal interference was present, fine adjustments were made with the aim of optimizing molar occlusion and incisal relationship. 3D occlusal splints were created and printed in UMA 90 resin using a Carbon M1 printer at our in-house 3D printing lab. Intraoperatively, the 3D printed occlusal splint was soaked in betadine and placed intraorally prior to wiring.

RESULTS: The average material cost for printing a resin occlusal splint was $20.43, with a total printing cost of $329.10 including labor. Turnaround time averaged 6.5 hours (3 hours of design and 3.5 hours of printing). Intraoperatively, the 3D printed occlusal splint set flawlessly in the patient's teeth, aligning the mandibular fragments and allowing for plating of the mandible fractures with ease.

CONCLUSIONS: With the seamless intraoperative application of a 3D printed occlusal splint, this study suggests that designing occlusal splints from solely CT imaging may be viable. This method would contribute unique value in an acute trauma setting where time is limited and only CT imaging is available. Additionally, in traumatic cases with multiple mandible fractures, creating an occlusal splint would aid in stabilizing mandible fragments and allow for accurate plating. Further application of this technique will allow for refinement and outcomes analyses.

OBJECTIVE: Each learner will be able to recognize the feasibility of CT-based 3D-printed occlusal splints for repair of acute occlusal trauma.

Quality of life in pediatric patients with craniofacial conditions from Mexico and the US: a matched cohort study

Abstract Presenter
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INTRODUCTION: Few studies exist that evaluate quality of life (QoL) in pediatric patients with diverse craniofacial conditions (CFCs), especially in a global setting.1 One qualitative study noted the increased public harassment experienced by patients with CFCs in Mexico.2 This study explores the differences in parent and patient-reported quality of life outcomes for patients living in the U.S. versus Mexico when matching for common cofounders such as age, sex, and diagnosis.

METHODS: In total, 144 parents (n=92) and patients (n=52) completed the Craniofacial Conditions Quality of Life scale (CFC-QoL), which measures 6 domains: bullying, peer problems, psychological impact, family support, appearance satisfaction, and desire for appearance change. Patients included were ages 1-22 years old with a variety of craniofacial diagnoses (cleft lip/palate, craniosynostosis, microtia, microsomia, and dermatologic conditions). Participants who reported Mexico as their country of residence were matched with participants from the United States based on age range, sex, and diagnosis. QoL outcomes were scored for each subscale and those with higher means indicated worse outcomes. An independent samples t-test was run to determine if there were any significant differences between patients living in the U.S. versus Mexico for each subscale.

RESULTS: Patients who reside in Mexico reported significantly worse outcomes in psychological impact ($p=0.008$) and desire for change in appearance ($p=0.009$) compared to those who reside in the U.S. when matched for age, sex, and diagnosis. Parents who reside in Mexico reported significantly higher desire for change in their child's appearance ($p=0.043$) compared to U.S.-based families.

CONCLUSIONS: Although most subscales of parent and patient-reported QoL outcomes are similar between the matched cohort in the U.S and Mexico, we can conclude that participants in Mexico report worse outcomes in 2 domains: psychological impact and desire for appearance change. Factors that might be influencing these outcomes include limited access to care and increased public harassment in Mexico.2 However, further study and a larger sample size is needed to determine the modifiable factors that are causing worse QoL outcomes in Mexico-based patients with CFCs. Additionally, the discrepancy in QoL outcomes demonstrates the need to include CFC patients from outside of the U.S. to determine the global need for future interventions.

REFERENCES:

1) Tapia VJ, Epstein S, Tolmach OS, Hassan AS, Chung NN, Gosman AA. Health-related quality-of-life instruments for pediatric patients with diverse facial deformities. Plastic and Reconstructive Surgery. 2016;138(1):175-187. doi:10.1097/prs.0000000000002285
2) Tapia VJ, Drizin JH, Dalle Ore C, et al. Qualitative METHODS in the development of a bilingual and bicultural quality of life outcomes measure for pediatric patients with Craniofacial Conditions. Annals of Plastic Surgery. 2017;78(5). doi:10.1097/sap.0000000000001027

Characteristics Driving "Potentially Avoidable" Transfers of Pediatric Mandibular Fracture Patients

Abstract Presenter
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BACKGROUND: Mandibular fractures account for up to 48.8% of pediatric facial fractures, making them one of the most common pediatric facial fractures. While a wide range of treatment modalities are available for these injuries, conservative treatment options, including jaw rest or chewing gum, are most frequently indicated. Despite the ubiquitous availability of conservative treatment regimens, pediatric mandibular fracture patients are often transferred, leading to costly and time-consuming "potentially avoidable" transfers for patients, families, and hospital systems. This study evaluates factors influencing "potentially avoidable" transfer, defined as a patient receiving conservative treatment post-transfer to a children's hospital.

METHODS: A retrospective review was performed of patients under 18 years of age who were evaluated for mandibular fractures at a pediatric level I trauma center between 2006 and 2021. Variables studied included demographics, etiology, medical history, associated injuries, treatments, and outcomes. Chi-squared, linear regression, Welch's t-test and ANOVA tests were conducted using Stata SE Software (College Station, TX).

RESULTS: A total of 480 pediatric patients (121 female and 359 male) met inclusion criteria. More than half of the patients (n=281, 58.5%) were transferred from an outside hospital and of those, 177 (63.0%) were deemed "potentially avoidable." Subsequent treatment (conservative vs. surgical intervention) did not differ significantly between the transfer and non-transfer groups ($p=0.415$). Insurance status (uninsured, $p=0.023$) and presence of a soft tissue injury ($p=0.022$) were significantly associated with likelihood of transfer. Trauma level, cause of incidence, gender, and presence of another fracture, musculoskeletal or brain injury did not significantly influence rate of transfer.

CONCLUSIONS: "Potentially avoidable" patient transfers are a significant logistical and economic burden to patients and hospital systems. Uninsured pediatric mandibular fracture patients were more likely to be transferred than similar peers regardless of presenting trauma level, yet they were no more likely to receive subsequent surgical care post-transfer than similar non-transferred peers. Concurrent soft-tissue injuries were a significant factor influencing "potentially avoidable" transfers. These findings support additional research and innovation in remote plastic surgery consultations for pediatric patients who may not benefit from urgent transfer.

Creation of the Scaphocephalic Index

Abstract Presenter
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INTRODUCTION: Premature fusion is termed sagittal craniosynostosis (SC) and is described by a classic dysmorphology, scaphocephaly. Scaphocephaly RESULTS as bi-parietal expansion is inhibited and anterior and posterior compensatory elongation occurs. We recently used surface imaging modalities to develop regional measures quantifying elongation in the frontal bossing index (FBI) and occipital bullet index (OBI). Creating a width based measure, would allow the isolated measurement of the fundamental pathology of scaphocephaly. Further, it would allow for the creation of a global metric which could easily replace the familiar cephalic index. This combined system would allow surgeons to identify both global and regional morphology in scaphocephaly.

METHODS: Surface imaging from CT scans or 3D photographs of 360 individuals with sagittal craniosynostosis and 221 normocephalic individuals was obtained. Cartesian grids were created on each individual's surface mesh using equidistant sagittal and coronal planes. Grid intersections were used as reproducible landmarks to identify patterns in width restriction. Area under the curve (AUC) analyses was performed to identify trends in regional morphology and create measures capturing population differences. The most distinct was then used to create a vertex narrowing index (VNI). Using the FBI, OBI, and VNI, a measure of W/L analogous to the cephalic index was created (Scaphocephalic Index, SCI). Measure performance was evaluated using area under the curve (AUC) analyses. Finally, measurement was then automated.

RESULTS: With regard to width, control crania were observed to round while those with SC consistently slope inward, with a more triangular appearance. Population differences increased as more superior regions were evaluated, with difference peaking just posterior to the AP midline at a height 70% of the way between the tragion and vertex. The VNI performed well with an AUC of 0.97, a sensitivity of 91.2% and a specificity of 92.2%. Index score is independent of age (<5 years), sex, and imaging modality. The measures can be simply combined to form a SCI. SCI measure performance was nearly perfect (AUC >0.999, Sensitivity >99%, Specificity >99%) in distinguishing control vs SC patients. The population means were 63(±5) and 88(±5) for the SC and control populations respectively.

CONCLUSION: The VNI allows surgeons to measure and track the primary pathology of SC. Allowing for the isolated measurement of the width abnormality of sagittal craniosynostosis, vertex narrowing. The VNI in combination with the FBI and OBI create regional cranial shape indices which allow for superior differentiation of SC and control patients compared with other systems as it approaches the accuracy of CT imaging. The system may be further utilized for comparison of operative techniques for SC over time as it avoids the need for serial radiation for long-term shape evaluation and is automatable without prohibitive technologic requirements.

Identifying Trends in Craniofacial Injuries Sustained While Riding Electric Scooters via the National Electronic Injury Surveillance System (NEISS)

Abstract Presenter(s)
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INTRODUCTION: In light of the increasing use of standing electric scooters on a nationwide scale, no study has specifically evaluated craniofacial injuries associated with their use to date.1-3 This study explored the incidence, demographics, and craniofacial injuries of standing e-scooter-related trauma in the United States over the past decade.

METHODS: The U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS) was queried for trends in craniofacial, standing e-scooter injuries between 2012 and 2021. Data collected included patient demographics, injury diagnoses, use of alcohol and helmet, and disposition. The NEISS weight variable was used to calculate the estimated national incidence of these factors. Cases involving, mobility scooters, gasoline-powered scooters, mopeds, electric skateboards, or non-rider pedestrians were excluded.

RESULTS: 1193 patients resulted for treatment of standing, e-scooter-related craniofacial injuries at hospitals in the United States between 2012 and 2021, representing a 12.4-fold increase in cases over this decade. Patients were predominately male (65.5%) with ages ranging from 2 to 87 years (average 28.3 years). The most common craniofacial injuries were lacerations (30.91%), contusions or abrasions
(17.39%), and concussions (14.44%). Of the head and neck injuries, lacerations most often occurred on the face (70.04%) while fractures most commonly affected the face (75.86%) and head (16.67%). The majority of patients were discharged home or observed in the emergency department (91.26%) with the remainder being admitted to the hospital (8.74%). Of patients 21

years or older, 22.87% were injured under the influence of alcohol. Helmet usage was specified in 5.69% and not found to affect concussions (OR: 1.48 95% CI [0.85,2.11]).

CONCLUSION: The increasing frequency of craniofacial injuries involving standing e-scooters, alongside the expansion of e-scooter ridesharing services in the United States, suggests the continued evaluation of e-scooter injury patterns. This cross-sectional study describes the frequency, type, and distribution of these craniofacial injuries and explores trends regarding alcohol and helmet use, injury diagnosis, and disposition. This knowledge can guide management and possibly inform prevention strategies. Additional studies should investigate the severity of these injuries and correlate RESULTS with other databases that explore hospital course.

1 Shichman, I., Shaked, O., Factor, S., Weiss-Meilik, A., & Khoury, A. (2022). Emergency department electric scooter injuries after the INTRODUCTION of shared e-scooter services: A retrospective review of 3,331 cases. World J Emerg Med, 13(1), 5-10. doi:10.5847/wjem.j.1920-8642.2022.002
2 Toofany, M., Mohsenian, S., Shum, L. K., Chan, H., & Brubacher, J. R. (2021). Injury patterns and circumstances associated with electric scooter collisions: a scoping review. Injury Prevention, 27(5), 490. doi:10.1136/injuryprev-2020-044085
3 Commission, U. C. P. S. (2021). Injuries Using E-Scooters, E-Bikes and Hoverboards Jump 70% During the Past Four Years. Retrieved 12/2022. Retrieved from https://www.cpsc.gov/Newsroom/News-Releases/2021/Injuries-Using-E-Scooters-E-Bikes-and-Hoverboards-Jump-70-During-the-Past-Four-Years

Positive Airway Outcomes in Syndromic Pierre Robin Sequence Infants Treated with Mandibular Distraction Osteogenesis: A Single Surgeon's Experience

Abstract Presenter
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BACKGROUND: Pierre Robin Sequence (PRS) presents as isolated PRS [iPRS] or in conjunction with a genetic syndrome [sPRS] that subsequently leads to feeding difficulties, respiratory dysfunction, and eventual failure to thrive. Mandibular distraction osteogenesis (MDO) has remained a mainstay of treatment to directly address the tongue-based airway obstruction in PRS patients. sPRS patients routinely have a more challenging clinical course, and there is a paucity of data comparing the effectiveness of MDO as a treatment for sPRS versus iPRS.

METHODS: A single-institution, IRB-approved, retrospective review was conducted of all PRS patients who underwent MDO by a single surgeon between January 2015-February 2022. The patients were stratified into iPRS or sPRS based on genetic evaluation (N=50) with 36% classified as sPRS. Primary measures were demographic and situational data including length of stay, follow-up, and complications; airway outcome measures included avoidance of tracheostomy, Apnea-Hypoxia Index (AHI), and laryngeal view pre-distraction and at the time of distractor removal.

RESULTS: Prior to distraction, patient characteristics of the iPRS (N=32) and sPRS group (N=18) showed no significant differences in patient age (105.1 ± 199.7 days; range 2-1051 days), AHI (17.3 ± 17.1; range 3.6-90), or laryngeal view (65% grade III or IV) ($p>0.05$). Six months post-distractor removal, 92% of both sPRS and iPRS avoided tracheostomy ($p>0.05$). Overall, post-MDO, there was a statistically significant decrease in mean AHI from 17.3 to 4.5 ($p<0.001$). sPRS patients in particular had a significant decrease in average AHI following MDO from 15.2 to 4.5 ($p=0.028$). Post-MDO, both groups had similar improvement of laryngeal view, growth curve, and avoidance of g-tube ($p>0.05$).

CONCLUSIONS: Despite the fact that sPRS patients typically have a more challenging clinical course, we found an equivalent clinical improvement in AHI and laryngeal view between sPRS and iPRS patients post-MDO. In our experience, MDO can effectively treat the functional limitations that arise in PRS, and we found significant benefit to MDO in both iPRS and sPRS patients without one subtype being favored. However, the decision to move forward with distraction remains a nuanced one and should be individualized to each patient and family.

"Growth Curves for Intracranial Volume and Cranial Index in a Diverse Population of Healthy Children"

Abstract Presenter
Alexander Velazquez

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BACKGROUND: In the management of patients with craniomaxillofacial deformities, it is imperative to understand normal anthropometric growth of the cranium. Although there have been advances in three-dimensional (3D) computed tomography (CT) images, there is an absence of normative growth curves of intracranial volume (ICV) and cranial index (CI) in a diverse population of healthy children using current imaging technology. The goal of this study is to establish normative craniometric growth curves in a healthy population of children (ages 0-18 years).

METHODS: CT scans of 115 patients who underwent cranial imaging at a tertiary children's hospital were included. Patients with head trauma, hydrocephalus or pathologic cranial dysmorphology (plagiocephaly/craniosynostosis) were excluded. Patients were stratified into 23 age groups of 5 patients each (0-2 months, 3-5 months, 6-8 months, 9-11 months, 12-17 months, 18-23 months, and yearly from 2-18 years). Primary outcomes of total intracranial volume and cranial index were analyzed using CT scans. Primary outcomes were plotted across age intervals, along with best-fit logarithmic curves.

RESULTS: Cranial index ranged from 75.44 to 83.55 in our cohort overall. The mean cranial index was 80.28 at birth, peaked to 83.55 at the 6–8 month period, and then returned to 80.96 at 3 years of age. The cranial index then continued to slowly decrease over time, reaching a nadir at age 18 years. In contrast, intracranial volume rapidly increased in the first 6-8 months of life, and then continued to slowly increase at each age interval throughout childhood, adolescence and into early adulthood.

CONCLUSION: Establishing normal cranial volumetric growth curves and changes in cranial indices during development is important in contextualizing cranial pathology. These data will enable us to compare pathologic cranial morphology, like craniosynostosis, to established normative growth curves.

Underdiagnosis of Syndrome of Trephined in Patients Undergoing Cranioplasty

Abstract Presenter
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INTRODUCTION: Syndrome of the Trephined (SoT), or "sinking flap syndrome" refers to the neurological deterioration that occurs after a large craniectomy. This syndrome has various symptoms including headaches, worsened hemisyndrome, or cognitive disorders with or without an orthostatic component; that improve or resolve entirely as early as 3 to 4 days after a cranioplasty procedure. Previous studies have proposed that SoT may be underdiagnosed because it is often difficult to discern SoT from the congruent neurological insults present in these patients. Thus, this study aims to evaluate the frequency of SoT symptomatology in patients undergoing cranioplasty using Activity Measure for Post-Acute Care (AM-PAC) scores which is a validated, physical therapist-administered metric of patient basic mobility and activity. Further, this study aims to evaluate risk factors associated with the development of SoT.

METHODS: A retrospective chart review was performed on 113 patients undergoing 172 cranioplasties between April 2016 to January 2022. Pertinent demographic, initial insult for craniectomy, cranial deficient size and surgical data was extracted from patients' charts. AM-PAC scores below 17 indicates >50% of impairments and a score of 24 implies no impairment.

SoT was defined as ≥2 points of improvement in AM-PAC score 3-7 days after cranioplasty. If a patient met the criteria for SoT charts were investigated for the mention or diagnosis of SoT. Paired sample t-test and ANOVA was used to determine statistical significance.

RESULTS: Sixty-four patients (females; n=27, males; n=37) were seen by a physical therapist before and after their cranioplasty procedure and had their mobility/activitiy evaluated by AM-PAC scoring. The average pre-cranioplasty AM-PAC score was 11 and the average post-cranioplasty AM-PAC score was 13. Twenty-four patients met the criteria for SoT with an average improvement in AM-PAC score of 4.5 points (11.75 to 16.25 p=0.0125). The most significant improvement in scores occurred within 3.6 days (p=0.031). The major indication for the acquired cranial defect was decompressive craniectomy due to a large vessel stroke (n=26) followed by decompressive craniectomy due to a traumatic brain injury (n=12). There was no significant difference between the indication for the cranial defect and the development of SoT (p=0.4151). Although patients who met the criteria for SoT had larger cranial defects this was not significant (119.23cm^3 vs. 137.16cm^3 p=0.333). Notably, only three patients were diagnosed with SoT by a plastic surgeon.

CONCLUSION: These RESULTS suggest an underdiagnosis of SoT in patients with large-size skull defects. It is important for surgeons to be astute in recognizing and diagnosing SoT since earlier cranioplasty may be warranted for these patients. It is crucial that we utilize of multidisciplinary approach including Plastic Surgeons, Neurosurgeons, Physical therapists and other medical professionals to prevent the worsening of SoT symptomatology towards improving patient outcomes.

Expected Outcomes of Maxillomandibular Advancement for Obstructive Sleep Apnea - A Systematic Review

Abstract Presenter
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BACKGROUND: Effectiveness of continuous positive airway pressure (CPAP) in obstructive sleep apnea (OSA) may be compromised for patients who are intolerant of CPAP, have inadequate CPAP fit, or possess upper airway abnormalities.1 In these patients, maxillomandibular advancement (MMA) is a powerful surgical option. Kent et al2 demonstrated interventions like MMA resulted in significant changes in OSA outcomes such as reduction in apnea-hypopnea index (AHI) and respiratory disturbance index (RDI). However, there are no clear guidelines on how much advancement to perform to adequately treat OSA beyond anecdote. We conducted a systematic review to evaluate the amount of improvement on

polysomnography outcomes following MMA and to correlate morphological adjustments to changes in OSA severity.

METHOD: Pubmed and Embase were our search engines for this PRISMA-compliant systematic review.3 Inclusion criteria were English-language studies that examined adult patients before and after isolated MMA for OSA. Studies were excluded if patients had syndromic diagnoses, previous history of jaw surgery, or combined surgical interventions for OSA treatment. Two researchers independently reviewed each of these studies by first screening titles and abstracts. All remaining articles were subjected to full-text review by the same reviewers. Study variables included study design, location, year, and sample size. Patient variables included age, BMI, comorbidities, history of other OSA interventions, as well as pre- and post-treatment OSA assessment. Intervention variables included degree of mandibular and maxillary advancement as well as length of follow up.

RESULTS: 5904 titles were identified from initial search and 39 full-text articles were included evaluating a total of 898 patients. We found a significant reduction in AHI and RDI following MMA (46.1 to 9.5, and 42.7 to 6.5, respectively; $p<0.05$). The mean improvement in AHI was 36.59 ±17.27 and mean improvement in RDI was 36.17 ±23.00. MMA also led to significant increases in airway volume (11.0mL vs 17.6mL, $p<0.001$) and airway length (12.4mm vs 18.2mm, $p<0.001$). Overall, 22 studies reported an average mandibular advancement of 9.3 ±2.7 mm and 21 studies reported an average maxillary advancement of 7.8 ± 2.2 mm. Meta-regression analysis did not yield a correlation between the amount of improvement in AHI/RDI and jaw advancement.

CONCLUSION: MMA is an effective treatment for patients with OSA, leading to significant improvements in polysomnography outcomes. There does not appear to be a clear correlation between the amount of advancement and degree of improvement in OSA, at least at the level of measuring study-level mean data.

REFERENCES:

1. Kent D, Stanley J, Aurora RN, et al. Referral of adults with obstructive sleep apnea for surgical consultation: an American Academy of Sleep Medicine clinical practice guideline. J Clin Sleep Med. 2021;17(12):2499-2505. doi:10.5664/jcsm.9592

2. Kent D, Stanley J, Aurora RN, et al. Referral of adults with obstructive sleep apnea for surgical consultation: an American Academy of Sleep Medicine systematic review, meta-analysis, and GRADE assessment. J Clin Sleep Med. 2021;17(12):2507-2531. doi:10.5664/jcsm.9594

3. Page MJ, Moher D, Bossuyt PM, et al. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. BMJ. 2021;372:n160. Published 2021 Mar 29. doi:10.1136/bmj.n160

Does stripping of the pterygomasseteric sling in sagittal split osteotomy result in bony reabsorption?

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OBJECTIVE: It has been debated whether stripping the masticatory muscles during a bilateral sagittal split osteotomy (BSSO) causes significant resorption of the inferior mandibular border, leading to unfavorable aesthetic changes. The aim of this study is to assess the level of resorption of the mandible and the resulting aesthetic changes following BSSO with complete stripping.

METHOD: Pre-operative, 4-8 week post-operative, and minimum 6 month post-operative cone beam CT scans were obtained for 29 patients who underwent BSSO (27 advancement, 31 setback). All patients had complete stripping of the pterygomasseteric sling intraoperatively. 27 linear, angular and volumetric measurements were performed on scans using Mimics 24.0 (Materialise NV, Lueven, Belgium). Paired and unpaired t-test were performed to determine differences in measurements at the late postoperative time point.

RESULTS: Mean advancement was 2.67mm and setback was -2.47mm with no significant amount of mean relapse. Antegonial notch height did not change significantly regardless of movement amount or direction. The mandibular body height decreased significantly with a mean change of -2.06mm ± 2.71 for advancements ($p=0.002$) and -2.11mm ± 2.92 for setbacks ($p=0.004$) in the late post-operative period. Additionally, the mandibular ramus had a significant loss in height with a mean change of -2.25mm ± 3.17 for advancements ($p<0.001$) and -1.63mm ± 3.61 for setback ($p<0.05$). The mandibular angle volume significantly increased with a mean change of 426.69mm3 ± 690.48 for advancements ($p=0.004$) and 476.08mm3 ± 1059.48 for setbacks ($p=0.018$) in the late post-operative period.

Thirty-one patients had a clockwise rotation of the proximal mandible and 27 had a counterclockwise rotation with a mean rotation of 3.65deg ± 1.86 and -3.72deg ± 3.19, respectively. The antegonial notch height did not significantly change. The mandibular body height significantly decreased for the clockwise group with a mean change of -1.56mm ± 2.79 ($p<0.005$) and increased for the counterclockwise group with a mean change of 2.69mm ± 2.74 ($p<0.001$). The mandibular ramus height significantly decreased for the counterclockwise group with a mean change of -3.02mm ± 2.96 ($p<0.05$). The mandibular angle volume significantly

increased with a mean change of 226.14mm3 ± 605.01 for the clockwise group ($p<0.05$) and 713.65mm3 ± 1104.09 for the counterclockwise group ($p=0.002$).

There was a significant soft tissue difference at the antegonial notch between the setback and advancement groups with a greater change occurring in the setback group from the coronal and axial views. In the coronal view, the antegonial notch height difference was 1.81mm ± 1.38 for the advancement group and 3.25mm ± 2.09 for the setback group ($p=0.005$). In the axial view, the antegonial notch height difference was 1.88mm ± 1.80 for the advancement group and 3.69mm ± 2.44 for the setback group ($p=0.002$). However, a regression analysis performed on the soft tissue changes as they related to the hard tissue changes at the antegonial notch showed no correlation at the coronal view ($R2=0.044$) or axial view ($R2=0.018$).

CONCLUSION: While changes to the mandibular contour do occur after BSSO, these changes do not appear to be large enough to be aesthetically significant. Complete stripping of the pterygomasseteric sling appears to be a safe maneuver if needed.

GENDER AFFIRMING

Close

A Cost Analysis of Outpatient Facial Feminizing Surgeries

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BACKGROUND: Although facial feminizing surgeries (FFS) improve gender dysphoria among male to female transgender (MF) patients, insurance coverage is minimal and underreported. Using a national database, we analyze total charges (TC) and primary payer (PP) distributions in outpatient FFS.

METHODS: 2016-2018 data from the National Ambulatory Surgery Sample (NASS) were subset to transgender patients using ICD10 codes. FFS were identified using CPT codes for genioplasty; blepharoplasty; lipectomy; rhytidectomy; brow ptosis; rhinoplasty; osteoplasty; lipectomy; and malar, mandibular, and forehead reconstruction. Demographics, TC, and PP were analyzed using Chi-squared and ANOVA tests.

RESULTS: 20,914 FSS encounters were identified with 69.5% females and mean [range] age of

54 [20, 90] and TC of $24,937 [160, 249,437]. The overall PP distribution for all FFS was 7.3% Medicaid, 33% Medicare, 42% private insurance, and 17% self. TC differed by PP ($p<0.001$); Medicaid had the highest of $31,601 [1691, 192495], closely followed by self-payers ($31,605 [160, 278415]), while Medicare had the lowest of $17,358 [419, 190810]. TC differed by income ($p<0.001$), with the highest earners having the highest TC of $26,006 [835, 278415]; and by residence ($p<0.001$), with patients in large metropolitan areas having the highest of $28,619 [1050, 278415]. Blepharoplasty was the most utilized (15%) and had the lowest overall TC of $12,201 [835, 172403] and the highest proportion of Medicare payment (56%). Rhytidectomy had the most self-payers (73%) and midface reconstruction had the most private insurance payers (81%).

CONCLUSION: To our knowledge, we are the first to characterize TC and PP distribution in outpatient FFS and we find higher insurance payment rates for FFS compared to previous reports. TC was significantly higher for Medicaid and self-paid procedures compared to Medicare and private insurance. PP also differed between FFS types, with rhytidectomies having the highest proportion of self-payers. These differences in PP based on FFS type and high overall TC underscore the financial burden of gender transition.

Insurance Coverage Denials for Patients Seeking Gender-Affirming Surgery in the State of Florida

Abstract Presenter
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INTRODUCTION: Over 1.4 million individuals in the United States identify as transgender or non-binary (TGNB), a large proportion of which seek gender-affirming surgery (GAS).1 One of the greatest barriers to obtaining GAS is the cost, affirming the significant role insurers play in transition.2 The PURPOSE of this study is to determine GAS procedures that are commonly denied among our TGNB population, and whether insurer criteria for coverage limit patient access to TGNB surgical care.

METHODS: The authors examined 159 consecutive GAS insurance submissions of a single plastic surgeon (S.D.), 90 of which had documented insurance coverage decisions. Of the 90 submissions, eleven insurance companies were identified as denying coverage for a GAS procedure. Web-based search of each insurer was completed and publicly available policies on top, bottom, and facial GAS were evaluated for coverage decisions and required criteria.

RESULTS: Of the eleven insurance companies that denied a GAS procedure, two (18.2%) had

no publicly available policy. The remaining nine insurers had a publicly available policy and statement of coverage for GAS. Compared to all nine insurers covering masculinizing top surgery (MTS) (100%), 77.8% of insurers (n=7) covered breast augmentation (BA) with an average of six required criteria for coverage. Two companies denied BA, stating the procedure was cosmetic and not medically necessary. Feminizing and masculinizing bottom surgery were universally covered (100%), with 6.8 criteria on average. Only one insurer (11.1%) covered facial feminization with eight required criteria. The remaining eight companies (89%) considered the procedure to be cosmetic. Evaluation of criteria among companies yielded eight insurers (88.9%) that denied GAS coverage when under the age of 18, however, two of the denying insurers (22.2%) reviewed adolescent submissions for MTS on a case-by-case basis. Eight companies (88.9%) had requirements for gender-affirming hormone therapy duration, specifically for bottom surgery in five insurers (55.6%). Six insurers (66.7%) required patients to publicly live in their desired gender role for at least twelve months, five of which (55.6%) were specific to bottom surgery. Four companies (44.4%) required evaluation by a mental health provider for other mental health disorders prior to coverage.

CONCLUSIONS: Most insurers that denied coverage for a GAS procedure had a publicly available policy for review. Whereas MTS and bottom surgery were universally covered among the companies, BA and facial procedures were often considered cosmetic and medically unnecessary. In general, companies that did provide coverage had multiple criteria outside of the recommendations made by WPATH Standards of Care 7. Discrepancies in what is considered cosmetic, along with multiple criteria required for coverage, create a barrier to receiving surgical care in our state's TGNB community.

REFERENCES:

1. Flores AR, Herman JL, Gates GJ, Brown TNT. How many adults identify as transgender in the United States? Los Angeles: the Williams Institute, June 2016
2. Nolan, Ian T.B.M.; Daar, David A. M.D.; Poudrier, Grace B.A.; Motosko, Catherine C. M.D.; Cook, Tiffany E. B.G.S.; Hazen, Alexes M.D. Barriers to Bottom Surgery for Transgender Men, Plast. Reconst. Surg.: March 2020 - Volume 145 - Issue 3 - p 667e-669e.

The Effect of the Medicaid Ban on Rates of Public and Private Insurance Coverage in Florida

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INTRODUCTION: In 2016, the Department of Health and Human Services barred discrimination based on gender identity for federal health system entities, including Medicare and Medicaid. However, in August 2022, the state of Florida took a step in the opposite direction and banned Medicaid coverage of all gender-affirming treatment, including surgery (GAS). The PURPOSE of this project is to determine the effect of this ban on the rate of insurance coverage for patients with both private and public insurance seeking GAS in the state of Florida.

METHODS: The authors evaluated 159 consecutive insurance submission forms for GAS in Florida from a single plastic surgeon (S.D.). Of these submissions, 69 lacked a documented decision for insurance coverage and therefore, were excluded. The remaining 90 submissions with a clear statement on coverage status available were categorized into either approved or denied. Chart review of remaining 90 submissions for 85 patients determined the date of insurer decision, type of GAS (top, bottom, facial, other), insurer, individual plan, and possible reasons for denial including a web-search of the insurer website.

RESULTS: Ninety insurance claims were submitted for 85 patients. Overall coverage rate was 80.0%, with top surgery being the most common surgery submitted (n= 66, 73.3%) and covered (n=56, 62.2%). No significant difference was noted in the total rate of coverage provided before and after the Medicaid ban (75.8% vs 82.5%; p=0.4439), though the number of claims submitted to private insurers approached significance (72.7% vs 89.5%; p=0.0752). Of the 33 claims (36.6%) submitted before the Medicaid ban, 24 (72.7%) were submitted to a private insurer and nine were submitted to either Medicare (n=5) or Medicaid (n=4). Fifty-seven procedures (63.3%) were submitted after the ban, with 89.5% of claims (n=51) to a private insurer and 10.5% to Medicare (n=1) or Medicaid (n=5). Overall approval rates declined for top surgery by 8.3% (90.5% to 82.2%) and bottom surgery by 14.3% (100% to 85.7%) following the Medicaid ban. Meanwhile, approval of facial feminization increased by 41.7% (33.3% vs 75.0%; p=0.2657). While the number of top surgery submissions to public insurers remained consistent (n=7 to n=6), submissions for top surgery to private insurers increased after the ban (n=14 to n=39), approaching significance (p=0.0571). Of the eighteen patient insurance denials during the study period, ten (55.6%) patients had identified reasons for denial consistent with the stated policy on the insurers' websites, while five patients were denied for unknown reasons (27.8%).

CONCLUSIONS: Approvals among all insurers for top and bottom surgery decreased following the Medicaid ban in Florida. This was contrasted by an increase in both the coverage provided for facial feminization procedures and the number of top surgery insurance claims submitted to private companies rather than public insurers. Though the findings may be limited by the relatively short duration of 5 months of data collection since the ban was passed and possible selection bias, these data suggest that as patients with public insurance may become affected by the new state legislature, the coverage provided by private insurers may be improving.

Improved post-surgical satisfaction following primary vaginoplasty: associations with neovaginal canal width and introitus depth

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PURPOSE: Dilator use following vaginoplasty maintains neovaginal patency and prevents neovaginal stenosis. Anecdotally, surgeons and patients may feel driven to incrementally increase (or "size up") dilators quickly following surgery in order to rapidly maximize neovaginal canal dimensions. While postoperative dilating practices are associated with improved post-surgical outcomes and satisfaction,1 there is limited evidence examining the extent of benefit offered by increased neovaginal canal depth and width.

METHODS: The present study included 426 total postoperative visits of 197 unique patients who underwent primary vaginoplasty with the Mount Sinai Center for Transgender Medicine and Surgery (CTMS), had their first postoperative follow-up visit between 10/31/2017-9/3/2020, and reported introitus depth. The researchers created a Gender Dysphoria Index (GDI), defined as patient-reported gender dysphoria. Preoperative and postoperative GDI (on a 0-10 Likert scale, where 10 is maximum gender dysphoria), neovaginal canal width (in dilator color), and introitus canal depth (in dilator dot) were analyzed. Reduction in GDI was calculated by subtracting postoperative from preoperative GDI; dilator colors and dots were converted to inches. Due to patient-dependent variations affecting the time course between surgery and postoperative clinical visits, data were stratified into four groups by days following vaginoplasty and analyzed using simple linear regression accounting for dilator width and depth as quantitative variables.

RESULTS AND DISCUSSION: Mean preoperative GDI was 5.77 (±2.82), mean postoperative GDI was 2.76 (±2.20), and reduction in GDI following vaginoplasty was significant ($p<0.001$). There was no statistically significant association between neovaginal canal depth and GDI reduction across any time point ([0-30 days] $p=0.956$; [31-90 days] $p=0.248$; [91-180 days] $p=0.573$; [181-365 days] $p=0.682$). Neovaginal canal width at one month and six-month postoperative visit time points revealed a weak negative correlation ([0-30] $r= -0.0433$, $p=0.0046$; [91-180] $r= -0.0121$, $p=0.03$) and may be incidental. Width did not reveal significant correlation with GDI reduction at follow-up visit at the three month and one year time point following primary vaginoplasty ([31-90] $p=0.603$; [181-365] $p=0.605$).

Because gender dysphoria has limitations as a quality-of-life measure among post-surgical transgender patients, GDI is a clinically and analytically useful quantitative tool. There are opportunities for investigations to determine the role neovaginal canal width, depth, external

genitalia appearance, trends over time of these variables, or any post-surgical loss play in reducing gender dysphoria and improving patient satisfaction and quality of life.

CONCLUSIONS: Vaginoplasty significantly reduced gender dysphoria index (GDI) among patients who underwent primary vaginoplasty at CTMS. Across all postoperative visit time points, neovaginal introitus depth and canal width in inches were not meaningfully associated with GDI reduction. These findings indicate that while it is highly likely that undergoing vaginoplasty improves patient quality of life, rapidly maximizing neovaginal canal depth and width postoperatively may not be as substantial.

REFERENCES:
1. Luikenaar, R.A., Santucci, R.A. and DeLeon, A.N., 2022. Vaginal Dilators and Dilating after Vaginoplasty. Context, Principles and Practice of TransGynecology: Managing Transgender Patients in ObGyn Practice, p.119.

Postoperative Pain and Opioid Use in Transgender and Nonbinary Patients After Masculinizing Top Surgery

Abstract Presenter
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INTRODUCTION: Top surgery is the most frequently performed gender-affirming surgical procedure.1 Due to many similarities between masculinizing top surgery and mastectomy for malignancy, transgender and nonbinary (TGNB) patients that receive this procedure are likely to experience comparable amounts of postoperative pain. However, in contrast to mastectomy for breast cancer, postoperative pain outcomes have yet to be adequately assessed for top surgery in the transgender and nonbinary (TGNB) community. The PURPOSE of this study is to evaluate postoperative pain and practices for pain management in TGNB patients that receive masculinizing top surgery at our institution.

METHODS: Retrospective review identified 50 consecutive patients with documented gender dysphoria that underwent masculinizing top surgery between June 2020 and February 2023. Patients with malignancy, that were cisgender, or those with severe comorbidities were excluded. Information regarding demographics, medical history, surgical technique, anesthetic pain regimens, and available reported pain scores were extracted from documented clinic or operative notes. SPSS v28 was used for statistical analysis.

RESULTS: Fifty patients had a mean age of 28.2 years and BMI of 28.3 kg/m2. Average pain

score recorded in the post-anesthesia care unit (PACU) was 3.26, with 38% of patients (n=19) having pain classified as moderate to severe. Preoperative and intraoperative pain regimens did not have a significant effect on PACU pain scores ($p>0.151$). Patients with moderate and severe PACU pain scores received pain medication in the PACU significantly more often than patients with mild scores (100% vs 31%; $p<0.001$). The pain score in the PACU was also positively correlated with body mass index (BMI) ($p=0.041$), with upwards of 30% of patients (n=5) with a BMI greater than 30 reporting pain categorized as severe. Eighteen total patients (36%) reported pain during a follow-up clinic visit. Compared to patients with mild PACU pain score, patients that had moderate or severe pain had significantly more reports of postoperative pain in clinic (45% and 30%; $p<0.001$) and more medication refill requests (19% vs 6.4%; $p<0.001$). Patients that self-reported opioid consumption were also 36% more likely to report pain during follow-up visits than the patients that took NSAIDs only (95% CI 0.22-0.50; $p<0.001$). No significant difference was noted in quantitative pain outcomes between patient age, gender identity, hormone therapy, nipple grafting, incision technique, anesthesia technique, and morphine milliequivalents (MME) prescribed at discharge.

CONCLUSIONS: Outcomes of this study suggest that the pain experienced after masculinizing top surgery can be significant, emphasizing the importance of pain management in the TGNB population. It is possible that TGNB patients are being overprescribed postoperative opioid medications, as taking an opioid medication did not decrease reported pain on patient follow-up. Patient factors such as BMI may also play a role in the amount of postoperative pain that TGNB patients experience., Pprospective studies with greater sample sizes are indicated to identify risk factors for poor pain control and to further characterize the pain experience and optimal treatment for it.

REFERENCES:

1. Institute TW. How Many Adults and Youth Identify as Transgender in the United States; 2022.

Impact of Area Deprivation on Access to and Outcomes of Gender-Affirming Top Surgery

Abstract Presenter
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BACKGROUND: Area deprivation index, a validated composite measure of neighborhood deprivation, has previously been associated with difficulty accessing surgical care. Access to timely care is especially important in the context of gender-affirming surgery, as prior work has shown that presentation at later ages is associated with worse mental health status among people seeking gender-affirming care.[1] Here we examine whether neighborhood deprivation impacts latency to care and outcomes of patients receiving gender-affirming top surgery.

METHODS: Patients who received gender-affirming top surgery between 2019-2022 were included. We collected demographic information, rural-urban commuting area (RUCA) codes, comorbidities, dates of social transition, dates of hormone therapy initiation, dates of surgery, complications, and length of follow-up. National ADI percentiles were determined using 9-digit ZIP codes, based on the 2020 ADI database. Differences in time to hormone therapy initiation and top surgery were assessed using multivariate Cox regressions and outcomes/complications were analyzed using comparative statistics between the patients in the most deprived ADI tertile versus all other patients.

RESULTS: 180 patients were included. 40% of patients belonged to the most disadvantaged ADI tertile. Patients in the most disadvantaged tertile were less likely to live in urban areas ($p=0.002$), more likely to have diabetes ($p=0.038$), and more likely to be current smokers ($p=0.008$). Age at social transition was comparable between groups, with a median age of 19 years old ($p = 0.421$). Average time from hormone initiation to top surgery was 2.19 years in the less disadvantaged group, compared to 2.58 years in the most disadvantaged tertile. Multivariate Cox regression analysis controlling for rurality and age at social transition showed that belonging to the most deprived tertile was associated with greater latency from hormone therapy initiation to top surgery, though this association did not reach significance (Hazard ratio (HR) 0.683, 95% Confidence Interval (CI) [0.464-1.006], $p=0.053$). Age at social transition was also associated with differences in elapsed time from hormone initiation to surgery, with patients who transitioned between ages 20-30 experiencing shorter latency to surgery than patients who transitioned under 20 (HR 1.709, 95% CI [1.099-2.658], $p=0.017$). ADI tertile was not associated with differences in latency from social transition to hormone initiation, or from social transition to top surgery ($p\geq0.224$). ADI tertile was not associated with differences in complication rates or length of follow-up ($p\geq0.104$).

CONCLUSION: Neighborhood deprivation may be associated with increased latency to top surgery following hormone therapy initiation, although this difference is small and may not be clinically significant. Neighborhood deprivation does not appear to impact age at social transition or latency to hormone therapy initiation. Patients from more disadvantaged neighborhoods experience comparable complication rates and follow-up care following gender-affirming top surgery. Investigating reasons for delay between hormone initiation and top surgery in patients from under-resourced areas seeking this care may inform ways to improve access to gender affirming surgical care for all patients.

RERERENCES:

1. Sorbara JC, Chiniara LN, Thompson S, Palmert MR. Mental Health and Timing of Gender-Affirming Care. Pediatrics. Oct 2020;146(4)doi:10.1542/peds.2019-3600

Evaluation of Depressive Symptoms Over Time in Transgender and Non-Binary Adolescents and Young Adults on Hormone Therapy Before and After Receiving Gender-Affirming Mastectomy

Abstract Presenter
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BACKGROUND: Transgender and non-binary (TGNB) youth experience a high level of depressive symptoms compared to the general population. The combination of gender-affirming hormone therapy (GAHT) and surgery (GAS) during adolescence has been found to alleviate gender dysphoria and steadily improve psychological functioning into young adulthood. This study aimed to evaluate depressive symptoms in adolescent and young adult TGNB individuals over time, relative to start of GAHT and gender-affirming mastectomies.

METHODS: Participants were 61 adolescent and young adult TGNB patients receiving gender-affirming medical treatment at Rady Children's Hospital in San Diego. Patients completed the Patient Health Questionnaire-2 (PHQ-2), a brief depression screening tool, at various clinic visits. Using linear mixed effects (LME) modeling we evaluated the relationship between PHQ-2 score and surgery type over time, specifically before and after surgery.

RESULTS: Patients underwent gender-affirming mastectomy either with keyhole mastectomy (28%) or double incision mastectomy with free nipple grafts (72%). We evaluated the impact of time and surgery type subgroups on PHQ-2 scores. LME analyses found that, taken together, time and surgery significantly affected PHQ-2 scores such that scores decreased by about 0.42 ± 0.12 (standard errors (SEs)) over time ($p < .0001$). Changes in depressive symptoms over time did not significantly differ between surgery type.

CONCLUSION: Adolescent and young adult TGNB individuals who undergo GAS experience

a decrease in depressive symptoms over time. As the number of adolescents seeking gender-affirming care continues to rise, medical providers should be familiar with the impact these medical interventions can have on patients' psychological health.

Maintaining Ethnic Congruence in the Transgender And Gender Diverse Black and African-American Population: An Assessment Of Patient-Reported Outcomes And Attitudes Following Rhinoplasty

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PURPOSE: The overall goal of rhinoplasty as a part of facial feminization surgery (FFS) is to achieve a softening of the face. While the major consideration of rhinoplasty is the removal of stereotypically masculine features from the nose in order to attain a more feminine facial structure, something that is just as important to consider is the ethnicity and racial BACKGROUND of the person undergoing the procedure. Conceptualizations of gender and perception of femininity and masculinity are often informed by concepts of ethnicity.[1] Rhinoplasty techniques have historically mainstreamed ideals of European populations, underrepresenting the more expansive view of aesthetic variations and pREFERENCES that exist in other communities. Multiple papers have examined and redefined the aesthetically ideal nose in varying populations, proposing recommendations on how to provide more ethnically congruent surgical outcomes to patients.[2]

This study examined patient-reported outcomes and attitudes within the transgender and gender-diverse Black and African-American populations following facial feminizing rhinoplasty, focusing primarily on patient perceptions of the maintenance of the ethnic congruence of their nasal structure.

METHODS: An anonymous questionnaire was distributed from November 15th, 2021 – February 15th, 2022 to patients ≥ 18 years of age who underwent elective closed or open rhinoplasty as a part of their FFS between 2015 and 2021, from our single institution. Participants ranked items from the validated Rhinoplasty Outcome Evaluation questionnaire and an extended questionnaire on a Likert Scale. Using Python version 3.8, data were summarized

using descriptive statistics and t-tests comparing demographic responses and Likert Scale scores were performed, with significance set at $p<0.05$.

RESULTS: Forty-five patient responses were collected. The mean age of respondents was 35 years of age, 44 respondents identified as transgender women, and 1 had another identifier. Of the respondents, 44.4% were White, 37.7% were Black/African-American, 20.0% were Native American/Alaska Native, 13.3% identified as multiple races/ethnicities, 4.4 % were Asian/Asian American, 2.2% were Native Hawaiian/other Pacific Islander, and 51.1% identified as having Hispanic or Latino origin or descent. There was no difference in satisfaction between the White and the African-American respondents. When compared to the White cohort, Black and African-American respondents were more likely to desire the preservation of their ethnic features ($p=0.02$). Surgeon consultation and communication were cited as major reasons that patients had confidence in their surgeon's abilities to perform the rhinoplasty in a way that maintained their ethnic features.

CONCLUSIONS: Over 50% of African-American and Black patients included in this study prioritized the maintenance of their ethnic features as a part of their facial feminizing rhinoplasty. Surgeons can increase patient confidence in their ability to perform a rhinoplasty that preserves patients' ethnic variations using culturally competent consultation and communication that allows ethnic and racial considerations to be a part of conversations surrounding their patients' surgical planning.

REFERENCES:

1. Plemons E. Gender, Ethnicity, and Transgender Embodiment: Interrogating Classification in Facial Feminization Surgery. Body & Society. 2019;25(1):3-28. doi:10.1177/1357034X18812942
2. Boahene KDO. Management of the Nasal Tip, Nasal Base, and Soft Tissue Envelope in Patients of African Descent. Otolaryngol Clin North Am. 2020;53(2):309-317. doi:10.1016/j.otc.2019.12.007

Effect of Preoperative Testosterone on Gender-Affirming Mastectomy Outcomes

Abstract Presenter
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PURPOSE: Gender-affirming mastectomies have increased in accessibility over the past decade, with upwards of a 13-fold increase in procedures performed. Further assessment of risk factors, including exogenous testosterone use, would improve patient outcomes. Despite numerous investigations over the past decade, there has not been a consensus regarding a relationship between testosterone use and post-op complications. We aim to further elucidate any association that may exist.

METHODS: A retrospective review of patients undergoing gender-affirming mastectomy was conducted over 32 months. The relationship between preoperative testosterone use and post-operative complications and revisions were evaluated.

RESULTS: 228 patients who underwent gender-affirming mastectomy were identified. 210 patients took testosterone preoperatively (92.1%). Mean time on testosterone was 2.49 years (SD 2.16). There was no difference between patients who were on testosterone and those who were not in rates of revisions ($p = 0.424$) or complications ($p = 0.615$). There was no difference in time on testosterone for revision or no revision groups ($p = 0.189$). Time on testosterone was longer for those who had complications (4.34 vs 2.31 years), though not significant ($p= 0.08$).

CONCLUSION: Our RESULTS show that testosterone use had no significant effects on rates of revisions or complications in gender-affirming mastectomy patients. Additionally, time on testosterone did not have an effect. We suggest that the use of gender-affirming hormones preoperatively is not a contraindication in these procedures. Further research is necessary to assess other risk factors for complications and revisions and to compare RESULTS across a range of patients, surgeons, and hospitals.

Rectovaginal Fistula Repair Following Vaginoplasty in Transgender Females: A Systematic Review of Surgical Techniques

Abstract Presenter
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BACKGROUND: Rectovaginal fistula (RVF) remains a complex complication following gender affirming vaginoplasty. Multiple RVF repair METHODS have been described; yet, the optimal approach remains unclear. This review aims to evaluate RVF repair techniques and

outcomes following vaginoplasty.

METHODS: A systematic review was performed per PRISMA guidelines. Ovid MEDLINE, Ovid EMBASE, Cochrane, and Web of Science were queried for records pertaining to RVF repair following vaginoplasty. Study characteristics, operative details, and demographics were collected. Outcomes included RVF repair method, recurrence rate, and complications.

RESULTS: Among 282 screened citations, 17 articles representing 41 patients were included. RVF repair METHODS identified included four conservative management approaches (n=12 patients), two non-reconstructive surgical techniques (n=22), 10 reconstructive surgical techniques (n=18). The most common non-reconstructive technique was primary closure with or without fistulectomy (n = 17) followed by ileostomy or colostomy. The most common reconstructive techniques were V-Y full thickness advancement with rectal flap (n=5) and infragluteal fasciocutaneous flap (n=4). Median time to recurrence was 6 months (IQR 7.5). Reported RVF repair complications included RVF recurrence (n=5, 14.7%) and wound complication or dehiscence (n=2, 5.88%). RVF repair success rate was 75.0% (n=9), 54.5% (n=12), and 88.9% (n=16) for conservative management, non-reconstructive techniques, and reconstructive techniques, respectively. Three cases of RVF recurred after non-reconstructive surgery, including ileostomy (n=2) and colostomy (n=1), while two cases of recurrence followed reconstruction.

CONCLUSION: There remains a high level of variability in the approach to RVF repair following vaginoplasty. Reconstructive surgical techniques may be a more optimal solution without necessitating ostomies, but this decision must be considered in the context of RVF location, individual patient expectations, and clinical presentation.

Patient Satisfaction Following Top Surgery: A RealSelf Analysis Using Advanced Natural Language Analysis

Abstract Presenter
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INTRODUCTION: Top surgery, also known as mastectomy and masculinization of the chest wall, is a significant procedure that is commonly pursued by female-to-male (FTM) transgender individuals or males with gynecomastia to improve their body image perception. The number of transgender individuals opting for this surgery often as their sole gender-affirming procedure is rapidly increasing, yet no study has queried a large patient-centered database to evaluate patient satisfaction following the procedure. The aim of this study is to analyze patient satisfaction with top surgery through a systematic analysis of RealSelf and determine if procedure cost plays a role.

METHODS: RealSelf.com was queried for patient reviews following chest masculinization surgery. A web scraper application was utilized to extract all relevant tabular data, including date of procedure, overall satisfaction ("Worth It" vs. "Not Worth It"), price, and written comments. An AI natural language tool powered by a neural network rule-based system was then used to perform objective sentiment analysis on all patient reviews. Reviews were classified as either positive or negative with a quantifiable confidence level. Pearson tests were performed to determine correlation between sentiment and price. Mann-Whitney U tests were conducted to identify significant differences in price on overall satisfaction levels.

RESULTS: From a total of 363 reviews for masculinizing top surgery, 350 (96.42%) were identified as having overall satisfaction. Satisfied patients also had significantly higher median positive sentiment levels (0.91 vs. 0.56, $p<0.001$), validating the natural language quantification process. Among patients with overall satisfaction, the median cost of surgery was $7,900 (IQR: 5,950 – 10,000). This was not statistically significant ($p=0.927$) from the median cost of surgery for patients with overall dissatisfaction was $8,705 (IQR, 7,000 – 9,500). Moreover, Pearson testing did not show any significant correlation between price and strength of positive or negative sentiment regarding the outcomes.

CONCLUSION: Our study suggests that the quality of outcome and patient satisfaction are not dependent on the cost of the procedure, as there is no significant correlation between a patient's satisfaction with their post-procedure RESULTS and the cost of the surgery. Additionally, our analysis of RealSelf reviews, utilizing both individual assessments and natural language quantification tools, indicates a high level of overall satisfaction among patients who have undergone top surgery. The natural language AI tools effectively analyze patient reviews, offering surgeons reliable feedback on patient satisfaction that can be utilized to enhance quality of care.

Quantifying Changes in Facial Feminization Rhinoplasty and Patient Satisfaction

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BACKGROUND: Rhinoplasty is one of the most commonly performed facial gender-affirming surgeries (FGAS) for transfeminine patients. While surgical techniques for feminization of the nose have been previously described, there is a lack of quantitative data describing the associated anthropometric changes. In this study, we aimed to quantify the changes made with feminization rhinoplasty and describe clinical patient reported outcomes.

METHODS: Three-dimensional photogrammetric (VECTRA, Canfield Scientific, Parsippany, N.J.) evaluation of the nose was performed preoperatively and postoperatively in transfeminine patients who underwent FGAS. Additional associated procedures included frontal sinus setback/forehead contouring, brow contouring, hairline advancement, genioplasty, mandibular contouring, malar implants, lip lift, and/or chondrolaryngoplasty. Anthropometric measurements assessed included alar width, nasal tip width, dorsal height, middorsal width, tip projection, nasofrontal angle, and nasolabial angle. Patients were surveyed preoperatively and postoperatively for satisfaction using the FACE-Q Nose module. Paired t-tests were utilized to assess for changes in postoperative measurements and changes in FACE-Q Nose satisfaction scores.

RESULTS: A total of 18 patients underwent FGAS during the study period. The average time between surgery and postoperative three-dimensional images was 7.2 ± 5.7 months. Rhinoplasty in combination with forehead reconstruction (frontal sinus setback and brow contouring) was performed in all 18 patients. Alar width, dorsal height, and middorsal width all decreased significantly ($p<0.05$). Nasofrontal angle increased by a mean of 3.3° (142.5 ± 8.1° to 145.8 ± 7.0°. $p=0.02$); there was no significant changes for the nasolabial angle. The mean FACE-Q score for satisfaction with nose increased by 43.0 (36.4 ± 13.0 preoperatively versus 79.4 ± 17.2 postoperatively, $p<0.001$). The mean scores for satisfaction with facial appearance overall, psychological function, and social function all increased significantly as well ($p<0.05$).

CONCLUSION: The main goals in feminization rhinoplasty are to create feminine nasal features and to enhance facial and nasal harmony. We found that decreases in alar width, dorsal height and middorsal width as well as an increase in the nasofrontal angle are correlated with nasal feminization and high patient satisfaction with their nose.

Gender Affirmation Surgery in Low-Income and Middle-Income Countries: A Systematic Review

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PURPOSE: Despite the remarkable growth of gender-affirming surgery, most literature remains concentrated within high-income countries (HICs); fewer than one-fifth of the studies come from low- and middle-income countries (LMICs). Transgender or non-binary (TGNB) individuals in LMICs face unique barriers in accessing safe surgical care (1,2). This is the first systematic review assessing preoperative characteristics and postoperative surgical outcomes following GAS in LMICs.

METHODS: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, five databases were systematically searched for original studies and case reports on GAS within LMICs. Excluded were surgeries unrelated to gender affirmation, surgeries performed in HICs, animal studies and secondary studies. Patient demographics, surgical characteristics, and postoperative outcomes were analysed using descriptive statistics.

RESULTS: A total of 21 studies with n=3431 patients were included in this review. Mean patient age was 30.2 years. 10 studies (47.6%) were from lower-middle-income countries and 11 studies (52.4%) were from upper-middle-income countries. No studies originated from low-income countries. Of n=3431 TGNB patients included, n=3392 (98.9%) underwent GAS. 8 studies reported on preoperative demographics (38.1%) and 19 studies (90.5%) reported on postoperative outcomes. A total of 9 studies included patients who underwent masculinizing GAS (n=2165, 63.1%) and 12 studies included patients who underwent feminizing GAS (n=1266, 36.9%). The most common masculinizing GAS was metoidioplasty (n=1286/2165, 59.4%), with a caveat that this statistic is driven by a single institution reporting on overwhelmingly metoidioplasty outcomes (n=1286). The most common feminizing GAS was vaginoplasty (n=929/1266, 73.4%). Mean follow-up was 31 months. Of n=2165 patients who underwent masculinizing GAS, n=250/2165 (11.5%) required revision and n=458/2165 (21.1%) experienced at least 1 complication, with the most common being urethral fistula (n=202, 9.3%). Of n=1266 patients who underwent feminizing GAS, 94/1266 (7.4%) required revision and n=188 (14.8%) experienced at least 1 complication, with the most common being flap necrosis (n=33, 2.6%). A total of 12 (57.1%) studies with 2005 patients reported on quality of life and patient satisfaction measures. Of these 2005 patients, 1310 (65.3%) reported improved quality of life and satisfaction following GAS. Of the studies that assessed for post-surgical regret, none of the 216 patients surveyed reported regret. Notably, 2 (9.5%) studies with 15/3431 (0.44%) patients were performed in settings where GAS was not formally legalised.

CONCLUSIONS: Existing literature on GAS in LMICs remains concentrated in select institutions and is poorly representative of global trends. This indicates the poor access to and lack of robust literature on GAS in LMICs. Nevertheless, the present review demonstrates reports of successful GAS performed in LMICs, with low incidence of complications and revisions. Further research is needed to better understand psychosocial factors, access, and quality of life of TGNB patients seeking GAS in LMICs.

REFERENCES:
1. Ologunde R, Maruthappu M, Shanmugarajah K, Shalhoub J. Surgical care in low and middle-income countries: Burden and barriers. International Journal of Surgery. 2014;12(8):858-863. doi:10.1016/J.IJSU.2014.07.009
2. Scheim A, Kacholia V, Logie C, Chakrapani V, Ranade K, Gupta S. Health of transgender men in low-income and middle-income countries: a scoping review. BMJ Glob Health. 2020;5(11):e003471. doi:10.1136/BMJGH-2020-003471

Insights into Facial Surgery Trends in the United States in the Setting of Gender Dysphoria: A National Analysis from 2012-2019

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INTRODUCTION: Over the past decade, there has been an improvement in access to gender affirming surgical care for the transgender population. Even with these improvements, this population still faces continued high level of disparities and access to specialized care. This includes both gender affirming surgery along with hormonal therapy, which are both critical to a patient's ability to safely and fully transition. Limited access to these lines of care have been associated with poorer outcomes and increased comorbidities, which hinder the long-term health and personal fulfillment of this patient population. Facial gender affirming surgery (FGAS), in addition to both top and bottom surgery, help patients align with their internal gender identify. While studies have focused on trends of top and bottom surgery, this study is unique by providing trends in FGAS within the United States from 2012 to 2019, with the primary aim of identifying areas for improving access to FGAS.

METHODS: The National Inpatient Sample (NIS) was utilized to identify patients who underwent FGAS from 2012 to 2019. The diagnostic codes for gender identity disorder and transsexualism were used to identify the desired patient population. Demographics and surgical variables, such as ICD coding for gender affirming surgery, were used within the NIS database to extract the patient population who received FGAS. Frequency distributions from the patient population was analyzed within Statistical Analysis System 9.4 to identify statistically significant trends amongst demographic and surgical variables. Nonparametric Kruskal-Wallis test was utilized and statistical significance was defined as a p-value <0.05.

RESULTS: In total, 132 patients underwent FGAS from 2012 to 2019. The incidence for FGAS has significantly increased over the time frame, rising by 1433%. Geographically, these surgeries were more likely to be performed in the West and Northeast geographical regions. Interestingly, hospital stay was increased amongst procedures performed in the Midwest (p=0.001). However, charges for FGAS by geographical location were not statistically significant (p=0.48). Stratifying by race, there was no significant difference with either hospital length of stay or the total number of charges (p=0.29 and p=0.48). Focusing on insurance type, patients with different providers did have different lengths of stay when undergoing FGAS (p=0.04).

CONCLUSION: FGAS is the quickest growing amongst all types of gender affirmation surgery. With the transgender population, it is important and critical that FGAS remains affordable and accessible. While a majority of FGAS are performed in the Northwest and West, it appears that patients within the Midwest and with certain insurance providers have longer length of stays compared to fellow FGAS patients. While this is one of the first studies to focus solely on FGAS, future studies are warranted to understand and analyze differences in care amongst the transgender population receiving FGAS.

Pilot Study of Paclitaxel-Coated Balloon Dilation of Post Phalloplasty Urethral Strictures

Abstract Presenter
Richard Santucci MD

Simple dilation of urethral strictures has been proven ineffective in the cismale and post phalloplasty populations. However, a novel paclitaxel-coated urethral balloon dilator has shown unexpectedly good RESULTS in the treatment of cismale strictures, achieving a shocking 3-year success rate of 77%. This new treatment was applied to an intended 20 patients with post phalloplasty strictures, as a pilot study to determine its efficacy. Most post-phalloplasty urethral strictures are found at the distal anastomosis, at the connection point between the pars fixa (labia minora) and penile (skin flap) urethra. All patients had short strictures in this area that would otherwise would have required open surgical repair.

METHODS: All patients had pre intervention IPSS (International Prostate Symptom Score) and uroflow determinations. Strictures were dilated up to 24 F with an uncoated balloon dilator, then dilated to 30 F with the paclitaxel coated balloon. Urinary catheters were not placed. Strictures were uniformly tight, narrowly fitting a 0.038-inch guidewire, and with an estimated circumference of 1-3 F.

RESULTS: 16 patients completed the study to date. The mean IPSS pre op was 27 (severe symptoms). The mean uroflow maximum was 6 ml/second, including 3 patients who could not void at all and had a suprapubic tube in place for urinary retention. 4/16 (25%) of patients failed definitively and required subsequent open urethroplasty, with a mean follow up of 100 days so far (range up to 300 days). Recruitment of an additional 4 patients, and long term follow up of

treated patients is ongoing.

CONCLUSIONS: Post phalloplasty stricture patients treated with a paclitaxel-coated urethral balloon dilation had a certain early failure rate of 25%, but in 75% patients, prolonged unobstructed voiding was achieved without the need for open surgical intervention. Longer follow up, and better definition of the ideal treatment window after phalloplasty will be required. There are currently no effective nonoperative treatment METHODS for urethral stricture, and the potential to obviate complicated urethroplasty in this population without the need for open surgery will be a welcome addition to the treatment armamentarium. Even when not curative, balloon dilation was a beneficial as a minimally invasive, safe method to temporize patients with highly symptomatic strictures until curative urethroplasty could be arranged.

Enhanced Recovery After Phalloplasty Surgery Clinical Pathway

Abstract Presenter
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PURPOSE: Enhanced recovery after surgery (ERAS) clinical pathways are a continuously evolving approach to postoperative care that serves to identify factors that delay recovery, and to minimize complications.1,2 Gender Affirming phalloplasty (GAP) is a complex, multi-surgeon operation and patients have intensive postoperative care needs.3,4 Our PURPOSE is to present the phalloplasty ERAS pathway from one of the highest volume phalloplasty practices in the United States, The Crane Center for Transgender Surgery.3,5

METHODS AND MATERIALS: This ERAS pathway was applied to 121 patients undergoing single stage GAP from January 2021 to December 2022, representing the 10 phalloplasties a month performed by our center; 85 by radial forearm free flap, 35 by anterolateral thigh flap, and 1 by latissimus dorsi flap. Our ERAS pathway including flap monitoring, medications, and activity is summarized.

EXPERIENCE: Post operative day (POD) 0 includes bedrest, intensive care unit levels of staffing, hourly flap checks and continuous monitoring with T-Stat visible light spectroscopy tissue oximeter. On POD 1, the patient-controlled analgesia pump is weaned to oral narcotics and once it becomes clear the patient will not require an operative takeback, a clear liquid diet and DVT prophylactic enoxaparin is started. POD 2, non-steroidal anti inflammatory medications are

begun. Floor status levels of staffing occurs on POD 3 and patient is out of bed to chair with T-stat monitoring while sitting. POD 4 twice daily ambulation with physical therapy begins, T-stat is removed, and transition to all by mouth medications occurs. The patient is discharged from the hospital on POD 5 after: urethral drain and negative pressure wound dressing removal, dressing/suprapubic catheter daily gentamicin irrigation teaching, and suprapubic catheter transitioned from gravity drainage to flip flo catheter valve.

SUMMARY OF RESULTS: In our cohort, the average hospital stay was 5.1 days. 93% of patients were able to leave the hospital on or before postoperative day 5.

CONCLUSIONS: We present a successful post-phalloplasty ERAS pathway, developed at our high-volume center, as a resource for other centers seeking optimal post operative care for GAP patients.

REFERENCES:

1.) Ljungqvist O, Scott M, Fearon KC. Enhanced recovery after surgery. JAMA Surg. 2017;152(3):292-298. doi:10.1001/jamasurg.2016.4952
2.) Mericli AF, McHugh T, Kruse B, DeSnyder SM, Rebello E, Offodile AC. Time-driven activity-based costing to model cost utility of enhanced recovery after surgery pathways in Microvascular Breast Reconstruction. J Am Coll Surg. 2020;230(5). doi:10.1016/j.jamcollsurg.2020.01.035
3.) Carter EE, Crane CN, Santucci RA. Established and experimental techniques to improve phalloplasty outcomes/optimization of a hypercomplex surgery. Plast Aesthet Res. 2020;2020. doi:10.20517/2347-9264.2020.81
4.) Berli JU, Monstrey S, Safa B, Chen M. Neourethra creation in gender phalloplasty: Differences in techniques and staging. Plast Reconstr Surg. 2020;147(5). doi:10.1097/prs.0000000000007898
5.) Rifkin WJ, Daar DA, Cripps CN, et al. Gender-affirming phalloplasty: A postoperative protocol for success. Plast Reconstr Surg Glob Open. 2022;10(6). doi:10.1097/gox.0000000000004394

Chest Reinnervation using Autologous Intercostal Nerve Graft in Gender Affirming Mastectomy with Free Nipple Grafting

Abstract Presenter
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BACKGROUND: Breast neurotization has improved post-operative sensation amongst patients undergoing breast reconstruction after cancer-related mastectomy. (1) Patients undergoing gender-affirming mastectomy with free nipple grafting (FNG) experience similar sensory deficits, however restoration of breast sensation in this population is less well-explored. Our team recently described a technique for targeted nipple reinnervation (TNR) amongst patients undergoing female-to-male (FTM) gender-affirming mastectomies with FNG using direct coaptation and allografts. The PURPOSE of this study is to describe a technique in which TNR with an intercostal nerve autograft may be used for breast reinnervation in patients undergoing gender-affirming mastectomy.

METHODS: Using TNR in a gender-affirming mastectomy, the sensory branches of intercostal nerves (T3-T5) are coapted to the dermatosensory elements of the newly positioned free nipple graft. For patients whose donor nerves do not provide sufficient length for direct coaptation, an intercostal nerve autograft is used for reinnervation. An intercostal nerve branch that would otherwise be sacrificed during a mastectomy is harvested and coapted to the donor nerve in an end-to-end fashion. This newly formed complex is then coapted to the newly grafted NAC.

RESULTS: TNR using intercostal nerve autografts allows for breast reinnervation amongst patients undergoing gender-affirming mastectomy when direct nerve coaptation is not possible.

CONCLUSION: TNR is a novel technique that has the potential to significantly improve post-operative sensation outcomes amongst patients undergoing gender-affirming mastectomy with free nipple grafting. Short-term RESULTS demonstrate that the use of autologous intercostal nerve grafts for breast reinnervation improves sensation and decreases the risk of post-operative numbness/neuropathic pain.

REFERENCE:
(1) Harish V, Haffner ZK, Bekeny JC, Sayyed AA, Song DH, Fan KL. Preserving Nipple Sensitivity after Breast Cancer Surgery: A Systematic Review and Meta-Analysis. Breast J. 2022;2022:9654741. Published 2022 Nov 19. doi:10.1155/2022/9654741

Conscientious Objection to Gender Affirming Care in Residency Programs

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BACKGROUND: Medical conscientious objection is defined as a refusal of healthcare workers to provide patient services that conflict with one's personal, moral, or religious beliefs.

Conscientious objection is a federally protected right, which was broadened to include religious-based objections to transgender healthcare in 2020.(1–3) As insurers and healthcare institutions expand their scope to include gender-affirming care, there will be increased exposure of medical trainees to gender-diverse individuals in clinical settings.(4) It is therefore increasingly prudent for physician training programs to consider anticipatory policies on conscientious objection, yet no published literature examines provider objections to gender-affirming healthcare. This study aims to characterize conscientious objection and formal policies related to the care of gender-diverse individuals within relevant subspecialty training programs.

METHODS: A cross-sectional survey was administered to program leadership of accredited plastic surgery and urology residencies from February to March 2023. The survey contained questions regarding trainee exposure to gender-affirming care, content of related institutional policies, and programmatic EXPERIENCE with objections to gender-affirming care. RESULTS were analyzed using descriptive statistics.

RESULTS: Program leadership from 13 plastic surgery (36%) and 23 urology (64%) residencies completed the survey. Many programs incorporated formal didactic training on gender-affirming surgery (83%, n=30) and direct clinical exposure to gender-affirming care (78%, n=27). However, only six programs (17%) were aware of existing institutional policies related to conscientious objection, one of which explicitly included gender-affirming care. Of these respondents, one program's policy was used by faculty and trainees to object to gender-affirming interventions, fertility preservation, and emergency care for gender-diverse persons. Of the programs who did not have or were uncertain of an existing policy (83%, n=30), three (10%) reported incidents of faculty and trainee objection to gender-affirming surgeries and peri-operative care.

CONCLUSION: Many accredited residency training programs in plastic surgery and urology engage in didactic and clinical training related to gender-affirming care, yet few have official policies related to faculty and trainee objection to these services. Although the prevalence of objection is low in this cohort, these incidents do occur and programs may benefit from creating official policies to address objectors. More comprehensive studies are required to understand the impact of conscientious objection and formal protective policies on both healthcare providers and gender-diverse patients.

REFERENCES:

1.) Fry-Bowers EK. A Matter of Conscience: Examining the Law and Policy of Conscientious Objection in Health Care. Policy Polit Nurs Pract. 2020;21(2):120-126. doi:10.1177/1527154420926156

2.) Keith K. HHS Strips Gender Identity, Sex Stereotyping, Language Access Protections From ACA Anti-Discrimination Rule. Health Aff. https://www.healthaffairs.org/do/10.1377/forefront.20200613.671888/. Published June 13, 2020. Accessed March 2, 2023.

3.) Nondiscrimination in Health and Health Education Programs or Activities, Delegation of Authority. Federal Register. https://www.federalregister.gov/documents/2020/06/19/2020-11758/nondiscrimination-in-health-and-health-education-programs-or-activities-delegation-of-authority. Published June 19, 2020. Accessed March 2, 2023.

4.) Morrison SD, Dy GW, Chong HJ, et al. Transgender-Related Education in Plastic Surgery and Urology Residency Programs. J Grad Med Educ. 2017;9(2). doi:10.4300/JGME-D-16-00417.1

Does Body Mass Index Affect the Outcomes of Gender-Affirming Masculinizing Chest Reconstruction?

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INTRODUCTION: Body mass index (BMI) is often used in surgical settings to determine a patient's risk of complication. Some research has identified BMI as a significant surgical risk factor for specific outcomes, while other research has found no associations between perioperative outcomes and BMI alone. In the context of gender-affirming surgeries, which are performed to increase transgender individuals' sense of congruence between their bodies and gender identity, BMI requirements limit access to care for overweight or obese patients. There is a critical need to understand the influence of BMI on surgical risk for this population.

METHODS: We conducted a retrospective chart review of the first 250 consecutive gender-affirming masculinizing chest reconstructions performed between 2017 and 2021 at a multi-specialty surgical center housed in a large academic medical institution. The included patients identified as transgender and/or nonbinary, were between 15-35 years old, and had a masculine gender identity. Study data were independently abstracted by 2 separate reviewers to ensure accuracy. Outcomes were chosen from the literature on gender affirming mastectomy and dichotomized for analysis. First, the relationship between (pre)operative factors and BMI was assessed using Pearson's correlation. Outcomes were then analyzed via univariate logistic regression using BMI at surgery as a continuous variable. Multivariate logistic regression was also performed to control for preoperative factors. Finally, the relationship between BMI and surgical satisfaction was assessed using ordinal logistic regression.

RESULTS: Patients were an average of 19.9 (SD: 3.6) years old at surgery. A majority of patients were White and non-Hispanic. 90% of surgeries were performed through double incision mastectomy; the remainder were performed through the periareolar approach. Higher BMI was associated with longer drain stays, larger volume of tissue resected, higher likelihood of having nipple grafts, and lower likelihood of having periareolar surgery. Higher BMI at surgery was statistically significantly related to the likelihood of experiencing dog ears in the intermediate

term (p=0.002). Multivariate logistic regression did not reveal any statistically significant impacts of BMI on the likelihood of experiencing complications at any study time points. No other complications were associated with BMI.

CONCLUSIONS: Masculinizing chest reconstruction was found to be safe and satisfactory for patients across the range of BMI. As expected, higher BMI was associated with a number of (pre)operative characteristics related to the amount of tissue resected. The only complication more likely to be EXPERIENCEd by patients with higher BMI was dog ears, a largely aesthetic complication without any additional safety concerns. Surgeons offering masculinizing chest reconstructions should inform patients with higher BMIs about what outcomes to expect but should not preclude these patients from having surgery.

Evaluating Video Quality, Understandability, and Actionability of YouTube Content for Gender Affirming Surgery: Metoidioplasty

Abstract Presenter
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INTRODUCTION AND OBJECTIVE: With the rise of social media platforms, consumer-style web-based health information has become more accessible to patients. The objective of this study was to analyze the quality, understandability, and actionability of metoidioplasty content on the social media platform YouTube.

METHODS: A YouTube search for "Metoidioplasty" was conducted, and the first 100 relevant video RESULTS were analyzed. Videos greater than 30 minutes in length, non-English speaking, or exclusively showing a surgical procedure were excluded, and 79 videos were analyzed. Each video was characterized by speaker and presenter demographics, channel/video statistics, and clickbait. Completeness was calculated based on what percentage of the categories of anatomy, treatment options, outcomes, benefits, and risks were discussed. A complete video discussed all five topics. Calculated scores for validated DISCERN and PEMAT metrics were the primary outcome variables and were used to quantify the quality, actionability, and understandability. Cut-offs of DISCERN ≥ 3 and PEMAT 75% were used to differentiate between "poor" versus "good/sufficient." Multivariate and univariate logistic regressions were performed to assess associations and the impact of variables on primary outcome variables (alpha < 0.05).

RESULTS: Of the videos analyzed,19 (24%) were of low quality, 78 (99%) had poor understandability, and 79 (100%) had poor actionability. Patients/consumers were the most

common content publishers (n=71, 90%) and narrators (n=71, 90%). 5 (6%) contained moderate-high misinformation. Of all the video characteristics analyzed, there was a statistically significant association between completeness and good actionability (OR, 0.64; 95%CI, .012, 6.94; p=0.05). CONCLUSION: Informational videos available to transgender patients interested in metoidioplasty on YouTube have overall poor quality, actionability, and understandability. In the videos that were complete, content creators were less likely to suggest actionable steps viewers can take to learn more about metoidioplasty. The information that is available to patients on social media influences the patient's ability to make informed decisions on options for gender affirmation. As such, it is essential for physicians to be aware of the quality of content and source of their patient's information. At this time, it is unclear whether the overall lack of high-quality videos and a lack of videos published by accredited physicians and hospitals are attributed to a lack of created content or the preferential display of patient-centered content curated by YouTube's internal algorithm.

Building a Cohort of Transgender and Nonbinary Patients from the Electronic Medical Record

Abstract Presenter
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PURPOSE: Sexual orientation, gender identity, and assigned sex at birth (SOGI/ASAB) have been routinely excluded from demographic data collection tools, including in electronic medical record (EMR) systems.1 Many healthcare organizations do not house structured data capture elements for SOGI within their EMR, leading to invisibility and misclassification of sexual and gender minority patients.2 There exist formal calls to standardize and collect this data, as well as strategies for standardization to minimize provider bias, while being affirming for patients.3-5 We assess the ability of adding structured SOGI/ASAB data capture to improve identification of transgender and nonbinary (TGNB) patients compared to using only International Classification of Diseases (ICD) codes and text mining and comment on the ethics of these cohort formation methods.

METHODS: We conducted a retrospective chart review to classify patient gender at a single institution using ICD-10 codes, structured SOGI data, and text mining for patients presenting for care between March 2019 and February 2021. Medical records flagged for additional review included any record with one or more of the following: 1) an ICD-10 diagnosis code of gender dysphoria, 2) any record with completed SOGI/ASAB questions, and 3) any clinical note containing a TGNB-related keyword. Charts with ambiguous or conflicting flags received additional review which incorporated manual cross-reference of organ inventories or laboratory values, medical problem lists, medications, and clinical notes. Two independent reviewers performed the chart review. Discrepancies were resolved by a third reviewer. Positive predictive

value (PPV) of each identification method was calculated using tabulation of both true and false positives.

RESULTS: 1,530,154 EMR records were queried. Overall, 154,712 contained relevant data fields, and 2,964 were manually reviewed. This approach identified a final 1,685 TGNB patient cohort. PPV was 56.8%, with ICD-10 codes, SOGI data, and text mining having PPV of 99.2%, 47.9%, and 62.2%, respectively. ICD-10, SOGI, and text mining data each exclusively captured 165 (10.3%), 704 (41.8%), and 118 (7.0%) patients; the remainder had multiple signals. Overall, 1343 (79.7%) patients were identified by SOGI data capture. 1,279 false positive records were tabulated. Most false positives were identified when the gender identity field was indeterminate (n=554, 43.3%). After indeterminate patients were removed, the overall and SOGI-specific PPVs improved from 56.8% to 69.6% and 47.9% to 68.4%, respectively.

CONCLUSIONS: A defined TGNB cohort yields the ability to analyze health disparities, perform quality evaluation and improvement, and guide cultural competency training to improve patients' access to and experience high-quality equitable healthcare. This is one of the first studies to use a combination of structured SOGI/ASAB data capture with keyword terms and ICD codes to identify TGNB patients. Our approach revealed that though structured SOGI/ASAB documentation was less than 10% in our health system, 1,343/1,685 (79.7%) of TGNB patients were identified using this method. Our study suggests that as health systems implement widely used and well-structured SOGI/ASAB data capture systems, other METHODS to identify TGNB patients may be retired. This will require further refinement of SOGI/ASAB selection and wider adoption of its use.

REFERENCES:

1. Reisner SL, Conron KJ, Scout, et al. "Counting" transgender and gender-nonconforming adults in health research: recommendations from the gender identity in US surveillance group. TSQ Transgender Stud Q. 2015;2(1):34-57.
2. Deutsch MB, Keatley JA, Sevelius J. Collection of Gender Identity Data Using electronic medical records: survey of current end-user practices. J Assoc Nurses AIDS Care. 2014;25(6):657-663.
3. Deutsch MB, Green J, Keatley J, et al. Electronic medical records and the transgender patient: recommendations from the World Professional Association for Transgender Health EMR Working Group. J Am Med Inform Assoc. 2013;20(4):700-703.
4. Nguyen A, Lau BD. Collecting Sexual Orientation and Gender Identity Information: Filling the Gaps in Sexual and Gender Minority Health. Med Care. 2018;56(3):205-207.
5. The Fenway Institute Released New Tools To Help Healthcare Organizations Collect Sexual Orientation And Gender Identity Data To Improve Quality Of Care And Reduce LGBT Health Disparities. Fenway Health Institute.

Gender-Affirming Plastic Surgery Improves Mental Health Outcomes and Decreases Anti-Depressant Use in Patients with Gender Dysphoria

Abstract Presenter

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PURPOSE: Patients with gender dysphoria face significant health disparities and barriers to care. Transition-related care includes hormonal therapy, mental healthcare, and gender-affirming surgeries. Studies have described favorable surgical outcomes and patient satisfaction, however the degree to which these procedures impact mental health conditions are not fully understood. The PURPOSE of this study was to evaluate the effect of gender affirming plastic surgery on mental health and substance abuse in the transgender population.

METHODS AND MATERIALS: A national insurance claims-based database was used for data collection. Patients with a diagnosis of gender dysphoria were propensity score-matched for likelihood of undergoing gender affirming surgery (no surgery being the control cohort), based on comorbidities, age and listed sex. Primary outcomes included post-operative antidepressant use and prevalence of mental health conditions.

RESULTS: A total of 3,134 patients with gender dysphoria were included in each cohort. Patients in the surgery group had overall lower rates of mental health conditions, substance abuse and SSRI/SNRI use. Among patients that underwent surgery, the majority of which were female to male procedures (74.7%), with chest masculinization the most common (71.2%). There was an absolute decrease of 8.8% in SSRI or SNRI prescription after gender affirming plastic surgery ($p<0.001$), and significant decreases in post-operative depression (7.7%), anxiety (1.6%), suicidal ideation (5.2%) and attempts (2.3), alcohol abuse (2.1), and drug abuse (1.9%).

CONCLUSION: Gender-affirming surgery in appropriately selected gender dysphoric patients is associated with decreased postoperative rates of SSRI or SNRIs use and improved mental health.

Penile Inversion Vaginoplasty Outcomes: The Mayo Experience

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PURPOSE: To determine the outcomes of primary penile inversion vaginoplasty (PIV) performed at a single institution from January 2017 to January 2023.

METHODS: Retrospective IRB-approved study of 178 patients who underwent primary penile inversion vaginoplasty at a single institution over six years. The study excluded patients who underwent zero-depth vaginoplasty or revision cases. Demographic characteristics, complications, revision, and readmission rates were collected. Minor and major complications were defined, and logistic regression analysis was used to determine odds ratios for factors associated with surgical complications. The data were tested for normal distribution using the Kolmogorov-Smirnov test. BlueSky Statistics software was used for analysis. The median follow-up was 7.38 months.

RESULTS: The sample population had a non-normal distribution (p 0.0043). The majority of the patients had an above-normal BMI (60%), while 17% had respiratory comorbidities and 29% were former smokers. The median age at the time of the procedure was 33.87 (26.99, 48.31), the intra-operative vaginal depth reached was 12cm (10.16, 15.24), the surgical time was 3h31 (4h48-7h16), the hospital stay was 5 days (5,6), and the hormone therapy duration was 863 days (543.25, 1360.75). The readmission rate was 8%, and 28% of patients required revision surgery, of which 32% were for both cosmetic and functional PURPOSEs. Additionally, 36.5% of patients underwent other gender-affirming surgeries. Major complications were EXPERIENCEd by 24.7% of patients, neovaginal stenosis (13%) being the most prevalent. Rectovaginal fistula was seen in 2 patients (1.1%): one managed intraoperatively, and other was readmitted for surgical management. Minor complications were EXPERIENCEd by 73% of patients, with wound dehiscence (48%) being the most prevalent, they were generally resolved within six months.
The logistic regression analysis found that increasing age was significantly associated with increased odds of graft loss occurring (OR=1.04, p=0.002), as well as increased odds of stenosis occurring (OR=1.05, p=0.005). Longer hospital stays were also associated with increased odds of stenosis (OR=1.5, p=0.02) and surgical site infections (OR=1.8, p=0.01) occurring, as well as an increased odds of any major complication occurring (OR=1.7, p=0.005) and wound dehiscence occurring (OR=1.5, p=0.002). Comorbidities such as respiratory and cardiovascular conditions were also significantly associated with increased odds of certain complications occurring. For instance, respiratory comorbidities were associated with increased odds of any major complication occurring (OR=4.1, p=0.001), epidermolysis occurring (OR=4.2, p=0.008), and revision surgery occurring (OR=2.7, p=0.01), while cardiovascular comorbidities were associated with an increased odds of bleeding occurring (OR=18.58, p=0.02). Smoking was found to be marginally associated with increased odds of revision surgery occurring (OR=4.46, p=0.07). Finally, increasing age was found to be associated with increased odds of major graft loss (OR=1.09, p=0.01), while respiratory comorbidities were associated with increased odds of major tissue necrosis (OR=8, p=0.02).

CONCLUSIONS: These findings suggest that several patient-related factors may increase the odds of surgical complications following this procedure. Overall, major complications are less prevalent, and with early diagnosis and intervention, PIV shows to be a reasonably safe and

effective gender-affirming procedure in transfemale patients. It's important to emphasize early, constant, and progressive neovaginal dilation to avoid stenosis.

Superthin Dermoglandular Flaps in Top Surgery in Transgender Men: Next step in evolution?

Abstract Presenter
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INTRODUCTION: Transgender healthcare is a rapidly evolving multidisciplinary field with exponential growth in recent decades with an estimate of 25 million transgender people worldwide (1,2), therefore a significant number of transgender and gender diverse groups are in constant search of gender-affirming medical/surgical treatment. (2,3) "Top Surgery" or gender-affirming mastectomy has become one of the most common gender-affirming surgery performed (2,3,4). Critical evaluation of techniques and outcomes must be constantly reassessed to offer, not only a loss of breast and skin tissue, but a true contouring chest masculinzation (3,4). The authors presented a 7-year EXPERIENCE with a novel gender-affirming double-incision markings mastectomy (inframammary fold) technique using superthin dermoglandular inferior-pedicle flaps.

OBJECTIVE: Evaluate the safety and outcomes of the authors' "Top Surgery" technique as a surgical alternative with long-term predictable RESULTS, establishing a comparison of pre- and post-postoperative quality of life.

METHODS: A retrospective study was performed in all the transgender male patients who undergo gender-affirming mastectomy between 2014 and 2021 in single Binary and non-Binary multidisciplinary private center. Data analysis included patient's demographic including cross-sex hormone therapy, intraoperative findings, postoperative complications, postsurgical outcomes, and quality of life based on the Breast-Q and Body Uneasiness Test [BUT-A]) (5) surveys RESULTS.

RESULTS: A total of 520 subcutaneous mastectomies were performed in 260 transgender male patients. Of those, 353 mastectomies were performed using an author´s technique and 167 were excluded because an alternative technique was done, incomplete surveys or lost during follow-up. Minor complications occurred in % of the patients, hematoma being the most frequent etiology n= 31(8.7%), followed by seroma n=23(6.5%). Partial/total loss of flap were seen in n=8(2.2%), without significant association of
age or smoking. Only n=9(2.5%) required secondary revisions. From the GENDER-Q and BUT-A surveys, significant improvements were observed.

CONCLUSIONS: Our patients cohort demonstrate that gender-affirming double-incision markings mastectomy (inframammary fold technique) technique using superthin dermoglandular inferior-pedicle flaps represents a safe alternative with predictable long-term results with low complication rates and marked increase in quality of life.

REFERENCES:

1. Coleman E, Radix AE, Bouman WP, et al. Standards of Care for the Health of Transgender and Gender Diverse People, Version 8. Int J Transgend Health. 2022;23(Suppl 1):S1-S259. Published 2022 Sep 6. doi:10.1080/26895269.2022.2100644
2. Wiepjes CM, Nota NM, de Blok CJM, et al. The Amsterdam Cohort of Gender Dysphoria Study (1972-2015): Trends in Prevalence, Treatment, and Regrets. J Sex Med. 2018;15(4):582-590. doi:10.1016/j.jsxm.2018.01.016
3. Wilson SC, Morrison SD, Anzai L, et al. Masculinizing Top Surgery: A Systematic Review of Techniques and Outcomes. Ann Plast Surg. 2018;80(6):679-683. doi:10.1097/SAP.0000000000001354
4. Ammari T, Sluiter EC, Gast K, Kuzon WM Jr. Female-to-Male Gender-Affirming Chest Reconstruction Surgery. Aesthet Surg J. 2019;39(2):150-163. doi:10.1093/asj/sjy098
5. Cuzzolaro M, Vetrone G, Marano G, Garfinkel PE. The Body Uneasiness Test (BUT): development and validation of a new body image assessment scale. Eat Weight Disord. 2006;11(1):1-13. doi:10.1007/BF03327738

The Impact of Ethnicity on Forehead Morphology and Frontal Sinus Characteristics for 157 Patients Undergoing Gender-affirming Facial Feminization Surgery

Abstract Presenter
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INTRODUCTION: Gender differences in frontal sinus morphology and their implications for frontal cranioplasty have been previously described. However, we sought to investigate differences in forehead morphology and frontal sinus characteristics stratified by ethnicity to better inform preoperative planning for gender-affirming facial feminization surgery (FFS).

METHODS: We performed a retrospective review of patients undergoing evaluation for de novo FFS at our institution from May 2019 to February 2023. Patients were included if they had CT maxillofacial images for analysis of frontal sinus characteristics. Preoperative maxillofacial

CT scans were analyzed for sinus height, depth and thickness 1, 2 and 3 centimeters from the midline. Degree of lateral orbital hooding, ideal forehead slope – or the expected slope of the frontal bone achieved after setback or recontouring (plane from nasion to a point tangent to the slope of the frontal bone irrespective of the glabella protrusion) – and actual forehead slope (line from nasion tangent to glabellar protrusion) were measured.1 Frequency and distance of protrusion of the sinus beyond the 'ideal slope line'1 (indicator of requiring setback rather than burring alone during cranioplasty) were also recorded. Data were analyzed using ANOVA, Kruskal-Wallis H tests, Mann-Whitney U tests, Spearman's Rank Order, and Chi-Squared tests.

RESULTS: 157 patients (ages 32.0 - 10.0 years) were included in our review. Clinical measurements of brow protrusion (from 16mm) were positively correlated with estimated forehead setback on exam (range 1 to 6mm) ($r_s=0.9$, $p<0.001$), VSP-predicted forehead setback (range 2.5-6mm, $r_s=0.5$, $p<0.001$) and actual operative setback (range 2.5-6mm, $r_s=0.6$, $p<0.001$). Operative setback measurements were positively correlated with CT measurements of frequency of sinus protrusion beyond the ideal forehead slope ($U=1221.5$, $p<0.005$), differences between the actual and ideal forehead slope ($r_s=0.5$, $p<0.001$) and distance of brow protrusion $r_s=0.5$, $p<0.001$), whereas nasofrontal angle demonstrated a negative correlation with setback measurements ($r_s=-0.3$, $p=0.004$). When stratified by ethnicity, Asian and Latina patients demonstrated lower clinical measurements of brow protrusion compared to Caucasian and African American patients (A:11 L:12.5 vs C:14 AA:13, $p<0.001$; $p=0.04$, respectively). However, there was no significant difference in frontal sinus measurements on CT imaging or operative approach between cohorts.

CONCLUSIONS: Clinical estimations of brow protrusion are accurate predictions of operative frontal setback. Meanwhile, ethnicity does not appear to have a significant influence on frontal sinus measurements or operative plan. Put another way, individual variability within ethnicities is as significant as any differences between ethnicities in regard to these variables. As a result, individualized preoperative planning is recommended to optimize outcomes in frontal bone setback and recontouring.

REFERENCES:

1. Lee MK, Sakai O, Spiegel JH. CT measurement of the frontal sinus - gender differences and implications for frontal cranioplasty. J Craniomaxillofac Surg. 2010 Oct;38(7):494-500. doi: 10.1016/j.jcms.2010.02.001. Epub 2010 Mar 23. PMID: 20335041.

Comparing Gender Congruency in Nonsurgical versus Postsurgical Top Surgery Patients: A Prospective Survey Study

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BACKGROUND: Gender dysphoria, when left untreated, can lead to reduced quality of life and increased rates of depression and suicide.1-3 Current treatments include hormone replacement therapy (HRT) and gender affirming surgeries.4-5 Prior studies on top surgery have evaluated patients who underwent surgical treatment or those who have received HRT alone. None have evaluated the additive effect of surgery and why some patients choose not to undergo surgery. Our study compared congruency, satisfaction, and discrimination in patients who underwent top surgery and HRT versus HRT alone. We hypothesized improved outcomes in top surgery patients but that financial burden is a common barrier for operation.

METHODS: Self-reported transgender subjects who were at least 15 years of age and have undergone at least 6 months of HRT were recruited. Those with a history of gender affirming facial or bottom surgeries were excluded. Subjects who have undergone gender affirming top surgery were assigned into the surgery arm, and those undergoing HRT alone were assigned to the hormone therapy arm. All subjects answered questions on gender congruency, discrimination, and barriers to care. Surgical patients were asked about postoperative satisfaction using the Breast-Q. A Mann-Whitney test compared survey responses between study arms.

RESULTS: One-hundred twenty-one eligible subjects completed the survey. Seventy (57.9%) participants were female-at-birth and 51 (42.1%) were male-at-birth. Forty-four (36.4%) participants identified as female, 57 (47.1%) identified as male, while 20 (16.5%) identified as non-binary or gender non-conforming. Within the hormone arm, 83.6% stated desire for surgery and 60.7% declared barriers to surgery, with cost and insurance coverage representing the most common barriers. Subjects in the surgery arm answered significantly more positively ($p<0.001$) on all questions regarding gender congruency. The greatest difference was observed in how subjects' physical bodies represented their gender identity, where the surgery group rated higher on the 5-point Likert scale by 2.0 points (p3.0 in all categories of breast augmentation and >2.6 for breast reduction on a 4-point Likert scale.

CONCLUSIONS: Top surgery, in addition to HRT, significantly improves gender congruency and decreases discrimination and abuse, compared to HRT alone. Our data further supports that top surgery can markedly improve someone's life. Unfortunately, barriers including cost and insurance coverage continue to be an obstacle for care.

REFERENCES:

1. Bockting WO, Miner MH, Romine RE, et al. Stigma, mental health, and resilience in an online sample of the US transgender population. Am J Public Health. 2013;103:943–951.

2. Clements-Nolle K, Marx R, Katz M. Attempted suicide among transgender persons: the influence of gender-based discrimination and victimization. J Homosex. 2006;51:53–69.
3. Reisner SL, White JM, Mayer KH, Mimiaga MJ. Sexual risk behaviors and psychosocial health concerns of female-to-male transgender men screening for STDs at an urban community health center. AIDS Care. 2014;26:857–864.
4. American Medical Association House of Delegates. H-185.950 Removing Financial Barriers to Care for Transgender Patients. American Medical Association: Chicago, IL, 2008.
5. S.E. James, J.L. Herman, S. Rankin, et al. The report of the 2015 U.S. Transgender survey National Center for Transgender Equality, Washington, DC (2016)

Providing Gender Affirming Care in a Public Health Payer System: A Cost-Utility Analysis of Top Surgery

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PURPOSE: Gender affirming "top" surgery (i.e., chest reconstructive mastectomy or augmentation) is a safe and commonly performed surgery for transgender and gender diverse (TGD) adults.1-2 In 2016, Padula et al. conducted a cost utility analysis (CUA) demonstrating coverage for gender affirming care (including surgery) is cost-effective from the perspective of an insurance provider in the United States.3 In Canada, where medical care is publicly funded and the responsibility of provincial health authorities, the impact of top surgery has yet to be appraised.

METHODS: A CUA was performed to examine the incremental cost per quality adjusted life year (QALY) gained, a standardized patient impact measure, associated with receiving top surgery. A Markov model, adapted from Padula et al. (2016), was created using TreeAge software.3 The study population was TGD individuals over 18 years old desiring top surgery. A public health payer perspective was chosen. Given differences in funding between provinces, Ontario was chosen as the base province for the model. Top surgery was compared to no surgery, where each arm included sub-groups with and without hormone therapy (HT). Before entering the Markov nodes, patients were either cycled into the HT branch or the no HT branch after receiving top surgery or not. Once in the Markov node, patients EXPERIENCEd outcomes over

one-year cycles for 10 cycles. A half cycle correction was applied to the model. Health care costs and QALYs were outcomes of interest. A cohort size of 1,000 was used to represent a conservative estimate of TGD patients awaiting surgery each year. Costs, utility values, and probabilities were derived from health authority reports and the literature.

RESULTS: Top surgery was cost-effective compared to no surgery over a 10-year time horizon when the impacts of related adverse health states (e.g., psychologic distress, suicidal ideation, and smoking) were considered. Costs were reported in 2022 Canadian dollars. A typical willingness to pay (WTP) threshold of $50,000/QALY was applied. The 10-year incremental cost effectiveness ratio (ICER) was $-81,183.56 per QALY gained. The net monetary benefit (NMB) was $394,050.00. A probabilistic sensitivity analysis demonstrated robustness of the RESULTS, finding top surgery was cost-effective in 97.5% of simulations and dominated in 75.4% of simulations.

CONCLUSIONS: Over time, provision of top surgery RESULTS in a reduction of costs for a public payer system and an improved general health state for TGD adult patients desiring surgical care. These findings may support advocacy efforts to reduce accessibility barriers for TGD patients desiring top surgery.

REFERENCES:

1. Cuccolo NG, Kang CO, Boskey ER, et al. Masculinizing Chest Reconstruction in Transgender and Nonbinary Individuals: An Analysis of Epidemiology, Surgical Technique, and Postoperative Outcomes. Aesthetic Plast Surg. 2019;43(6):1575-1585. doi:10.1007/s00266-019-01479-2
2. Cuccolo NG, Kang CO, Boskey ER, et al. Epidemiologic Characteristics and Postoperative Complications following Augmentation Mammaplasty: Comparison of Transgender and Cisgender Females. Plast Reconstr Surg Glob Open. 2019;7(10):e2461. doi:10.1097/GOX.0000000000002461
3. Padula W v., Heru S, Campbell JD. Societal Implications of Health Insurance Coverage for Medically Necessary Services in the U.S. Transgender Population: A Cost-Effectiveness Analysis. J Gen Intern Med. 2016;31(4):394-401. doi:10.1007/s11606-015-3529-6

Barriers of Access to Gender-Affirming Surgery: A Scoping Review

Abstract Presenter
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PURPOSE: Demand for gender-affirming surgery among transgender and gender diverse individuals has increased over the past 20 years1; however, patient, provider, and systemic factors often prevent equitable access to these surgeries.2 We performed a scoping review to describe the literature on barriers impacting access and provide a robust evidence base to guide systematic change and future research to improve access to these vital surgeries.

METHODS: A scoping review was conducted utilizing the Arksey and O'Malley framework.3 Seven databases were queried from inception through March 14, 2022 with search strings adapted from previously existing searches based on gender-affirming surgery and barriers of access to care. Three researchers screened titles and abstracts for inclusion, and two researchers conducted full-text screens on the included articles. All conflicts were resolved, and data extracted included study characteristics and barriers of access to gender-affirming surgery.

RESULTS: Our search yielded 5,719 unique articles of which 139 were selected for full-text review and 56 were included. Most studies were observational (n=49) and utilized online research settings (n=36). Articles spanned multiple procedure types including transfeminine (n=24) and transmasculine genital surgery (n=22) and transmasculine (n=22) and transfeminine top surgery (n=17). The most common barriers in accessing gender-affirming surgery included insurance coverage (n=32), finances, including direct and indirect costs (n=31), preoperative medical eligibility and letters (n=19), healthcare provider attitudes (n=15), lack of healthcare provider knowledge (n=15), and lack of patient educational resources (n=14). Additional barriers identified included: availability of surgeons, both the number and those in-network (n=12), fear of surgery, complications, recovery, and stigma (n=10), and uneven geographic distribution of surgeons (n=10).

CONCLUSIONS: While access to gender-affirming surgery has increased over time, significant barriers continue to exist. There is a large opportunity to pursue future research to address and reduce these barriers. Specifically, these data support the need for greater exposure to gender-affirming surgery in medical training programs to increase provider education and the number of practicing gender-affirming surgeons, as well as improve healthcare provider attitudes towards transgender healthcare. In addition, expansion of insurance coverage and standardization of preoperative eligibility requirements should be implemented as they were cited as the most common causes of individuals' lack of access to these critical surgeries.

REFERENCES:

1. Canner JK, Harfouch O, Kodadek LM, et al. Temporal Trends in Gender-Affirming Surgery Among Transgender Patients in the United States. JAMA Surg. 2018;153(7):609-616. doi:10.1001/jamasurg.2017.6231

2. El-Hadi H, Stone J, Temple-Oberle C, Harrop AR. Gender-Affirming Surgery for Transgender Individuals: Perceived Satisfaction and Barriers to Care. Plast Surg. 2018;26(4):263-268. doi:10.1177/2292550318767437

3. Arksey H, O'Malley L. scoping studies: towards a methodological framework. Int J Soc Res Methodol. 2005;8(1):19-32. doi:10.1080/1364557032000119616

Tranexamic Acid and Hematoma Rates in Transmasculine Chest Surgery

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BACKGROUND: Minimizing surgical blood loss is imperative to avoid surgical morbidity and mortality, as well as aesthetic compromise. A pharmacologic prevention employed across multiple surgical specialties is the use of anti-fibrinolytic agents, most commonly tranexamic acid (TXA). Its role in plastic surgery appears promising, however, a paucity of data still exists outside of craniofacial surgery. There are a few articles describing the use of TXA in breast cancer patients undergoing mastectomy or lumpectomy, but at present there is no literature regarding TXA administration in transmasculine chest surgery.

METHODS: A prospective cohort study was conducted involving transmasculine patients undergoing chest reconstruction surgery for chest dysphoria. The procedures were performed by a single surgeon at a single institution over the course of 8 months (May through January). Patients receiving perioperative TXA were compared to multiple historic control groups. The TXA
protocol was 500mg iv prior to incision and 500mg topical prior to incision (500mg TXA mixed into 1L of tumescent solution which was then infiltrated throughout the chest - 500cc each side). Other than TXA administration, all surgeries were performed in the exact same manner with the exact same METHODS for achieving hemostasis. The primary outcome was significant hematoma requiring intervention at any point during the post-operative and follow up period.

RESULTS: 125 consecutive patients (250 breasts) who received perioperative TXA were studied over a 8 month period. The control groups included historical cases that did not receive TXA (125
consecutive patients per 6–8-month time block for each of the past 5 years). The average hematoma rate was 3.5% in the control groups compared to .8% in the TXA group (1 hematoma in the entire cohort).

CONCLUSION: The combined use of TXA intravenously and topically in transmasculine chest surgery significantly reduced hematoma rates. The promising RESULTS of the study thus far encourages the ongoing expansion of TXA indications in plastic surgery.

Partial and Full Facial Feminization Surgery at a Major Academic Hospital: A Retrospective Cohort Study

Abstract Presenter
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INTRODUCTION: In recent years, there has been increasing demand for facial feminization surgery (FFS) as insurance coverage and access to care have improved and transgender females increasingly seek surgery to address their gender dysphoria. This study presents our EXPERIENCE at a major academic hospital with partial-FFS (P-FFS) and single-stage full-FFS (F-FFS), with particular focus on surgical planning and the alignment of patient goals and expectations.

METHODS: A retrospective review of the electronic medical record was carried out for all patients 18 and older diagnosed with gender dysphoria who were referred to the senior surgeon for FFS between January 2019 and December 2022. Patients were grouped as either P-FFS, when a multi-stage operative approach was taken, or F-FFS, when the upper, middle, and lower facial thirds were addressed in a single anesthetic event.

RESULTS: We identified 200 patients who underwent FFS. The majority had P-FFS, as these patients preferred to acclimate to their post-surgical facial features before making a decision to have additional FFS. Virtual surgical planning was employed in all cases and helped clarify and align patient goals and expectations. Patients from both groups were highly satisfied with their outcomes.

CONCLUSIONS: Both P-FFS and F-FFS are safe and reliable approaches to gender-affirming surgery that each confer specific advantages to patients and surgeons. A staged approach to FFS benefits from virtual surgical planning and allows for a less invasive and more personalized approach to facial gender affirmation.

Is There Regret? Evaluation Of Gender Affirming Top Surgery at A Single Center

Abstract Presenter
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PURPOSE: Gender affirming top surgery (GATS) refers to procedures focusing on reconstruction of the breast or chest wall, that includes breast augmentation, fat grafting, breast reduction or subcutaneous mastectomy. Following hormonal therapy procedures often represent the initial surgical step in gender affirmation.1 This study aims to evaluate quality of life, satisfaction and level of regret following GATS using validated surveys in both male-to-female (MTF) and female-to-male (FTM).

METHODS: We conducted a retrospective anonymous online survey at a quaternary academic medical center in the Midwest on transgender patients who underwent MTF or FTM GATS by a single surgeon from 2018-2022. The validated Breast-Q Augmentation (MTF), TRANS-Q (FTM) and Decision Regret Scale surveys assessed patients' satisfaction with respect to physical, psychosocial and emotional health.2,3,4 Pertinent socio-demographic data was collected to assess diversity of the studied population. Following IRB-approval, the survey was distributed to 76 patients (17 MTF/59 FTM).

RESULTS: We received a total response rate of 72% (10/17 MTF;45/59 FTM). 50% were White, 33% African American, 6% Asian and 5% Hispanic. Age at the time of GATS was statistically different between the two groups at 36.1 ± 10.4 (MTF) and 26.6 ± 7.8 (FTM) (p= 0.003). 64% of patients utilized private insurance and 96% were transitioning for a minimum of 1-2 years prior to undergoing GATS. Generalized anxiety disorder(60%), depression(60%), post-traumatic stress disorder(33%) and bipolar disorder(13%) was observed. 95% of patients agreed/strongly agreed that symptoms of their mental disease improved after GATS (MTF 4.4 ± 0.5/FTM 4.5 ± 0.8).56% of patients acknowledge thoughts of self-harm or suicide prior to undergoing GATS; 16% and 38% stated GATS eliminated or improved these thoughts, respectively. The decision regret score is scaled from 0 to 100 with 0 representing no regret. The overall score for MTF had a mean of 6.0 ± 12.9 versus 22.0 ± 39.8 for FTM (p=0.031). The TRANS-Q survey reported satisfaction was good/very good for overall procedure (91%), chest shape(89%), sexual confidence(80.5%) and scar location(78%). Comparably, decreased satisfaction was observed with nipple sensation(44%), nipple appearance(54%), nipple color(68%) and scar size(61%). However, 100% and 96% of TRANS-Q respondents agreed/strongly agreed that they would recommend GATS to others or would choose GATS again. The mean score for the Breast-Q Augmentation psychosocial well-being and outcome satisfaction modules were 70.8±21.1 and 79.3±22.2, respectively.

CONCLUSION: Our study suggests that GATS improves self-confidence, physical, psychosocial, emotional and mental health. Yet, few noted regret. Future prospective studies on larger cohorts using validated measures are needed to evaluate underlying factors contributing to regret in order to improve healthcare delivery in this population.

REFERENCES:

1.Claes KEY, D'Arpa S, Monstrey SJ. Chest Surgery for Transgender and Gender Nonconforming Individuals.Clinics in Plastic Surgery.2018;45(3):369-380.doi:https://doi.org/10.1016/j.cps.2018.03.010

2.Pusic AL, Reavey PL, Klassen AF, et al.Measuring Patient Outcomes in Breast Augmentation:Introducing the BREAST-Q© Augmentation Module.Clinics in Plastic Surgery.2009;36(1):23-32.doi:https://doi.org/10.1016/j.cps.2008.07.005
3.Wanta J, Gatherwright J, Knackstedt R, et al."TRANS"-questionnaire (TRANS-Q):a novel, validated pre- and postoperative satisfaction tool in 145 patients undergoing gender confirming mastectomies.European Journal of Plastic Surgery.019;42(5):527-30.doi:https://doi.org/10.1007/s00238-019-01547-5
4.Brehaut JC, O'Connor AM, Wood TJ, et al.Validation of a Decision Regret Scale.Medical Decision Making.2003;23(4):281-292.doi:https://doi.org/10.1177/0272989x03256005

Sentiment Towards Gender Affirming Surgical Care Among Plastic Surgery, Urology, and Obstetrics and Gynecology Postgraduate Trainees.

Abstract Presenter
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Providing gender-affirming care is a critical medical service that is rapidly evolving given the dynamic insurance and political landscape. There is limited information in the literature documenting an increase in willingness to provide care in the medical and surgical community. Plastic Surgery (PS), Urology, and Obstetrics/Gynecology (OB/GYN) are the disciplines most likely to perform gender-affirming surgeries (GAS). Anecdotally, these groups are most likely to view this population favorably. Targeting residents and fellows within these surgical residencies, we aimed to gauge the willingness to provide surgical care for this patient population in the US.

Plastic surgery, Urologic surgery, and OB/GYN trainees from all U.S. training programs were asked to complete a cross-sectional 26-question survey between August 2020 and January 2022. Respondents were queried regarding their demographic background. We focused on addressing transgender curricular exposure, knowledge of services offered at their institution, and comfort surrounding the training opportunities in transgender patient care. Additionally, respondents were queried on their desire or willingness to perform gender-affirming care or surgeries. Demographic data including personal gender identity and connection to the LGBTQ community was also collected.

164 responses across specialties were collected. Statistical analysis demonstrated distinct trends across specialties in exposure, comfort, gender, and region. Additionally, individual text-based responses from the survey were compiled. Our survey demonstrated consistency with prior studies on regional exposure to GAS but revealed interesting perspectives regarding the morality

of providing this care. Namely, whether trainees have the option to opt in or opt out of surgical gender training despite the prevailing belief that these services are necessary.

Amongst all specialties, survey takers felt that residents should not have the option to opt out of curriculum specific to gender diverse patients (80.99%, 115/142) nor the option to opt out of caring for gender diverse (82.39%, 117/142). Similarly, most respondents to the survey do not have a moral/ethical objection to care for (90.85%, 129/142) nor to provide surgical care (82.39%, 117/142) for gender diverse patients. When looking at specialty specific responses, PS had the highest exposure to GAS. However, 20/68 plastic surgery respondents thought that residents should have the option to opt out of gender-affirming care, which was found to be significantly more than the other surgical specialties ($p=0.013$) with only 5 other respondents in OB/GYN or urology programs responding in favor of opting out. There was no statistical significance to respondents having moral/ethical objections to providing neither care or surgeries for gender diverse patients, despite the significance in PS residents in favor of opting out of services. OB/GYN had the overall lowest exposure to surgical cases with urology being exposed to the highest number of revision surgeries. Numerous other significant results were noted in our study.

Residency programs have made meaningful strides in offering more accessible and competent gender-affirming training. Differences in support exist among the included specialties. Plastic surgery for instance is most likely to teach GAS in their curricula but is more likely than their other specialties to opt out of training. This could be explained by preference among learners in subspecialty interests other than GAS. More interesting is that this finding does not seem to be a result of moral or ethical grounding. As most bottom surgery complications are urologic, it makes sense that revision surgeries are high in urologic training programs. Finally, the option to opt out of gender-affirming care also parallels the opt out option for abortion training in OB/GYN residencies but is not a standardized option amongst PS, urology, or OB/GYN training programs. This is the first survey of this kind to survey multiple surgical specialties providing gender-affirming surgical care and query resident sentiment and highlights the need for more questions to be asked about how to address GAS training in residency programs.

A New, Validated Algorithm for Masculine Chest-Wall Contouring in Female-to-Male Transgender: clinical and patient-reported outcomes using the TRANS-Q

Abstract Presenter
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BACKGROUND: The recent increase in the number of scientific publications on Chest-Wall Contouring Surgery in gender reassignment in female-to-male (FtM) transsexuals, reflects their importance in strengthening the patients' self-image and facilitating living in the new gender

role. To masculinize the chest by removing the female contour and optimise aesthetic outcomes, an appropriate pre-operative plan is crucial. We describe a novel algorithm which we used in our group of FtM transexual patients and we validated this using the TRANS-Q questionnaire.

METHODS: From 2016 to 2023, 97 consecutive FtM transgender patients underwent surgical procedure by the senior author (LR). A new algorithm is based on the simple assessment of the position of the nipple areola complex (NAC) to the Pectoralis Major and can easily guide the surgeon between the two surgical options: 1) Peri-Areolar (PA) or 2) a Double Incision (DI) Technique. The PA technique is used when the NAC is on the inferior border of pectoralis major; the DI technique is used when NAC is on the inferior border of pectoralis major. The TRANS-Q questionnaire was used to evaluate patient-reported outcomes (PROs), pre- and post-operatively, and differences evaluated using the Wilcoxon Sign Rank Test.

RESULTS: Eighty-three patients underwent DI technique, with median BMI 22.6 and median age of 26. Comparing pre- versus post-operative TRANS-Q scores, the median score for satisfaction with chest shape increased from 1 to 5 ($p<0.0001$); satisfaction with how chest looks with clothes on increased from 1 to 5 ($p<0.0001$); satisfaction with how chest looks with clothes off increased from 1 to 5 ($p<0.0001$); satisfaction with chest symmetry increased from 1 to 5 ($p<0.0001$); feeling confident sexually increased from 1 to 4 ($p<0.0001$); satisfaction with sex life increased from 2 to 4 ($p<0.0001$); feel sexy/attractive in clothes increased from 1 to 5 ($p<0.0001$). Six patients (7%) had seroma and no patients had partial/total nipple necrosis. Fourteen patients underwent PA technique, with median BMI 22.6 and median age of 24. Comparing pre- versus post-operative TRANS-Q scores, the median score for satisfaction with chest shape increased from 1 to 3.5 ($p<0.01$); satisfaction with how chest looks with clothes on increased from 1 to 5 ($p<0.01$); satisfaction with how chest looks with clothes off increased from 1 to 5 ($p<0.01$); satisfaction with chest symmetry increased from 1 to 5 ($p<0.01$); feeling confident sexually increased from 1 to 4 ($p<0.01$); satisfaction with sex life increased from 1 to 3.5 ($p<0.0001$); feel sexy/attractive in clothes increased from 2 to 5 ($p<0.01$). Four patients (29%) had seroma and no patients had partial/total nipple necrosis.

CONCLUSION: The authors propose a new algorithm to approach FtM transgender surgery. The high level of satisfaction validated by the TRANS-Q questionnaire can be guaranteed only by a clear pre-operative plan as per this new algorithm that we believe can simplify the surgical choice and maximize the aesthetic outcomes.

The Bottom Line: National Legislative Favorability and Insurance Coverage for Adult and Adolescent Gender Affirming Bottom Surgery

Abstract Presenter
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BACKGROUND: Although gender-affirming genital reconstruction ("bottom surgery") is medically necessary, improving gender dysphoria and quality of life, adult transgender patients experience significant financial barriers and difficulties navigating insurance coverage. The aim of this study is to assess the extent of coverage for these procedures across states, to determine the impact of legislative favorability on insurance coverage, and to assess concordance between policy criteria and international standards of care put forth by The World Professional Association for Transgender Health (WPATH).

METHODS: The policy for gender-affirming bottom surgery of insurance groups representing 80% market coverage in each state was assessed through a web-based search or telephone call in November 2022. Each policy was categorized into three groups based on previously published methodologies: never (N), case-by-case (CC), and preauthorization (PA). Among PA policies, criteria and coverage of specific surgery conditions were extracted and assessed based on adherence to WPATH standards. The relationship between established scores of legislative favorability and policy coverage in each was analyzed, as well as compared across regions.

RESULTS: We found that 299 (96%) of the 316 queried insurance policies in the United States provide PA coverage for gender-affirming genital reconstruction. The greatest proportion of PA policies (97%, $p=0.045$) as well as the greatest overall legislative favorability score ($p<0.001$) were in the Northeast, followed by the West, Midwest, and South, respectively. Predefined thresholds of legislation scores significantly predicted a state's ratio of PA policies on chi-square ($p<.0001$), and simple linear regression showed a significant relationship between the legislation subscore related to healthcare and coverage in each individual state ($p=.038$). The most common criteria to diverge from WPATH standards related to hormone therapy, number of referrals, and duration of time lived in a congruent gender role, all of which were more restrictive. Prostatectomy and vulvectomy were the least frequently covered procedures at 16.7% and 58.5% of polices, respectively. Coverage of reversal surgery, fertility preservation treatments, and revisionary surgery was offered in 42 (14.0%), 15 (5.0%), and 63 (21.1%) of policies with PA coverage, respectively. While never covered in 285 (90.2%) policies, adolescent GAS was found to have similar regional trends ($p=.0003$) and youth legislative favorability scores were also significantly predictive of adolescent policy coverage across states on chi-square ($p=.002$) and simple linear regression ($p=.0045$).

CONCLUSION: Our study found that the majority of insurance policies in the United States provide preauthorization coverage for gender-affirming bottom surgery. However, the criteria for coverage often deviate from the recommendations of the World Professional Association for Transgender Health (WPATH), and there is significant regional variation. State legislation appears to play a role in the extent of insurance coverage, with states with more favorable legislation having a higher percentage of PA policies. As legislation in the United States evolves along with the social climate, the resulting impact on GAS should be regularly assessed to inform provider management and improve standards of care.

Retrospective Analysis of Phalloplasty by a Specialized Transgender Surgery Center

Abstract Presenter
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Phalloplasty is a masculinizing genital gender affirmation surgery, requested by 91% of patients seeking surgical transition. Due to the complexity of reconstruction involved, phalloplasty has been associated with high complication rates. Urethral lengthening remains the main cause of overall complications, with all cause urinary complications being reported as high as 70%.[1] The objective of our study is to observe the specific urinary, emergent, donor site, and aesthetic complications associated with this complex procedure in the rapidly evolving field of transgender care.

Data was gathered via retrospective chart review of 280 transmasculine patients undergoing phalloplasty at our center between 7/17 and 10/20 (38 months). Patients had an average follow up period of 17 months. Average age at phalloplasty was 34 years (range 18-64). 66% (185/280) received a radial forearm flap (RFF), 34% (94/280) received anterolateral thigh flap (ALT), and 0.4% (1/280) received a musculocutaneous latissimus dorsi flap (MLD). The average length of phallus was 5.7 inches (range 4.5-8.5). 57% (159/280) of patients required delay of glansplasty while 43% 121/280 had glansplasty at the time of phalloplasty. Patients with prior masculinizing genital gender affirming surgery included: 23 with metoidioplasty, 3 with phalloplasty, and 28 with vaginectomy.

Thirty patients (11%) experienced a complication requiring urgent surgery or emergency room admission and 19 patients (7%) experienced complications of the donor site requiring surgery. Many patients experienced urinary tract complications while 21 patients (7.5%) did not have urethral lengthening. Urinary tract complications included: urethral stricture (147), urethral fistula (85), meatal stenosis (44), and cystolithiasis (3). No patients experienced rectal injury. Total phallus loss occurred in two cases (0.7%), due to vascular insufficiency and subsequent necrosis. Eighteen patients experienced infection of the phallus, which were resolved with antibiotics or minor incision/drainage. Seven patients (2.5%) had no phallic sensation.

There were a variety of procedures done for aesthetic and hygienic PURPOSE: s post-phalloplasty. Of those receiving liposuction (70/280), 94% were amongst patients with ALT and

4% were RFF, and 2% were MLD. Penile lift was performed in 20% (56/280) of cases and penile plication in 17% (49/280). 32% received a penile prosthesis after phalloplasty at the time of this writing. Overall, patients experienced an average of 3.6 complications requiring surgery (range 0-18) and had an average of 2.8, usually planned, visits to the operating room after phalloplasty (range 0-12).

This is the first report of phalloplasty RESULTS from a US, high-volume (~100 cases year), dedicated phalloplasty unit which has completed over 1000 phalloplasties. This detailed analysis of complications of this hypercomplex surgery should prove useful to practitioners, patients and payors alike.

1. Lane M, Sluiter EC, Morrison SD, et al. Phalloplasty: Understanding the chaos. Plastic and Aesthetic Research. 2020;2020. doi:10.20517/2347-9264.2020.106

From the Top: Geographic Variation and Impact of Legislation on Insurance Coverage for Masculinizing vs Feminizing Top Surgery

Abstract Presenter
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BACKGROUND: "Top surgery" includes masculinizing bilateral mastectomy and chest wall reconstruction as well as feminizing breast augmentation and is the most commonly sought form of gender-affirming surgery (GAS). Despite proven benefits of surgery, transgender and non-binary adults frequently experience financial barriers and difficulties navigating insurance coverage. The social and political context of gender-affirming care places insurance coverage in an evolving and unsteady state in the wake of recent legislative changes. The aim of this study was to assess variation in top surgery insurance coverage based on geographic and legislative factors, and to compare policy criteria with international standards of care set by The World Professional Association for Transgender Health (WPATH).

METHODS: Policies for feminizing and masculinizing gender-affirming top surgery from insurance groups representing 80% of the market coverage in each state were evaluated through a web-based search or telephone call. The policies were classified into three categories: no-coverage (NC), case-by-case (CC), and preauthorization (PA). Among PA policies, specific surgery conditions and criteria for coverage were analyzed for adherence to World Professional Association for Transgender Health (WPATH) standards. The relationship between established

scores of legislative favorability and policy coverage in each state was also assessed and compared across regions.

RESULTS: Of the 316 queried policies, third-party payers more frequently offered PA coverage for feminizing (93.0%) than masculinizing (74.1%) top surgery ($p<.001$). Furthermore, 22.2% of policies did not offer any coverage for male-to-female breast reconstruction, compared to 2.8% for female-to-male mastectomy. The criteria for feminizing surgery were also more restrictive and divergent from medical guidelines, with policies often requiring longer durations of hormonal therapy, ongoing psychotherapy, and duration of gender-congruent living experience, as well as additional referring letters. Nipple reconstruction, reversal, and revisionary procedures were covered in 65.3%, 24.8%, and 18.0% of policies, respectively. Simple linear regression showed a significant relationship between state legislative favorability and insurance coverage for adolescent feminizing ($p=.007$) and masculinizing ($p=.0052$) top surgery, but not for adult procedures. Regional variation in adolescent policy type (N, CC, and PA) was also significant for masculinizing ($p=.016$) and feminizing ($p=.017$) top surgery, with the highest PA proportion in the Northeast, followed by the West, Midwest, and South, respectively, but regional variation was not observed for adult procedures.

CONCLUSION: Insurance coverage for female-to-male top surgery is more common than for male-to-female top surgery, and the criteria for feminizing surgery more frequently diverges from medical guidelines. Geographic region and legislative favorability impacts insurance coverage for adolescent top surgery, which has been shown to significantly improve quality of life and alleviate discomfort and distress related to gender dysphoria. Therefore, insurance coverage for these interventions should be regularly reviewed as social, political, and legislative climates continue to change.

Face First: The Effects of National Legislative Favorability on Insurance Coverage for Gender Affirming Facial Surgery in Adults and Adolescents

Abstract Presenter
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BACKGROUND: Health insurers in the United States have considerable discretion in determining which healthcare interventions are considered "medically necessary." These decisions are often based on economic, legislative, and ideological considerations rather than medical evidence, leading to limited coverage of surgical gender-affirming care for the

transgender and non-binary population. Facial gender-affirming surgery (FGAS) has been identified as having particularly limited coverage and high barriers to access. There is growing evidence that these procedures are medically necessary, reflected in the recently updated Standards of Care (SOC) published by the World Professional Association for Transgender Health (WPATH). The aim of this study was to provide an updated review of insurance coverage and legislative support for FGAS, and to determine the level of concordance between insurance policies and the WPATH SOC.

METHODS: Data were collected from FGAS policies of insurance groups covering at least 80% of market share in each state. The policies were categorized into prior authorization (PA), case-by-case (CC), and never-covered (N). Among PA and CC policies for both adults and adolescents, criteria were assessed based on adherence to WPATH standards. The relationship between established scores of legislative favorability and policy coverage in each state was also assessed and compared across regions.

RESULTS: We found that the majority (53%) of the 317 queried insurance policies in the United States did not provide coverage for FGAS. The greatest proportion of PA policies (34.5%, $p=0.045$) as well as the greatest overall legislative favorability score ($p<0.001$) were in the Northeast, followed by the West, Midwest, and South, respectively. Predefined score thresholds of legislative favorability significantly predicted a state's ratio of PA policies on chi-square ($p<.0001$). Simple linear regression showed a significant relationship between legislative favorability and the extent of coverage in individual states ($p=.0001$). Many policies were poorly defined and did not include specific criteria, stating that facial surgery is deemed "gender-affirming" only if it corrects features that significantly deviate from the gender norm. We also found low rates of coverage for corrections/revisions (21.1%) and reversal (14.0%). Although 90.0% of policies did not offer coverage for adolescents, regional trends and relationships to state legislation were similar to that of adult FGAS.

CONCLUSION: Our findings demonstrate that insurance coverage in the United States has not evolved to match revised standards of care according to available scientific evidence. We found poor coverage of FGAS, deviant criteria, and a strong relationship between national regions and legislation for both adults and adolescents. Poorly defined policies may increase unnecessary denials of coverage. Third-party payers have an important role in decreasing obstacles to medically necessary transgender and nonbinary care, and future progress depends on the evolution of legislative and political landscapes.

National Estimates of Gender-Affirming Surgery by US Census Region: A Nationwide Ambulatory Surgery Sample Analysis

Abstract Presenter
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PURPOSE: In 2016, legislation prohibiting discrimination on the basis of gender identity in health insurance was passed, and studies from the inpatient setting showed improved insurance coverage for gender-affirming surgeries (GAS) across the country. However, with state legislatures introducing and, in some cases, passing bills that criminalize surgeons who provide GAS, care for patients experiencing gender dysphoria remains threatened. Given the interstate differences in legal protections and attitudes toward TGD people, there is a need for more information about how region impacts the health of people undergoing GAS. This study investigates differences in patient demographics and the performance of GAS by U.S. census region using national data from the ambulatory surgery setting.

METHODS: Individuals with gender dysphoria who underwent GAS in the ambulatory setting from 2016 to 2019 were identified in the Nationwide Ambulatory Surgery Sample (NASS) using billing codes. Demographic and clinical characteristics were collected for each encounter and stratified by US census region. Changes over the study period were compared using Pearson $\chi 2$ tests with Rao Scott corrections and multivariate logistic regression for categorical variables and linear regression for continuous variables.

RESULTS: The data set included a weighted estimate of 33,174 encounters with 72.8% (95% CI, 69.1%-76.2%) for chest reconstruction, 24.1% (95% CI, 20.9%-27.5%) for surgery on the genitals and reproductive organs, and 6.0% (95% CI, 4.6%-7.8%) for facial surgery. The rates of GAS increased by 187% from 4,320 in 2016 to 12,396 in 2019. In the Midwest, GAS increased by 257% compared to 203% in the Northeast, 218% in the South, and 154% in the West. Between 2016 and 2019, 47.2% (95% CI, 36.3%-58.5%) of encounters for GAS were in the West, 25.2% (95% CI, 17.5%-34.8%) in the Northeast, 14.1% (95% CI, 9.6%-20.0%) in the Midwest, and 13.5% (95% CI, 9.0%-19.8%) in the South (P<.001).
The proportion of patients paying completely out-of-pocket was lowest in the West (3.2%; 95% CI, 2.0%-5.1%; P<.001) compared with the Northeast (6.35%; 95% CI, 3.6%-10.9%), Midwest (6.5%; 95% CI, 4.7%-9.0%), and South (8.3%; 95% CI, 5.4%-12.6%).
The West accounted for 59.5% (95% CI, 43.8%-73.6%; P<.05) of all facial surgery with 14.3% (95% CI, 7.6%-25.3%) in the South, 19.1% (95% CI, 10.6%-32.1%) in the Northeast, and 7.1% (95% CI, 4.2%-11.7%) in the Midwest. Compared with patients in the West, those in other regions had higher odds of anxiety and depression (OR, 1.57; 95% CI, 1.09-2.26; P<.05) and were more likely to have lower incomes than other individuals from the same region undergoing ambulatory surgery (P<.001).

CONCLUSION: There was substantial growth of GAS in the Midwest, South, and Northeast between 2016 and 2019. Compared with other regions, patients who underwent GAS in the West were more likely to have income levels similar to that of the general population, receive health insurance coverage for GAS, and experience a lesser burden of mental illness. These RESULTS suggest that despite improved access to GAS, attitudes toward gender diverse people remain

heterogenous across the country and further efforts are needed to improve health outcomes for patients undergoing GAS.

Long Term Fate of Testis Prosthesis after Metoidioplasty and Phalloplasty

Abstract Presenter
Brenna Briles

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Testicle prostheses are a common component of masculinizing genital gender affirmation surgery, metoidioplasty and phalloplasty. Few studies have examined complications associated specifically with testicle prostheses, but existing data report rates of replacement as high as 30% due to factors including infection, extrusion, leakage, malpositioning, urinary obstruction, and discomfort.[1–4] The PURPOSE: of this study is to identify specific complications, either self-resolving or requiring surgical management, associated with testicle prostheses at our dedicated transgender surgery center, over a long follow up period exceeding 5 years.

We conducted a retrospective chart review of all transmasculine patients undergoing testicular implants after metoidioplasty or phalloplasty between January 2016 to November 2019, stopping the series in 2019 to allow at least 3 year followup. 23 patients were identified, 16 (70%) of whom had a prior metoidioplasty and 7 (30%) with prior phalloplasty receiving only testicular implants (no penile implant). The average follow-up period was 5.25 years (range 3.11-7.06 years). Average patient age at implantation was 44 years (range 22-62), an average of 0.85 (range 0.67-1.15) years after metoidioplasty or phalloplasty. Types of implants used included AART size #1 silicone (15, 65%), AART size #2 silicone (1, 5%), Coloplast Torosa saline-filled (3, 13%), and unknown (4, 17%). 20 (87%) patients received bilateral implants while three (13%) received unilateral. Four (17%) patients experienced a scrotal wound, either minor epidermal loss or a small eschar, on the scrotum that required no intervention. Zero patients experienced scrotal wounds requiring surgical or bedside debridement. Zero patients experienced prosthesis infection, extrusion, or implant leakage. One patient (0.04%) had their implant replaced due to malpositioning and went on to have a second implant placed without complications. The outcomes of testicle implants in our cohort compare very favorably to published reports.

REFERENCES:

1. Pigot GLS, Al-Tamimi M, Ronkes B, et al. Surgical Outcomes of Neoscrotal Augmentation with Testicular Prostheses in Transgender Men. Journal of Sexual Medicine. 2019;16(10):1664-1671. doi:10.1016/j.jsxm.2019.07.020
2. Hage JJ, van Turnhout AAWM. Long-term outcome of metaidoioplasty in 70 female-to-male transsexuals. Ann Plast Surg. 2006;57(3):312-316. doi:10.1097/01.sap.0000221625.38212.2e

3. Kang A, Aizen JM, Cohen AJ, Bales GT, Pariser JJ. Techniques and considerations of prosthetic surgery after phalloplasty in the transgender male. Transl Androl Urol. 2019;8(3):273-282. doi:10.21037/tau.2019.06.02
4. Legemate CM, de Rooij FPW, Bouman MB, Pigot GL, van der Sluis WB. Surgical outcomes of testicular prostheses implantation in transgender men with a history of prosthesis extrusion or infection. Int J Transgend Health. 2021;22(3):330-336. doi:10.1080/26895269.2020.1840476

The Assessment of Behavioral Health Readiness in Gender-Affirmation Surgery: A Survey of Provider Strategies

Abstract Presenter
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PURPOSE: Mental health provider assessment prior to gender-affirming chest and genital surgery is recommended by World Professional Association of Transgender Health Standard of Care 8 (WPATH SOC v8). The present study is a cross-sectional survey aimed to characterize the decision-making process of mental health providers (MHP) to assess behavioral health readiness prior to gender-affirming surgery (GAS).

METHODS: A survey was deployed investigating provider evaluation approaches and assessment of psychosocial domains during pre-surgical referral for gender-affirmation. The survey was distributed via email to 490 providers in Baltimore and the District of Columbia. Provider information was retrieved via Psychology Today; providers who self-identified as competent in transgender and non-binary (TGNB) issues were included. MHPs were grouped by method of training in transgender issues, volume of evaluations completed per year, and gender identity of the provider. Descriptive statistics were calculated. Chi-square and Fisher's exact tests were used to compare the assessment METHODS used, psychosocial domains emphasized, and potential barriers for referral between the groups. Independent t-tests and ANOVA were used to compare the number of sessions required and assessment outcomes between groups.

RESULTS: Of 20% (n=98) of MHPs who responded to the survey, 22 (22.4%) identified as TGNB. A significantly higher proportion of TGNB providers considered unrealistic expectations to be a contraindication to referral compared to cisgender providers (n=16 [88.9%], n=29 [51.8%]; P=.005). Cisgender MHPs with a low-volume practice required more sessions before referral (4.3 ± 3.4 than cisgender high-volume (1.5 ± 0.4), TGNB high-volume (1.9 ± 1.3), or TGNB low-volume providers (1.8 ± 1.1; P=.006). Fewer evaluation sessions were required by high volume MHPs and TGNB MHPs compared to low volume and cisgender MHPs. High-

volume MHPs were more likely to emphasize informed consent as an important domain compared to low-volume MHPs (n=14 [66.7%], n=17 [32.1%]; P=.009) Evaluations resulted in surgical referral for a median of 95% of clients (IQR [85.0% – 100.0%]) and did not significantly differ based on volume of evaluations or gender identity of the evaluating provider. A significantly higher proportion of the 57 MHPs who attended a professional conference perceived value in the current process of pre-surgical assessments for gender-affirmation compared to those who had not attended a conference (n=29 [63.0%], n=9 [32.1]; P=.028). MHPs with mentorship were less likely to consider mental health history an important domain compared to those without (n=1/39 [2.6%], n=7/35 [20.0%]; P=.023).

CONCLUSION: The approach to MHP assessments of behavioral health readiness prior to GAS is variable, though most evaluations result in referral. While the assessment should facilitate surgical transition, MHPs with personal or professional experience are likely considering the client's gender journey and informed consent earlier than those with less experience. This inconsistency is demonstrated in varying session requirements and barriers to referral.

Analyzing Trends in Negative Rhetoric Surrounding Gender-Affirming Surgery and Gender-Affirming Surgeons on Twitter

Abstract Presenter
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BACKGROUND: Negative rhetoric on social media regarding gender-affirming surgery (GAS) threatens the health of the transgender and gender-diverse (TGD) community and the safety of physicians and institutions performing GAS.1–4 While there is known negative rhetoric and abuse directed toward gender-affirming surgeons on social media,5 it has not yet been assessed in the literature or addressed by institutional or society-based leadership. We aim to characterize trends in negative rhetoric and hate speech on Twitter related to gender-affirming surgeons and GAS.

METHODS: Using Octoparse, a web extraction program, tweets from 2020 to 2022 on Twitter were identified using keywords "surgery" or "surgeon" and commonly used terms of hate-speech aimed at surgeons including: "mutilation," "mutilate," "pedophile," or "groomer." Reviewers

determined GAS-related context and evaluated for negative or supportive rhetoric in individual tweets. Engagement (likes and retweets) with negative GAS-related tweets was assessed. Linear regression models and descriptive statistics were applied.

RESULTS: Of the tweets collected using the above terms, 10,027 tweets referenced GAS, and 6,028 (60.12%) tweets contained negative rhetoric. Negative rhetoric increased significantly from July 2020 to September 2022 ($R2= 0.48$, $p<0.001$). Between 2020 and 2021, there was a 274.5% increase in negative tweets per month and a 458.2% increase from 2021 to 2022. From 2021 to 2022, negative tweets received 146.6% more likes and 125.3% more retweets.

CONCLUSION: We found a significant increase in GAS-related tweets with negative rhetoric and rising average engagement with this content from 2020 to 2022. These findings emphasize the increased harmful rhetoric and hate speech targeting GAS and gender-affirming surgeons on social media. Threats against institutions and individual surgeons may reduce the number of surgeons going into the field and the amount of accurate online information, ultimately harming patients. Society-based leadership should organize to counter online misinformation and advocate for surgeons and systems providing GAS.

REFERENCES:

1. Hughto JMW, Pletta D, Gordon L, Cahill S, Mimiaga MJ, Reisner SL. Negative Transgender-Related Media Messages Are Associated with Adverse Mental Health Outcomes in a Multistate Study of Transgender Adults. LGBT Health. 2021;8(1):32-41. doi:10.1089/lgbt.2020.0279
2. Jaffee KD, Shires DA, Stroumsa D. Discrimination and Delayed Health Care Among Transgender Women and Men: Implications for Improving Medical Education and Health Care Delivery. Med Care. 2016;54(11):1010-1016. doi:10.1097/MLR.0000000000000583
3. Nair AN. Far-right influencers are targeting individual doctors. Some see echoes of the 'anti-abortion playbook.' NBC News. Published October 7, 2022. Accessed February 19, 2023. https://www.nbcnews.com/tech/internet/far-right-influencers-are-targeting-individual-doctors-rcna49701
4. Zadrozny B, Collins B, Winters T. FBI charges Massachusetts woman with Boston Children's Hospital bomb threat. NBC News. Published September 16, 2022. Accessed February 19, 2023. https://www.nbcnews.com/tech/internet/fbi-charges-massachusetts-woman-boston-childrens-hospital-bomb-threat-rcna47973
5. Human Rights Campaign. Digital Hate: Social Media's Role In Amplifying Dangerous Lies About LGBTQ+ People. Center for Countering Digital Hate Inc; 2022. Accessed November 9, 2022. https://hrc-prod-requests.s3-us-west-2.amazonaws.com/CCDH-HRC-Digital-Hate-Report-2022-single-pages.pdf

An Overview of the Current Understanding of Erogenous Sensation

Abstract Presenter
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PURPOSE: Despite remarkable advances in the field of gender-affirming surgery (GAS), there has been remarkably little progress in understanding the biologic basis of erogenous sensation and optimizing return of sensation following GAS (1) The extent to which erogenous sensation is preserved has been significantly correlated with postoperative sexual function and patient satisfaction following GAS (2,3) Yet, unlike the perception of pain, temperature, pressure, and touch, erogenous sensation remains poorly understood. Here, we conduct the first systematic review to summarize the current understanding on erogenous sensation following GAS to provide insight into existing knowledge gaps for future investigation.

METHODS: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, the databases PubMed, Cochrane, and PsychInfo were queried from inception until December 2022 for full-text English articles studying erogenous sensation. Studies were screened and data was extracted independently by two reviewers and conflicts were resolved by discussion with the primary author. Studies were categorized by study design, whether erogenous sensation was defined, and assessment method of erogenous sensation. Descriptive statistics were calculated, and key RESULTS were compiled.

RESULTS: Of 1191 studies screened against title and abstract, 174 studies were further assessed for full-text eligibility. A total of 118 studies met the inclusion criteria for final analysis. Of 86 (72.9%) studies that assessed erogenous sensation as a primary outcome, most studies (38 [44.1%]) relied on subjective unstandardized patient reported surveys; 19 (22.1%) used objective assessments such as vaginal surface EMG and vaginal photoplethysmography; and the remaining 29 (33.7%) articles were reviews of existing literature. The minority 22 (18.6%) of studies provided a definition of erogenous sensation. The pathophysiology involving erogenous sensation was investigated in 19 (16.1%) studies, with key findings demonstrating similar morphology of erogenous receptors in the clitoris and penis but higher receptor density in the clitoris. Erogenous sensation was found to be primarily mediated by the special C-tactile afferent nerve fibers with the chemical mediators calcitonin gene related peptide and substance P playing an important role. In the breast, erogenous sensation at the nipple areolar complex was notably completely independent from tactile sensation with innervation from the intercostal nerves. The brain regions involved in erogenous sensation were investigated in 7 (5.9%) studies, which provided uniform evidence that the insula was responsible for processing erogenous sensation.

CONCLUSIONS: There is limited understanding of the biologic basis of erogenous sensation. With most of the literature based on small sample sizes and subjective outcome measures, assessing postoperative erogenous sensation remains limited. Future research is needed to develop a standardized method for assessing erogenous sensation to effectively evaluate postoperative outcomes following GAS.

REFERENCES:
1. American Society of Plastic Surgeons - Statistics. [Feb; 2023]; Plastic Surgery. https://www.plasticsurgery.org/news/plastic-surgery-statistics 2020
2. Peters BR, Annen AA, Berli JU, et al. Neurosensory Re-education following Gender-affirming Phalloplasty: A Novel Treatment Protocol. Plast Reconstr Surg Glob Open. 2022;10(10):e4616. Published 2022 Oct 24.
3. Calotta NA, Kuzon W, Dellon AL, Monstrey S, Coon D. Sensibility, Sensation, and Nerve Regeneration after Reconstructive Genital Surgery: Evolving Concepts in Neurobiology. Plast Reconstr Surg. 2021;147(6):995e-1003e.

Examining the Evolving Landscape of Gender Assignment Surgery in the United States: A Trend Analysis from 2012 to 2019

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INTRODUCTION: Transgender individuals encounter significant disparities in health across a variety of domains. Previous studies demonstrate that these disparities contribute to an even greater discrepancy in the quality and access to care. Outside of general care, transgender individuals face significant barriers to specialized care, such as hormonal therapy and gender affirming surgery. The limited access causes delays to needed care, associated with poorer outcomes, and contributes to development of other comorbidities such as mental health disorders. With a disjoint between available gender affirming care and the growing transgender population, this study focused on analyzing the overall trends in gender affirming surgery in the United States between 2012 to 2019 to identify inequalities and areas of improvement in transgender care.

METHODS: Using the National Inpatient Sample (NIS), diagnostic codes for gender identity disorder and transsexualism were used to identify the desired patient population. Patient information and demographics were extracted from the NIS database, including the type of gender affirming surgery performed, stratified by top and bottom gender-affirming surgery. Analysis of patient variables was conducted using their frequency distributions. A nonparametric Kruskal-Wallis test was utilized in Statistical Analysis System 9.4 to compare groups and identify statistically significant RESULTS, defined as a p-value < 0.05.

RESULTS: The incidence of top and bottom surgery has significantly increased from 2012 to 2019. Top surgery increased by 126%, while bottom surgery increased by 404% within this time frame. Geographically, these surgeries were more likely to be performed in the West and Northeast geographical region. Interestingly, hospital stays increased in both top and bottom surgery in the Midwest ($p=0.01$, Top surgery; $p<0.001$, Bottom surgery). The number of charges by race and geographical location, along with the length of stay by race, was not statistically significant for either top or bottom surgery ($p=0.52$, $p=0.47$, $p=0.69$, Top Surgery; $p=0.5$, $p=0.49$, $p=0.18$, Bottom Surgery). While the length of stay was not statistically significant by insurance carrier in top surgery, it was significant amongst bottom surgery ($p=0.08$, Top surgery; $p<0.001$, Bottom surgery). Charges by hospital type were not statistically significant within top surgery but were among bottom surgery ($p=0.75$, $p<0.001$).

CONCLUSION: With a significant increase in the number of gender affirming surgeries, it is critical that care is affordable and accessible. The growth in the number of surgeries is occurring in two regions. While care is not different between races, there appear to be differences amongst payments within bottom surgery by insurance provider and hospital type. While this contained a large sample size, future studies are warranted to understand the associations with differences in care within the transgender population.

Close

Penile inversion vaginoplasty postoperative management

Abstract Presenter
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PURPOSE: To compare levels of self-reported pain and of opioid use between two groups of patients receiving different pain management protocols, after penile inversion vaginoplasty in a single institution from June 2021 to January 2023.

METHODS: The study was approved by Mayo Clinic IRB. A retrospective chart review was performed for transgender patients who underwent gender-affirming primary penile inversion vaginoplasty (PIV) at a single institution. The study excluded patients who underwent minimal depth vaginoplasty or revision cases. Pain levels were assessed on the surgical floor using the Numeric Pain Rating Scale. The amount of narcotic medication used orally and intravenously were recorded during the hospitalization, and the hospital length of stay was also reported. The average and maximum pain reported by patients were calculated per day and per hospital stay. The total amount of narcotics the patient received in the postoperative period was converted to Morphine Milligram Equivalents (MME). The Kolmogorov-Smirnov test was conducted to

evaluate the distribution of the sample. If the sample proves to be normally distributed, a parametric test like Student's T-test would be used to compare both the reported pain levels as well as the total narcotic used.

The study compared two groups of patients who were given different postoperative pain management protocols (Group A and Group B). Group A was defined by patients receiving standard post-operative analgesics: oral acetaminophen (Tylenol) and NSAIDs, PRN oral narcotic, and PRN intravenous narcotic. Group B was defined by patients receiving an enhanced recovery protocol: oral acetaminophen (Tylenol) and NSAIDs, PRN oral narcotic, PRN intravenous narcotics, and additionally ketorolac (Toradol) in the immediate postoperative period, scheduled oral gabapentin, and celecoxib.

RESULTS: Fifty patients underwent PIV within the study period. The average hospital length of stay for all patients was 4.92 days (±0.237). Group A had a slightly longer average stay of 5.0769 days, with a lower standard deviation (±0.215) compared to Group B 4.75 (±0.429). The average level of postoperative pain for all patients was 4.2474 (±0.418) on a scale of 0 to 10. Group A had a slightly higher average pain level of 4.28 (±0.579), while Group B had a slightly lower average pain level of 4.2121 (±0.618). The maximum level of postoperative pain experienced by any patient was 7.8 (±0.423). Group A had a slightly higher maximum pain level of 7.8462 (± 0.602), while Group B had 7.75 (±0.604). Kolmogorov-Smirnov test showed that the sample data is not significantly different from a normally distributed population (P= 0.9715). While overall reported pain levels did not vary significantly between the two groups (P >0.05), there was a significant decrease in MMR used in group B (group A – mean 271 (± 213) MME vs group B – mean 138 MME (± 112), P = 0.009).
Conclusions:
Despite the overall high patient post-operative satisfaction, patients can experience significant post-operative pain after surgery which may lead to high levels of post-operative opioid use. This study highlights the effectiveness of non-opioid medications used in the immediate post-operative setting in significantly decreasing opioid use following PIV.

The Top Five Ethical Issues Surrounding Facial Feminization Surgery

Abstract Presenter
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BACKGROUND: As Plastic Surgeons lead the growing field of transgender reconstruction and gender affirming facial surgery, they must pay close attention in understanding the ethical issues surrounding the field of Transgender Medicine. However, there is a paucity of literature

regarding ethical issues surrounding Facial Feminization Surgery (FFS). Our aim was to identify the Top 5 ethical issues surrounding FFS and outlining both sides of each issue.

METHODS: A focus group was used to create a 50-question survey for both Health Care Providers and Transwomen that was aimed at identifying the Top 5 ethical issues surrounding FFS. Once created, this questionnaire was administrated to FFS providers and perioperative patients (n=450). Based on ranking scores of ethical issue importance the Top 5 issues were nominated. An extensive literature search was used to critique both sides of the issue.

RESULTS: The Top 5 ethical issues identified by our structured questionnaire were: 1) Societal Construct of Gender (Has society's changing view of gender impacted the importance of FFS?), 2) Medical Necessity (Is FFS medically necessary? Should insurances cover it?), 3) Barriers and Access (Should society invest resources in removing barriers to accessing FFS?), 4) Irreversibility and Age of Consent (Should the irreversibility of FFS be a deterrent to patient selection? What should be the age of consent to FFS?), Femininity and Beauty (How do beauty and femininity constitute each other?). Detailed look at both sides of each of these issues will be discussed and an approach for reconciliation in practice will be identified.

CONCLUSIONS: Plastic surgeons are in the unique position to shape the growing field of transgender medicine and FFS but a critical look at ethical issues are important to shape the lives of patients and the view of gender in society.

Breast Cancer Screening, Incidence, and Reconstructive Rates in the Transgender & Gender Diverse Population

Abstract Presenter
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INTRODUCTION: Early detection via screening for breast cancer has been shown to significantly reduce long-term mortality in cis-gender women [1]. Breast cancer screening rates for the transgender and non-binary (TG/NB) community remain as low as 2-7% [2]. Research regarding adherence to screening guidelines for breast cancer as well as incidence of breast cancer and post-mastectomy breast reconstruction for the TG/NB population is limited. This study sought to examine current screening and incidence rates for breast cancer and reconstruction among the TG/NB population.

METHODS: A cross-sectional analysis in the All of Us National Database, which includes adults aged 18 and older from 2018-present, was performed. Participants enroll as direct

volunteers or through participating health care provider organizations and complete health surveys. The database was queried to identify individuals who self-identify as TG/NB. Genetic susceptibility (as defined by the presence of the BRCA1 or BRCA2 gene), breast cancer screening incidence, use of hormone-replacement therapy (HRT), breast cancer malignancy incidence, mastectomy rates, and breast reconstruction rates were isolated.

RESULTS: A total of 1383 TG/NB subjects were identified. The majority of respondents (63%) identified as White. One hundred and seventy (12%) of respondents identified as Hispanic or Latino. Four hundred and twenty-seven (30%) of respondents were aged 45 and above.

Thirteen (<1%) of TG/NB respondents reported having a diagnosis of breast malignancy. Thirteen (<1%) of TG/NB respondents underwent mammographic or sonographic screening for breast cancer; of these, 2 (<1%) reported having a diagnosis of breast malignancy. A total of 282 (20.4%) TG/NB individuals reported taking HRT; of these, 5 (<1%) had undergone screening for breast cancer, and 7 (<1%) reported having a diagnosis of breast malignancy. In comparison, 52,919 (14.3%) of all respondents reported taking HRT; of these, 3,700 (<1%) reported having a diagnosis of breast malignancy. One (<1%) TG/NB individual underwent mastectomy. No TG/NB patients underwent breast reconstruction of any kind.

CONCLUSION: While rates of breast cancer screening and malignancy are lower in the TG/NB population as compared to all survey respondents, results may be skewed towards a younger population, as over two-thirds of TG/NB respondents were under the age of 45, and therefore may not yet be eligible for routine breast cancer screening. Notably, a larger percentage of TG/NB individuals reported taking HRT when compared to total All of Us respondents; yet <1% of TG/NB individuals taking HRT were screened. Given the increased risk of developing breast cancer for patients on HRT [3], it is critical to monitor these patients and screen for breast cancer regularly.

REFERENCES:

1. Duffy, S.W., et al., Mammography screening reduces rates of advanced and fatal breast cancers: Results in 549,091 women. Cancer, 2020. 126(13): p. 2971-2979.
2. Luehmann, N., et al., A Single-Center Study of Adherence to Breast Cancer Screening Mammography Guidelines by Transgender and Non-Binary Patients. Annals of Surgical Oncology, 2022. 29(3): p. 1707-1717.
3. Vinogradova, Y., C. Coupland, and J. Hippisley-Cox, Use of hormone replacement therapy and risk of breast cancer: nested case-control studies using the QResearch and CPRD databases. BMJ, 2020. 371: p. m3873.

Staged Phalloplasty in Gender-Affirming Surgery Has Lower Rates of Postoperative Complications

Abstract Presenter
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INTRODUCTION: Gender-affirming surgery utilizes various techniques that can be performed as a single, multispecialty procedure or as multiple, single-specialty, staged procedures. The primary components of transmasculine gender-affirming surgery include hysterectomy, phalloplasty, and urethroplasty, with other procedures such as scrotoplasty, vaginectomy, oophorectomy, and implants performed based on patient preferences.[1] Rates of complications in phalloplasty are high, especially those which affect voiding and sexual function.[2–3] This study aimed to assess the types and frequency of complications in single and staged phalloplasty and provide treatment recommendations for providers.

METHODS: This retrospective cohort study was conducted at a single institution from March 2019 to December 2022. Patients were 18 years or older at the time of surgery, had a diagnosis of gender dysphoria, and underwent phalloplasty. Patients were assigned groups based on whether they had a single or staged procedure. Single procedures involved the phalloplasty, hysterectomy, and urethroplasty in one surgery. Staged procedures had each procedure performed as separate surgeries. Staged procedures only accounted for phalloplasty performed by plastic surgery. Complications were defined as need for reoperation, urethral stricture, urethral fistula, necrosis of neophallus, infection, wound dehiscence, and flap loss. A univariate analysis was conducted.

RESULTS: Thirty-two patients underwent phalloplasty, with 21 from the South, 4 from the Midwest, 3 from the Northeast, and 4 from the West. There were 19 (59.4%) patients receiving single procedures and 13 (40.6%) patients receiving planned staged procedures. The mean operative time for single procedures was 15.1 ± 3.8 hours, and the mean operative time for staged procedures was 6.5 ± 4.8 hours ($p<0.001$). Overall complication rates were higher in the single procedure group (68.4%) than in the staged procedure group (8.3%) ($p<0.001$). Urethro-cutaneous fistulas were the only specific complication that significantly differed between the groups. Single procedures had a rate of 42.1%, while staged procedures had a rate of 8.3% ($p<0.05$). In the single procedure group, reoperations were performed in 57.9% of cases whereas only 8.3% of staged procedures required reoperation ($p<0.01$). Single procedures were associated with a longer time from surgery to discharge (9.1 ± 5.7 days) than staged procedures (4.5 ± 1.6 days) ($p<0.005$).

DISCUSSION: Staging hysterectomy, urethroplasty, and phalloplasty for gender-affirming surgery in transgender men appears to provide clear benefits. Staged procedures have better surgical outcomes as evidenced by a decrease in overall complication rates, urethro-cutaneous fistula rates, and reoperation rates. Although single procedures may be preferred for patients traveling long distances, their increased rates of complications necessitate frequent reoperations, attenuating their potential benefits. Larger, multi-institutional studies are needed to better understand the differences in complications from single and staged procedures.

REFERENCES:
1. Wu CA, Jolly D, Boskey ER, Ganor O. A systematic review of staging and flap choice in gender-affirming phalloplasty. Journal of Reconstructive Microsurgery Open. 2022;07(02). doi:10.1055/s-0042-1748884
2. Nassiri N, Maas M, Basin M, Cacciamani GE, Doumanian LR. Urethral complications after gender reassignment surgery: A systematic review. International Journal of Impotence Research. 2020;33(8):793-800. doi:10.1038/s41443-020-0304-y
3. Bryson C, Honig SC. Genitourinary complications of gender-affirming surgery. Current Urology Reports. 2019;20(6). doi:10.1007/s11934-019-0894-4

Breaking Barriers: A Comprehensive Study of Gender-Affirming Surgery Outcomes for HIV-Positive Patients

Abstract Presenter
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INTRODUCTION: There are approximately 1.6 million transgender adults and youths in the United States, and these individuals are disproportionately affected by the human immunodeficiency virus (HIV). Prior investigations have yielded mixed results regarding postoperative outcomes in patients with HIV, and research specific to gender-affirming surgery (GAS) outcomes in HIV-positive individuals is sparse. We used a national database to depict demographics, surgical characteristics, and postoperative outcomes within this patient population and assess any risk of complications in GAS conferred by HIV.

METHODS: Using the IBM® MarketScan® Research Database, patients with a diagnosis of gender dysphoria who underwent gender-affirming surgery (GAS) (mastectomy, breast augmentation, hysterectomy, orchiectomy) between 2007 and 2021 were identified using the International Classification of Disease, ninth (ICD-9) and tenth (ICD-10) edition, and Common Procedural Terminology (CPT) codes. Among these, HIV-positive individuals were defined as those who had an HIV diagnosis and/or a highly active antiretroviral therapy (HAART) prescription, identified with National Drug Code Numbers. In both HIV-positive and -negative cohorts, patient demographics and procedure-related complications within 90 days of the index surgery (seroma, hematoma, dehiscence, infection, fat necrosis, tissue necrosis, deep vein thrombosis or other vascular complication, and non-specified complications) were recorded. Although patients who underwent multiple GAS procedures simultaneously were included, patients were excluded if they underwent subsequent procedures within the 90-day window following the index GAS procedure(s). Chi-squared, Schapiro-Wilk, Wilcoxon-Mann-Whitney,

and multivariate logistic regression testing were used for statistical analysis.

RESULTS: Of 5,772 patients meeting the criteria (mean age 28.90 ± 10.46), 538 (9.3%) were categorized as HIV-positive. Mastectomy was the most common (65%), followed by hysterectomy (22%), orchiectomy (13%), and breast augmentation (7%). HIV-positive patients were, on average, more often young adults ($p = 0.007$), underwent the index procedure(s) more recently ($p < 0.001$) and more often in the Northeast US region ($p < 0.001$), and had higher comorbidity levels ($p < 0.001$). HIV-positive patients more often underwent breast augmentation and orchiectomy ($p \leq 0.001$), and underwent multiple GAS procedures simultaneously ($p = 0.002$). 9% of patients experienced at least one complication following the index GAS procedure(s). In a multivariable regression model, additional simultaneous GAS procedures (OR 2.618; $p < 0.001$) and Elixhauser index scores of four or higher (OR 1.558; $p < 0.001$) were associated with increased odds of experiencing one or more complications following the index GAS procedure(s), while HIV status ($p = 0.207$) did not affect odds of experiencing complications.

CONCLUSION: HIV was not associated with increased odds of experiencing complications following GAS, suggesting the safety of GAS within the HIV-positive patient population. As GAS becomes more common, including among people with HIV, future investigations should continue to evaluate trends and outcomes within GAS with a broader scope involving genital gender-affirming surgery.

Medicaid Coverage for Gender-Affirming Surgery: A State-by-State Review

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PURPOSE: An estimated 1.3 million adults in the United States identify as transgender and approximately 276,000 or 21.2% are enrolled in Medicaid. In 2022, 52.9% of states offer legal protections in Medicaid policies for gender-affirming care. However, provisions for types of gender-affirming surgeries vary significantly by state and are constantly evolving with the establishment of new laws. The aim of this study was to systematically review Medicaid coverage for gender-affirming surgeries state-by-state.

METHODS: We previously reported on the categorization of each state's health policy as protective, restrictive, or unclear for gender-affirming care overall under Medicaid plans. Building upon our previous work, we systematically assessed the 27 states with protective policies to determine coverage of gender-affirming surgeries. Policies that were in effect as of August 2022 were reviewed. Surgical procedures were categorized as chest, genital, craniofacial and neck, or miscellaneous reconstruction. Coverage for individual procedures was subsequently classified as explicitly covered, explicitly non-covered, or not described.

RESULTS: Among the 27 states with protective Medicaid policies for gender-affirming care, explicit coverage was found for chest (n=17, 62.9%), genital (n=17, 62.9%), and facial (n=7, 25.9%) reconstruction, albeit coverage for specific types of surgeries within these categories varied. Several states did not explicitly specify the types of reconstruction covered. Twelve states (44.4%) gave no indication for breast augmentation or implant coverage, 15 states (55.6%) gave no indication for labiaplasty/vulvoplasty coverage, and 18 states (66.7%) gave no indication for penile prosthesis coverage. Sixteen states (59.3%) did not describe coverage for gender-affirming facial surgery. Coverage for surgical revision was not described by 19 states. For states that did explicitly specify coverage of surgery, the availability for gender-affirming chest and genital reconstruction was similar. Breast reduction or mastectomy was explicitly covered by 17 states (63.0%) and breast augmentation or implants were explicitly covered by 15 states (55.6%). Penectomy was explicitly covered by 15 states (55.6%) and phalloplasty was explicitly covered by 14 states (51.9%). However, gender-affirming facial reconstruction was only explicitly covered in six states and D.C. (25.9%). Additional procedures covered for facial reconstruction were limited. Five states (18.5%) explicitly covered thyroid chondroplasty while three states (11.1%) explicitly covered blepharoplasty, brow lifts, cheek implants, lip enhancement/reduction, and scalp advancement/reduction. Typical explicitly non-covered services included pectoral implant (n=6, 22.2%), mastopexy (n=6, 22.2%), collagen injections & other fillers (n=8, 20.6%), neck lifts (n=9, 33.3%), laryngoplasty (n=8, 29.6%), liposuction (n=8, 29.6%), and reversal surgery (n=12, 44.4%).

CONCLUSIONS: Among the 26 states and D.C. (52.9%) that cover gender-affirming care under Medicaid, many had explicit coverage for the major gender-affirming chest and genital procedures. In contrast, gender-affirming facial reconstruction is limited in its coverage. Additionally, states are often non-descriptive in their gender-affirming policies, thus complicating interpretation of coverage for numerous surgical procedures. Given that many states did not describe coverage, final rates are indeterminate as it is left up to subjective interpretations of policy and individual reviews of medical necessity.

The Man-Go Method: A Novel Technique to Improve Aesthetic Outcomes of Free Nipple Grafting in Masculinizing Top Surgery

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BACKGROUND: Masculinizing top surgery (MTS) can help align a patient's chest appearance with their gender identity. Most commonly it is performed using a bilateral inferior mammary fold incision with free nipple grafting (FNG). Nipple areolar complex (NAC) reconstruction is a critical component, however there is a lack of information surrounding the technique of NAC reconstruction. We review patients undergoing MTS with FNG using a novel technique of FNG, known as the "Man-Go Method".

METHODS: This retrospective study included patients 18 or older, who underwent MTS with FNG between 2020-2022. Those who underwent MTS without FNG were excluded. A single surgeon performed all operations.

RESULTS: Of the 166 patients, 31.3% were smokers. Most patients (97.6%) did not experience partial or total graft lost, and 2 patients experienced partial unilateral nipple necrosis, and 2 experienced total unilateral graft loss. In total 8.4% of patients incurred a complication with the most common being seroma, which occurred in 7 patients (4.2%). Interestingly, patients undergoing combo cases with OBGYN for hysterectomy followed by MTS were more likely to incur chest wall infection (7.5% vs 1.1%, OR = 7.50). There was no difference in hematoma or seroma formation, dehiscence, partial or complete nipple loss, or revision rates between groups. than those who underwent only MTS (p=0.012).

CONCLUSIONS: The Man-Go Method is a safe and effective method to optimize NAC appearance for FNG in MTS. The procedure is straightforward, does not require harvest or creation of a separate composite graft, and does not require excessive preparation of the de-epithelialized site for graft inset. This reduces operative time and complexity in comparison to some of the current modifications of NAC reconstruction. Additionally, patients appear to be satisfied with their reconstructive outcomes.

The Cost-Effectiveness of Gender Affirming Chest Feminization and Masculinization

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PURPOSE: Although the transgender and gender diverse (TGD) community has gained more visibility and respect in recent years, the TGD community continues to experience diminished quality of life and increased mortality. At least partially due to barriers to health care, factors contributing to a decreased quality of life include increased rates of HIV, sexually transmitted infections (STI's), cancers caused by HPV, depression, anxiety, substance use, and suicide. While gender affirming hormone therapy and surgery is associated with enhanced physical and mental health, significant cost and access barriers block these life-saving services. The purpose of this study was to investigate the cost-effectiveness of gender-affirming chest feminization and masculinization in transgender and gender diverse adults.

METHODS: A cost-effectiveness analysis was conducted using two Markov models with a willingness to pay (WTP) threshold of $50,000/Quality Adjusted Life Year (QALY). In both the model investigating chest masculinization as well as that of feminization, the two amin arms of the Markov models were undergoing surgery or no surgery with additional sub-arms of negative or positive health events, such as post-operative complications and adverse health or successful surgery and access to hormone therapy. Data on health event probability, quality of life, and cost were extracted from the 2015 US Transgender Survey (USTS) Report, the Froedtert & Medical College of Wisconsin Health Network, and available literature. Analysis was performed using TreeAge Pro Healthcare (2022) and Microsoft Excel (2022).

RESULTS: For transfeminine patients, gender-affirming chest feminization is cost-effective with a cost of $9,478.33 and effectiveness of 0.77 QALY's, respectively, in the first year of the model. The incremental cost-effectiveness ratio (ICER) of $610.55 is below the WTP threshold, demonstrating the cost-effectiveness of the procedure. For transmasculine patients, gender-affirming chest masculinization is also cost-effective with surgery having a cost and effectiveness of $14,928.15 and 0.77 QALY's, respectively, compared to a lack of surgery ($9,521.521, 0.43 QALY's) in the first year of the model. The ICER was $14,302.74/QALY which is below the WTP thereby demonstrating the cost-effectiveness of the procedure. Moreover, this model predicts the ICER gradually decreasing to $11052.05/QALY at five years, $9262.93/QALY at ten years, and $8,128.20/QALY at fifteen years.

CONCLUSIONS: We are one of the first groups utilizing the 2015 USTS Report to establish the cost-effectiveness of both chest feminization and masculinization procedures. Our Markov Model uniquely considers a variety of possibly health events experienced by transgender patients, such as post-operative complications, access to gender-affirming hormone therapy or lack thereof, and adverse mental health. These results suggest hormonal and surgical gender-affirming care for both transmasculine and transfeminine patients should be offered as the quality of life for transgender individuals is enhanced. Moreover, enhancing the health of the TGD community limits the expenses of health institutions long-term as the TGD patients experience less complications from adverse physical and mental health commonly associated with a lack of gender-affirming care.

Exploring Decisional Conflict Experienced by Individuals Considering Metoidioplasty and Phalloplasty Gender Affirming Surgery (MaPGAS)

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OBJECTIVE: To evaluate decisional conflict among individuals considering Metoidioplasty and Phalloplasty Gender Affirming Surgery (MaPGAS).

METHODS: We administered a cross sectional survey to adult, English speaking participants assigned female at birth considering MaPGAS recruited via social media platforms and community health centers. Data collected included demographics, medical and surgical history MaPGAS type considered, and the Decisional Conflict Scale (DCS). DCS domains measure uncertainty, informed status, personal values clarity, perceived support, and decision effectiveness. Scores range from 0-100; a score > 37.5 indicates greater decisional conflict. Participants were also asked to provide open ended feedback related to MaPGAS uncertainty. Demographic characteristics and DCS scores were compared between surgical subgroups using descriptive and chi-square statistics using one-factor ANOVAs with Bonferroni adjustments and post hoc Tukey's tests to compare mean DCS scores between groups.

RESULTS: A total of 362 participants completed the survey, mean age 30.3 years; 41% (n = 149) non-binary, 76% (n = 276) White, 75% (n = 274) non-rural, 45% (n = 164) privately insured, 37% (n = 135) completed ≥ 4 years of college, 23% (n = 84) considering metoidioplasty, 24% (n = 87) considering phalloplasty, 26% (n = 93) considering both metoidioplasty and phalloplasty, and 27% (n = 98) not considering/already had MaPGAS. DCS total scores were lowest (least conflict) for those not considering MaPGAS and highest for those considering both MaPGAS options, though not statistically significant. Those considering both MaPGAS options had higher uncertainty subscale scores 64.1 (SD25.5, $p < 0.001$) than respondents in the other three groups (43.5 (SD 29.7), 36.7 (SD 30.4), 22.8 (SD 23.1). Concerns surrounding MaPGAS complications emerged as the top feedback factor contributing to uncertainty and decisional conflict.

CONCLUSIONS: In a cross-sectional national sample of individuals seeking MaPGAS, decisional uncertainty was highest for those considering both MaPGAS options as compared to metoidioplasty or phalloplasty alone. This suggests this cohort may benefit from focused decision support.

Determining Chin Dimensions for Feminizing Genioplasty: An Anatomical Study

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BACKGROUND: Feminizing genioplasty warrants modification of the chin to achieve a feminine appearance. This study aims to compare female and male skeletal chin dimensions to provide guiding principles for surgical planning of feminizing genioplasty.

METHODS: Dry skulls stored at the Cleveland Museum of Natural history were included for analysis. Sex, age, and ethnicity were documented. Lower facial height, chin height, width, projection, and shape were assessed. Chin height was measured from B Point to Menton. Chin width was measured in the parasagittal plane (distance between vertical lines drawn between the canine and first premolar) and as the distance between the mental foramina. Chin projection was measured from the anterior nasal spine through the B point to the menton. Chin width was normalized to zygomatic and gonial widths. Independent-sample t-tests were carried out to detect significant differences between observed values of chin dimensions between both groups. Multivariate analysis of variance (MANOVA) was used to detect significant differences in the shape and size of the chin between male and female chins and between African American and European American chins. Based on a desired power of 80%, a confidence level of 95%, and a pooled standard deviation of 3.77 mm, a sample size of 86 skulls was required to detect a difference of 2.30 mm between male and female chin heights.

RESULTS: Forty-three male (43.58±12.52-year-old) and 43 female (40.48±12.04-year-old) skulls were included. In each group, 25 skulls were of African origin and 18 were of European origin. Male chin height (24.44±1.96 mm) and lower facial height (LFH, 69.41±5.79 mm) were greater than females' (chin height: 21.53±2.25 mm; LFH: 64.03 ±6.07 mm) ($p<0.0001$). Male chin width was greater between parasagittal lines (male 33.08±2.12; female 31.30±2.26; $p=0.0001$) and inter-mental foramina (male 45.23±2.72 mm; female 44.00±2.59 mm; $p=0.017$). Intergonial width was significantly larger in men (men, 97.15±6.85mm; female, 90.57±5.20mm; $p<0.0001$), as was zygomatic width (male, 129.87±5.99mm; female, 123.57±8.07mm; $p<0.0001$). After parasagittal width was normalized to intergonial width (female: 0.35±0.030; male: 0.34±0.027; $p=0.43$) and zygomatic width (female: 0.25±0.024; male: 0.26±0.021; $p=0.82$), there were no significant differences noted between the sexes. Although normalization of interforaminal width to zygomatic width did not demonstrate significant differences between the sexes (female: 0.36±0.027; male: 0.35±0.026; $p=0.15$), normalization of interforaminal width to intergonial width (female: 0.49±0.034; male: 0.47±0.043; $p=0.024$) revealed a significant

difference between male and female skulls. Chin projection (male, 75.40±7.96mm; female, 75.63±7.02mm; p=0.89) did not differ according to sex. Male chins displayed larger and more prominent lateral tubercles producing a square-shaped chin. In comparison, female chins were rounded. In males, African ethnicity was associated with significantly greater chin height (African, 24.89±2.02mm; European, 23.82±1.73mm; p=0.038) and chin width in the parasagittal plane (African, 33.70±2.30mm; European, 32.22±1.51mm; p=0.011) compared to European ethnicity. In contrast, female skulls did not demonstrate a significant effect of ethnicity on chin morphology.

CONCLUSIONS: The most important factor in feminizing genioplasty appears to be the correction of the chin shape; height and width reduction are not necessary for most subjects.

Nonbinary Trans Patients Report Exceptionally High Satisfaction Following Gender Affirming Mastectomy: a GENDER-Q Patient Reported Outcomes Analysis

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PURPOSE: Nonbinary (NB) transgender individuals are those who do not identify with their assigned gender at birth and do not identify solely as men or women. NB people have existed cross-culturally throughout history. Despite being exceptionally diverse, within the healthcare system, these patients are often overlooked or amalgamated with binary trans (BT) patients with whom they often have considerably different experiences and healthcare needs. This may manifest in barriers to gender-affirming surgery (GAS), such as requirements for hormone replacement therapy and psychosocial assessment, which have been developed for BT populations and are often less relevant for NB patients. Utilizing GENDER-Q, a novel patient-reported outcome measure, this study aimed to clarify the impact of GAS generally, and gender-affirming mastectomy (GAM) in particular, for nonbinary patients.

METHODS: Following IRB approval the GENDER-Q questionnaire was sent to adults who previously consulted for GAS at our institution, including those who did not move forward to surgery here. Participants who responded to relevant questions and reported their age and gender identity were included. Respondents who indicated that "man" or "woman" best described their gender identity were compared with those who selected any other gender identity. A subgroup analysis of GAM patients was conducted comparing NB patients with binary trans men (BTM).

To enable univariate comparisons (Chi-square and Fisher's exact tests) of ordinal Likert scale responses, answers above and below the middle of the scale were grouped and compared.

RESULTS: Three-hundred fourteen respondents were included, 219 (69.7%) identified as BT (101 trans men, 118 trans women) and 95 identified as NB. NB respondents reported statistically higher rates of being misgendered (NB:35.06% vs. BT:11.56%, P-value < 0.001), more often reported feeling unsafe in public (NB:44.74% vs. BT:27.75%, P-value = 0.008) and were less satisfied with the way their body aligned with their gender (NB:58.14% vs. BT:75.39%, P-value = 0.004). Auspiciously, both binary and NB respondents reported GAS affirmed their gender (NB:98.39%, BT:96.77%, P-value = 0.513) and was one of the best decisions they've made (NB:98.39% vs BT:97.37%, P-value = 0.655). GAM was found to be the most common procedure among both BTM (79.2%, 80/101) and NB respondents (76.5%, 65/85). Isolating for GAM demonstrated both BTM and NB patients had comparably high satisfaction with the way their chests looked (93.55% vs. BTM:91.76%, P-value = 0.761) and affirmed their gender postoperatively (NB:95.16% vs. BTM:98.72% P-value = 0.322). Overall, both groups agreed the outcome was what they wanted (NB:98.28% vs. BTM:95.08% P-value = 0.334) and that it was worth what they went through (NB:98.28% vs. BTM:96.72% P-value = 0.589).

CONCLUSION: Both binary and nonbinary respondents reported exceptionally high satisfaction following gender-affirming surgery. The most common procedure among nonbinary respondents was mastectomy. When isolating for mastectomy patients, binary trans men and nonbinary respondents demonstrated comparably high satisfaction with the way their chest affirmed their gender identity postoperatively and looked overall. Further, both groups agreed they got the outcome they wanted, and that it was worth what they went through. This data supports increased access to mastectomy for nonbinary individuals.

Public Perceptions of Aesthetic Outcomes for Gender-Affirming Mastectomy (GAM)

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INTRODUCTION: Gender affirming surgery, notably gender-affirming mastectomy (GAM), has become increasingly common. Available surgical techniques include periareolar or dual incision with or without free nipple grafting. Dual incisions range from straight to curved, which often follows the contour of the pectoral muscle. Though patient factors may necessitate a specific surgical approach, patient preferences for chest contouring, scar pattern, and the nipple-

areolar complex also inform technique. To augment surgeon-rated aesthetic outcomes of such procedures, our study sought to characterize the public perceptions of aesthetic outcomes for gender-affirming mastectomy.

METHODS: To assess aesthetic ratings of surgical outcomes, de-identified postoperative patient images and digital illustrations were presented in a survey through Amazon Mechanical Turk. Participants were blinded to the type of surgery (GAM or gynecomastia) presented. Three surgical techniques were compared: dual incision (straight or curved) and periareolar. Respondents evaluated overall appearance, resemblance to a cisgender male chest, shape and position of scars, and shape, position, and size of nipples. Rating scale options were poor, fair, good, and excellent. Feminine vs masculine scale options were extremely feminine, slightly feminine, slightly masculine, and extremely masculine.

RESULTS: 114 complete responses were obtained. Respondents were predominantly 25 – 34-year-old (40.4%), white (79.8%), heterosexual (59.6%), cisgender men (54.4%) with a normal BMI (51.8%). 7.9% of respondents had a past surgical history involving their chest. Straight and periareolar GAM incisions in postoperative patient photos were more often rated as excellent or good on overall appearance (straight: 61.4%, periareolar: 54.5%, curved: 40.4%; p=0.005), resemblance to a cisgender male chest (straight: 53.5%, periareolar: 54.4%, curved: 43.8%; p=0.223), and scar shape (straight: 47.3%, periareolar: 53.5%, curved: 37.8%; p=<.001) compared to curved incisions. Straight (81.6%) and periareolar (73.7%) GAM incisions were more often described as very masculine or slightly masculine compared to curved incisions (56.2%) (p=0.058).

For gynecomastia, periareolar incisions had the highest ratings for overall appearance (periareolar: 78.1%, curved: 51.7%, straight: 36.8%; p=<.001), resemblance to a cisgender male chest (periareolar: 78.9%, curved: 54.5%, straight: 38.5%; p=<.001), and scar shape (periareolar: 78.0%, curved: 42.9%, straight: 32.5%; p=<.001). Incision type preferences for the digital drawings were similar to those for gynecomastia surgery across these three factors. While periareolar and curved incisions were rated most masculine for gynecomastia (p=0.005), periareolar and straight were rated most masculine for the digital illustrations (p=<.001). For GAM photos, gynecomastia photos, and the digital drawings, periareolar incisions were consistently the preferred scar shape.

CONCLUSIONS: Our characterization of public perceptions of aesthetic outcomes for gender-affirming mastectomy suggests that patients seeking to maximize resemblance to a cisgender male chest may prefer straight or periareolar incisions. Differences in preferences for GAM postoperative photos vs gynecomastia photos vs digital illustrations suggest theoretical preferences may not always translate in practice and between different surgeries. For some patients, however, the ideal gender-affirming mastectomy outcome may deviate from the ideal cisgender male chest as dual incisions can sometimes provide an illusion of chest contour. Surgeons offering gender-affirming mastectomy can incorporate these results during preoperative consultation for informed shared decision making with patients.

Changes in Surface Area, Width and Height in the Orbit, Mandible and Chin among Facial Feminization patients

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PURPOSE:
Measuring craniofacial changes in facial feminization patients can elucidate ideal postoperative measurements and standardize feminine craniofacial features to achieve patient goals. This study aimed to examine changes in surface area and direct measurements of three of the commonly manipulated regions of the face in facial feminization surgery (FFS): the forehead/superior orbital rim, mandible, and chin.

METHODS: Pre-operative and post-operative radiographic images were analyzed from 11 FFS patients using Mimics V25.0 software by Materialise. The forehead/superior orbital rim, right and left mandibles and chin were each individually isolated by utilizing anatomical landmarks to assess for surface area (SA). Direct measurements included the frontal nasal angle (FNA: glabella-nasion-sella), bossing angle (BA; glabella-nasion-anterior table), bigonial width (bilateral gonion distance), chin height (menton to root of central incisor) and chin width (distance between mental tubercles). Paired t-tests were utilized to assesses the degree of pre-and post-operative changes.

RESULTS: All measurements significantly decreased post-operatively. The SA of the forehead/superior orbital rim had an average11.8% decrease (pre-operative:13600.7 mm2 vs post-operative: 11821.7 mm2, $p=0.03$). The chin had an average 9.4% average decrease in SA (pre-operative: 13018.8 mm2 vs post-operative: 11732.4 mm2, $p=0.02$). For the mandibles, the left mandible had an average decrease of 12.1% (pre-operative: 3327.9 mm2 vs post-operative: 2893.9 mm2, $p=0.01$), while the right mandible had an average decrease of 7.9% (pre-operative: 3102.9 mm2 vs post-operative: 2841.4 mm2, $p=0.04$). For the forehead/superorbital rim, the FNA significantly decreased from 116.62° to 107.68° (7.42% average decrease, $p=0.01$), while the BA decreased on average 40.70% (preoperatively 20.24° vs. postoperatively 12.02° $p<0.001$). For the direct chin measurements, the average chin height decreased from 23.68 mm to an average of chin height of 21.67 mm (8.47% average decrease, $p= 0.005$), while the average chin width decreased from 22.71 mm to 16.44 mm (27.60% average decrease, $p<0.001$). The

average bigonial width decreased from 97.38 mm to an average post-operative width of 92.7 mm (4.7% average decrease, p=0.002).

CONCLUSION: Each region manipulated in FFS underwent significant decreases in both surface area and direct measurements. These findings contribute to quantifying changes for FFS for identifying standards to further inform patient expectations. Future studies are needed to assess ideal measurements and percent changes craniofacial surgeons could aim to achieve depending on patient pre-operative characteristics.

The Growing Phenomenon of Detransitioning: A Google Trends Analysis

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INTRODUCTION: Detransitioning is defined as the return to native gender by an individual who previously underwent gender transition by means of social, medical, or surgical treatment. Over the last decade, multidisciplinary gender-affirming care and understanding of this patient population have expanded across the United States. While documented rates of surgical regret are reported to range between 1-2%, recent data shows that about 13% of patients detransition at one point in their lives. Alarmingly, 82.5% of people who had detransitioned reported at least one external factor such as social stigma as the major motivating factor.1 This study utilized Google Trends to analyze the recent search popularity of detransitioning.2

METHODS: The term "detransitioning" was analyzed using Google Trends. Search popularity was assessed over a one-year time period in addition to regional search trends by state. Changes in search volume were compared according to popular news media detailing detransitioning and gender transition regret.

RESULTS: There were fluctuating relative search volumes (normalized search volume in comparison to total search volume) for the term "detransitioning" with peaks in December 2022 and February 2023. Average relative search volume surged after a December 2022 media publication on a former Navy SEAL's detransitioning story. The state associated with the most search interest in detransitioning was Minnesota, followed by Colorado, Oklahoma, Oregon, and Missouri. Incidentally, a 2022 Minnesota Student Survey showed an alarming rise in suicide attempts in the transgender high school student population. Similarly, Oklahoma filed a "Don't Say Gay" bill in April 2022, Oregon introduced a bill criminalizing gender-affirming surgeries in minors, and Missouri filed four new bills in an attempt to ban all gender-affirming care.

DISCUSSION: A rise in public interest around social phenomena as detransitioning seems to mirror high-profile media cases. Detransitioning is a yet poorly understood phenomenon by the plastic surgery community at large. Factors leading to patients reversing prior gender-affirming treatments have been linked to external factors such as societal stigma. Interestingly, states that have shown most search activity around detransitioning may have experienced concomitant social changes around LGBTQ issues.

REFERENCES:

1. Turban JL, Loo SS, Almazan AN, Keuroghlian AS. Factors Leading to "Detransition" Among Transgender and Gender Diverse People in the United States: A Mixed-Methods Analysis. LGBT Health. 2021 May-Jun;8(4):273-280. doi: 10.1089/lgbt.2020.0437. Epub 2021 Mar 31. PMID: 33794108; PMCID: PMC8213007.
2. Google Trends. Detransitioning. Accessed March 7, 2023. https://trends.google.com/trends/explore?date=today%205-y&geo=US&q=ozempic

Nonbinary and Transgender Male Patient Preferences for Gender-Affirming Top Surgery

Abstract Presenter
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BACKGROUND: Twenty percent of the transgender population identifies as non-binary. Most of the current research on the surgical preferences, goals, and outcomes of transgender patients does not distinguish between trans-male and non-binary patients pursuing chest masculinization. The primary aim of this study was to compare the surgical practices for gender-affirming top surgery between non-binary and trans-male patients. We hypothesized that the prevalence of different chest masculinizing procedures in each group was significantly different between the two groups.

METHODS: This study included patients aged 18 years and older who underwent "top surgery" between January 2003 and December 2022. Surveys containing the BODY-Q chest module were sent to patients who met inclusion criteria. Demographics, medical comorbidities (smoking status, diabetes, hypertension, mental health conditions), procedure types, intraoperative and postoperative complications, and survey responses were compared using Fisher's exact test, Pearson's Chi-squared test, or Wilcoxon rank sum test, as appropriate.
Results: Three hundred and twelve patients met inclusion criteria and were sent a survey. The

survey response rate was 24% (76/312). Of the 76 respondents, twelve (16%) identified as non-binary and 64 (84%) identified as trans-male. Age (23 versus 25-year-old, p=0.3), BMI (28 versus 29, p=0.4), history of tobacco use (33% versus 33%, p>0.9), diabetes (0% versus 3.1%, p>0.9), hypertension (8.3% and 4.7%, p=0.5), and depression (50% and 42%, p=0.6) did not differ between our non-binary and trans-male cohorts. The most common procedure type was double incision mastectomy with nipple-areola graft for both groups (50% and 74%, p=0.2, non-binary and trans-male, respectively). Non-binary and trans-male patients had equivalent rates of intraoperative (0% versus 1.6%, p>0.9) and postoperative complications (8.3% versus 11%, p>0.9). Both groups reported that surgery improved their overall quality of life (75% versus 84% strongly agree, p=0.5, non-binary and trans-male, respectively). Both populations preferred their chest to be flat (98% versus 100%, p=>0.9, non-binary and trans-male, respectively) and to have smaller nipple-areola complexes (83% and 95%, p=0.085, non-binary and trans-male, respectively). Nipple sensation was reported to be important for 33% of non-binary patient and 41% of trans-male patients (p=0.8). Trans-male patients placed greater importance on having a male chest for their gender identity compared to non-binary patients (95% vs 83% very important, p=0.056). Two patients, both non-binary (17%), elected to not keep their nipple-areola complexes (NACs) and reported that no NACs were more congruent with their gender identity (p=0.023).

CONCLUSIONS: Non-binary patients represent a significant proportion of patients seeking chest masculinization procedures. In this study, non-binary patients had distinctive surgical preferences regarding NACs. Thus, the non-binary population may require different surgical planning and have distinctive clinical needs compared to their trans-male counterparts.

Mental Health Changes in Partners of Transgender Patients Post Gender Transition: A Population-Based Study

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PURPOSE: To date, no study has evaluated the psychosocial impact that gender transitioning has on partners of transgender nonconforming (TGNC) individuals. In this study, we assessed relationship dynamics, including psychosocial distress, quality of life, and internal resilience of partners of TGNC individuals.

METHODS: Anonymous surveys were administered via the Amazon Mturk Platform. Eligible participants were ages 18-99, with a partner who underwent a gender transition. Relationship satisfaction and mental health was assessed via validated questionnaires, e.g., Self-Esteem and Relationship Questionnaire (SEAR), General Anxiety Disorder (GAD), and Personal Health Questionnaire Depression Scale (PHQ-8). Linear regression assessed associations between relationship satisfaction and status of partner transitioning (social vs. hormonal vs. surgical). Data analysis was performed using descriptive and analytical statistical methods, Welch's t-tests, multivariate linear regression models, and Spearman's coefficient correlations on SPSS (v28).

RESULTS: Out of 337 participants who completed the study, 42.4% identified as male, with a mean age of 35.8. Nearly half (44.4%) had partners who transitioned from cis male to trans female (MTF), while a third (36.8%) had partners who transitioned from cis female to trans male (FTM). Most (72.4%) reported their partner underwent a surgical transition (15.1% top surgery, 5.6% bottom, 51.6% top and bottom), while 27.6% reported non-surgical partner transitioning (13.1% social, 14.5% hormonal). Sexual satisfaction and resilience scores were higher among respondents whose partners had undergone non-surgical transitioning ($p<0.001$). PHQ-8, GAD, and sexual satisfaction scores differed significantly among participants whose partners underwent top only surgery vs. bottom only surgery ($p<0.001$).

CONCLUSION: This is the first study to report the psychosocial impact of TGNC transitioning on their partners. We found that partner sexual satisfaction, depression, and anxiety scores were impacted by their TGNC partner's level of transitioning, with greater impact associated with surgical transitioning. Supportive services for partners of TGNC individuals should be considered during the work-up and transition process to better protect these romantic relationships for the benefit of both parties.

Use of Titanium Mesh During Frontal Sinus Setback in Facial Feminization Surgery: Clinical Outcomes

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BACKGROUND: Facial feminization surgery (FFS) encompasses multiple procedures in order to address gender dysphoria among transfeminine patients. Furthermore, the upper third of the face has several characteristics, including brow position, hairline shape, and forehead projection, that may confer cis-feminine identity. Depending on respective Ousterhout classification, the latter may be addressed through an anterior frontal sinus setback. Methods of its fixation may consist of metal or bioabsorbable plates. However, titanium mesh, often used in frontal sinus fracture repair, has not been described in the context of frontal bossing reduction in FFS. The purpose of this study was multifold: 1) to study clinical outcomes associated with use of titanium mesh for stabilization of bone following anterior frontal sinus setback; and 2) to compare its

efficacy with other fixation methods including bioabsorbable plates.

METHODS: A retrospective cohort study of transfemale and non-binary patients undergoing primary FFS by our senior author between January 2021 and February 2023 was performed. Variables collected include demographics, Ousterhout classification, operative details, including temporal augmentation, method of fixation, use of bone dust, hairline advancement, as well as complications, and duration of follow-up. Patients with history of prior FFS were excluded. Data was analyzed using SPSS, (IBM; Armonk, NY).

RESULTS: A total of forty-three transfeminine patients were included in this study. The cohort had an average age of 33.0 years (SD = 8.7) and a median follow-up time of 1.0 month (IQR = 1.0 to 7.0). Amongst our cohort, 26 patients (60.5%) received titanium mesh, 1 (2.3%) patient received metal plates, and 16 patients (34.8%) underwent burring only for forehead contouring. There were no reported complications or need for revision surgery to the forehead amongst the entire cohort despite frontal sinus reconstruction material used and number of additional feminizing procedures performed during the primary FFS.

CONCLUSIONS: Complication rates and patient satisfaction were favorable among patients receiving titanium mesh for fixation of the anterior table during FFS. Titanium mesh can be considered as an additional technique for frontal bossing reduction and anterior table fixation in FFS.

Outcomes of Gender-Affirming Chest Masculinization Surgery Among the Adolescent and Young Adult Transgender Population

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PURPOSE: Gender-affirming procedures can reduce gender dysphoria, decreasing rates of depression and suicidality among transgender patients.1 Surgical candidacy can be limited by obesity, due to concern for complications.2 Due to limited research on gender-affirmation surgery among the pediatric population, this study investigates chest-masculinization surgery outcomes in transgender and gender-nonconforming adolescents and young adults.

METHODS: All transmasculine patients undergoing top surgery between March 2020 and June 2022 by a single surgeon at a children's hospital were retrospectively reviewed. Patient demographics, body mass index (BMI), surgical technique, and outcomes were collected.

Revisions included any elective OR return to modify chest appearance. Patients with BMI above or below 30 kg/m2 were compared. Analysis was completed using chi-squared analysis and independent T-test.

RESULTS: Upon review, 135 patients underwent top surgery (113 double-incision mastectomies (DI) with or without nipple grafts, 21 Keyhole mastectomies, 1 breast reduction), of which 41 had BMI>30kg/m2, with a range of 15.8-48.4 kg/m2. The average length of follow up was 4.4 ± 4.4 months (range 0-18.3 months) for this cohort. Overall complication and revision rates were 11.1% and 5.2%, respectively. Complications included hematoma (6.7%), seroma (4.4%), and surgical site infection (0.7%). Complications did not significantly vary based on surgical technique (DI: 9.7% vs Keyhole:19.1%, p=0.386) or BMI (>30kg/m2: 9.8% vs <30kg/m2: 11.7%, p=0.974). Additionally, revision rates did not significantly differ based on surgical technique (DI: 4.4% vs Keyhole: 9.5%, p=0.667) or BMI (>30kg/m2: 4.9% vs <30kg/m2: 5.3%, p=0.752). Thirty-day readmission rates also did not significantly vary between BMI cohorts (>30kg/m2: 4.9% vs <30kg/m2: 7.5%, p=0.861). Patients with seromas had a lower average BMI than those without (23.3 kg/m2 vs. 27.26 kg/m2, p=0.008).

CONCLUSION: Our results suggest top surgery can be safely performed among transmasculine youth and adolescents with BMI ≥30kg/m2, and patients with lower BMI may have an increased risk of seroma formation. While preoperative weight loss may be preferred, high BMI should not be a barrier in proceeding with chest-masculinization surgery.

REFERENCES:
1. Akhavan AA, Sandhu S, Ndem I, Ogunleye AA. A review of gender affirmation surgery: What we know, and what we need to know. Surgery. 2021;170(1):336-340. doi:10.1016/j.surg.2021.02.013
2. Rothenberg KA, Gologorsky RC, Hojilla JC, et al. Gender-Affirming Mastectomy in Transmasculine Patients: Does Obesity Increase Complications or Revisions?. Ann Plast Surg. 2021;87(1):24-30. doi:10.1097/SAP.0000000000002712

GLOBAL PARTNERS

Implications of demographic, cultural and economic factors on symmetrization decision making during implant-based breast reconstruction in Argentina.

Abstract Presenter
Jose ViÃ±as MD

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BACKGROUND: Currently, there is a predominant trend towards implant-based reconstructions in Argentina and factors such as patient preference, lifestyle, physical habits, age at cancer diagnosis, bilateral mastectomies and cultural influences could contribute to explain it, as well as the decision to symmetrize the contralateral breast in the same procedure. The aim of this study is to identify the factors influencing the patient's decision whether or not to undergo second-stage breast reconstruction and contralateral breast symmetrization.

METHODS: This study was conducted between January and May 2023 in a tertiary referral center in Buenos Aires, Argentina. Patients who underwent breast reconstruction with tissue expander between 2012 and 2022 were contacted via telephone and asked to answer a questionnaire about their demographics, medical history, and the type of reconstruction performed. Ethical approval was obtained from the research ethics committee before the data collection.

RESULTS: 633 patients underwent unilateral implant-based breast reconstruction between 2012 and 2022 in our hospital. Five hundred thirty-three patients (84,2%) underwent second-stage surgery to place a definitive implant. Symmetrization of the contralateral breast was performed in 409 (76.74 %) of these patients. In the group of patients of 60 years or less, 84.2% underwent symmetrization of the contralateral breast while this procedure was performed in only 50% of the patients of 60 years or more. 89.6% of patients that had symmetrization of the contralateral breast with implant placement had 60 years or less. 81.0% of patients that underwent breast reduction for contralateral breast symmetrization had Body mass index (BMI) > 25.

CONCLUSIONS: Symmetrization of the contralateral breast in the opportunity of second-stage breast reconstruction seems to depend on social, economic, cultural and lifestyle variables. Our findings suggest that symmetrization in breast reconstruction is determined by these factors.

Skin Cancer Profile in Liver Transplant Patients: An Australian cohort

Abstract Presenter
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Rohan Rajaram MD

BACKGROUND: The development of aggressive and rapidly growing cutaneous malignancies is a well-established secondary consequence of liver transplantation. Immunosuppression required post-transplant is a known risk factor for carcinogenesis however there remains a question on the impact of other contributing patient factors. Limited literature exists on the

characteristics of cutaneous malignancies post liver transplant and by extension there lacks an ideal surveillance protocol and management guideline for skin cancers in this population.

OBJECTIVE: To undertake a large scale, retrospective case control study that analyses skin cancer data in Liver transplant recipients at a single major transplant centre in Victoria, Australia with the aim to create a decision tree to stratify the risk of developing skin cancers post liver transplant.

METHODS: A total of 216 liver transplant recipients were identified from the Austin Health Liver transplant database from 2000 to 2020. 116 patients were found to have developed cutaneous malignancies post-transplant with the remaining patients utilised as a control group for comparison. Demographic data including Fitzpatrick skin type and skin cancer risk factors were collected. 443 individual cutaneous malignancies were identified, and further analysis of subtype, location and malignant characteristics were performed.

RESULTS: Age, male sex, Fitzpatrick skin type 1-2, smoking, family and personal history of skin cancer pre transplant, increased frequency of blistering sunburn and Azathioprine use was associated with the development of skin cancer. Most skin cancers developed were SCCs in the head and neck area. These cancers were disproportionately moderately and poorly differentiated however with early detection the majority of these lesions were managed by general practitioners and dermatologists in the community.

CONCLUSION: The data demonstrates that a variety of personal risk factors increase the risk of developing cutaneous malignancies post liver transplant. Furthermore, it confirms that skin cancers developed are higher grade and more aggressive than in the normal population. This helps to stratify patient risk profiles to identify a high-risk liver transplant recipient cohort who are likely to develop skin cancers and helps to determine future protocol development for skin cancer surveillance in the post liver transplant population.

Trapezius flap: a forgotten option for reconstruction of the head and neck

Abstract Presenter
Rado Zic MD

Abstract Co-Author
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INTRODUCTION: Although the trapezius flap is a useful reconstructive option in the head and neck reconstruction it is often not utilized do the popularity of microsurgery and the need for lateral or prone surgical positioning. Because it is not used regularly surgeons are not familiar with its anatomy which can be variable and are reluctant to use it.

ANATOMY: Anatomical studies describe two main patterns of vascular supply to the trapezius and that the muscle is principally supplied by three vascular sources: the transverse cervical

artery, the dorsal scapular artery, and the posterior intercostal arterial branches. The flap can also be raised as a propeller flap based on the perforators.

PATIENTS: The authors will present a case series using the trapezius flap to cover the posterior occipital and skull base defects.

CONCLUSION: The trapezius flap is a reliable and low morbidity option for reconstruction of head and neck defects, and not only when microsurgical procedures cannot be performed due to a lack of expertise, equipment, or comorbidities of the patient.

Interest of a 3D custom-made implant in the reconstruction of bone defects of the cranial vault

Abstract Presenter
Franck Duteille MD

The authors report five cases of a patient managed for severe cranial vault depression following combined neurosurgery and radiotherapy (4 cases) or post trauma (1 case).
This situation caused major aesthetic discomfort and was potentially dangerous due to the mechanical weakness of the bone flap. Patients were also very anxious about this situation and acknowledge to limit some activities (riding horse ..). But the main concern was their aesthetic appearance.
There was 3 women and two men, the average year was 48 years old.
The authors had a CAD (computer aided design) silicone elastomer custom-made implant made to fill perfectly the depression.
Beforehand, an expansion was performed in two cases and local flap in one case to cover the implant after removal of the radiated or bruised skin. This was made to avoid the post-surgical dehiscence risk and silicone elastomer infection
The mean surgical time was 72 mn. The surgery and post-operative course raised no concerns.
After minimum 6 months (6 to 19 months) of follow-up, the result is very good and the patient very satisfied, proving that this technique certainly has its place in the therapeutic arsenal when faced with a tissue defect of the cranial vault.

Fully Telemetric Robot-Assisted Microsurgery: First Clinical Experience

Abstract Presenter
Maximilian Kueckelhaus MD

BACKGROUND: Recently, there is an ongoing trend in plastic surgery with robotic-assisted microsurgery and supermicrosurgery devices being developed. Combining a telemetrically controlled robotic microscope with an also telemetrically controlled microsurgery robot unlocks synergistic effects with complete disconnection of the operating surgeon from the operating

field. Here, we report the first clinical free flap reconstructions using this setup.

METHODS: Twenty-three surgeries were performed with the combined remote approach using the Symani® Surgical System and the RoboticScope® in open microsurgery procedures. The time to complete the anastomosis and ischemia time were recorded. The surgical performance for anastomoses was assessed using the modified Structured Assessment of Microsurgical Skills (SAMS) score. Subjective satisfaction was evaluated by the surgeons in comparison to conventional microsurgery. For learning curve evaluation, the senior authors first four (first group) and last four (last group) procedures were compared.

RESULTS: Overall, flap survival was 95.7%. The average arterial anastomosis time was 36.7 ± 10.9 minutes. Total time of surgery was 277.7 ± 63.8 minutes and ischemia time was 100.6 ± 24.9 minutes. Most SAMS score parameters were significantly higher in the last group of surgical procedures compared to the first operations. Subjective satisfaction was equal or better with the combined robotic-assisted approach in most categories.

CONCLUSIONS: Our data demonstrates safety and feasibility of the use of a combined remote approach. Robotic systems for microsurgical procedures may hold promising potential for improvement of surgical quality and open up new frontiers in microsurgery.

Development of a Machine Learning-Devised Plasma Extracellular Vesicle Proteomic Signature for Differentiating Primary from Metastatic Melanoma

Abstract Presenter
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INTRODUCTION: Melanoma, accounting for most skin cancer fatalities, is increasing in incidence. Current melanoma management primarily uses Breslow Thickness, a largely subjective prognostic indicator. Extracellular Vesicles (EVs), lipid bilayer-bound particles that facilitate intercellular communication, could serve as novel biomarkers for melanoma when circulating in plasma. The objective of this study was to employ machine learning to generate

proteomic EV signatures from plasma to distinguish between melanoma stages, with potential prognostic implications.

METHODS: Plasma from 36 melanoma patients (24 primary, 12 metastatic) and 13 healthy controls was used to isolate Extracellular Vesicles through Size Exclusion Chromatography. Post-characterisation, these EVs underwent mass spectrometry using data-dependent acquisition for protein identification. Differential expression analysis across study groups informed feature selection via machine learning, resulting in an EV proteomic signature for group differentiation. Signature accuracy was evaluated with unsupervised hierarchical clustering and identified proteins were cross-referenced with tumour tissue gene expression using The Cancer Genome Atlas (TCGA) data.

RESULTS: Across all study groups, over 200 unique proteins were identified from plasma-derived EVs. Notable variances in proteomic profiles between metastatic and primary melanoma patients were observed, as were differences with healthy controls. Two proteins, HIST1H1E & ANKHD1, were unique to melanoma patients' EVs. A distinguishing proteomic EV signature (comprising SERPIND1, VWF, TNC, and PLG) was developed. This classified the groups with 76% accuracy, and all four proteins have been previously implicated in melanoma progression. Of these, VWF and SERPIND1 had significantly higher expression in plasma EV samples from those with metastatic disease, and in gene expression analysis of metastatic tumours using TCGA data. No notable differences in concentration, size, or protein:particle ratio were detected across groups.

CONCLUSION: This study highlights the potential of machine learning-enabled proteomic EV signatures as an innovative tool for accurate melanoma staging. Identified proteins unique to metastatic melanoma suggest potential prognostic and predictive value. Further validation is required to confirm these findings.

The ergonomic FALD flap for one-stage total breast reconstruction

Abstract Presenter(s)
Benedetto Longo MD, PhD
Benedetto Longo

BACKGROUND: The Fat-Augmented LD (FALD) flap combines this pedicled flap with immediate intraoperative fat transfer. Very little is described concerning its inset at mammary site. Our efforts have concentrated on seeking the best flap orientation and skin-adipose paddle molding, in order to refine the aesthetic outcome and obtain a complete breast reconstruction (BR) in one-stage.

METHODS: We conducted a prospective clinical study between December 2020 and March 2022, comparing patients in which we designed an ergonomic inset of the FALD flap with vertical orientation of the skin adipose paddle (Group-A) with a traditional horizontal orientation

of the paddle (Group-B). The study endpoints were the difference in aesthetic outcome through a subjective and objective evaluation and the difference in terms of complications.

RESULTS: 32 FALD flaps (23 patients) was performed for the Group-A and 31 FALD flaps (25 patients) for Group-B. The two groups were homogeneous in terms of demographic and surgical data ($p>0.05$). Global rate of complications was homogeneous among the groups, without statistically significant differences ($p=0.973$). The mean global score of surgeon's assessments showed a statistically significant superior aesthetic outcome in Group-A ($p<0.00001$). Regarding patients' satisfaction, Group-A was superior in terms of breast size ($p<0.00001$), shape ($p=0.00179$) and overall satisfaction ($p=0.00014$).

CONCLUSION: The ergonomic vertical FALD flap allowed us to achieve a one-stage total BR, with excellent breast projection and upper pole fullness. These refinements in flap shaping and molding could help surgeon to achieve a brilliant totally autologous BR, without the need for microsurgical experience.

Difference in lymphedematous change between inguinal lymphadenectomy and inguino-pelvic lymphadenectomy in patients with skin cancer of the lower extremity

Abstract Presenter
Taku Maeda MD

BACKGROUND: Surgical intervention to restore lymphatic drainage pathways is more effective in the earlier stages of lymphedema. Therefore, it is important to accurately predict the severity of lymphedema following lymph node dissection. There is currently little evidence to support the notion that inguino-pelvic lymphadenectomy is associated with greater morbidity than inguinal lymphadenectomy, although it is believed that the difference in the extent of surgery results in a difference in severity of lymphedema. In this study, we compared the difference in lymphedematous change between inguinal lymphadenectomy and inguino-pelvic lymphadenectomy in patients with skin cancer of the lower extremity.

PATIENTS AND METHODS: Twenty-nine patients with skin cancer of a lower extremity who underwent lymphadenectomy were classified into an inguinal lymphadenectomy group and an inguino-pelvic lymphadenectomy group. The ratio of the circumference of the affected extremity to that of the unaffected extremity at 20 cm and 10 cm above the upper edge of the patella, and at 10 cm and 20 cm below the lower edge of the patella was calculated on computed tomography images.

RESULTS: There were 16 men and 13 women, with median age of 68.2 (range 17–85) years. There were 21 cases of melanoma, 5 cases of squamous cell carcinoma, and 1 case each of invasive extramammary Paget's disease, porocarcinoma, sebaceous carcinoma, and liposarcoma. Fourteen patients underwent inguinal lymphadenectomy, and 15 underwent inguino-pelvic

lymphadenectomy. The mean circumference ratios in the inguinal lymphadenectomy group and inguino-pelvic lymphadenectomy group were respectively 1.09 and 1.26 at 20 cm and 1.13 and 1.31 at 10 cm above the upper edge of the patella, showing statistically significant differences at both positions. One the other hand, the mean circumference ratios were respectively 1.07 and 1.05 at 10 cm and 1.11 and 1.04 at 20 cm below the lower edge of the patella, showing no statistically significant differences at either position. The incidence of lymphedema was 5 of 14 patients (35.7%) in the inguinal lymphadenectomy group and 10 of 15 patients (66.7%) in the inguino-pelvic lymphadenectomy group.

CONCLUSIONS: Inguino-pelvic lymphadenectomy was associated with more severe lymphedematous change than inguinal lymphadenectomy. Although a statistical difference in lymphedematous change was demonstrated between inguinal lymphadenectomy and inguino-pelvic lymphadenectomy in the thigh, the difference was not significant in the lower leg. When lymphedema gradual worsens without proper treatment, the lymphoscintigraphic findings also change, reflecting the severity.* In terms of the severity of lymphoscintigraphic findings, our results were similar to type II (comparatively mild type: dermal backflow apparent in the thigh but not the lower leg). Considering the high incidence and severity of lymphedema after inguino-pelvic lymphadenectomy, early surgical intervention to restore lymphatic drainage pathways may reduce the deterioration of lymphedema in these cases.

REFERENCES

* Maegawa J, Mikami T, Yamamoto Y, Satake T, Kobayashi S. Types of lymphoscintigraphy and indications for lymphaticovenous anastomosis. Microsurgery 2010;30(6):437-442.

Complete Preservation Of Scrotal Skin In A Case Of Fournier's Gangrene Involving The Inguinoscrotal And Perineal Region

Abstract Presenter
Shamala Durairajanayagam MD

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murali sundram

Fournier's gangrene is defined as a polymicrobial necrotizing fasciitis that involves the inguinal, perineal, testis, scrotal and perianal regions. The infection spreads in the superficial and deep fascia planes. Often the scrotal skin is involved and is subject to partial or complete surgical debridement. This results in an exposed testis requiring temporary burying and definitive unsightly skin grafting or flap reconstruction. We present the successful management of Fournier's gangrene originating from a left epididymo-orchitis in a 35-year-old man. He developed excruciating pain over the left scrotum and clinically the scrotal skin was red and inflamed. CT scan showed a large 15cm x 15cm x 12cm area of cellulitis and abscess collection in the left inguinoscrotal region extending into the perineum. Debridement was done on day 4 of admission. A decision was made to preserve the scrotal skin. An incision was made from the left

lateral inguinal region and extended down to the left perianal region. 100 mls of frank pus was drained. A very thin layer of scrotal skin was preserved while the underlying fascia and muscles were debrided from the underside. A total of four surgical debridements were performed and the wound was closed in stages starting inferiorly while the superiorly located wounds were dressed with negative pressure wound therapy (NPWT). As early as the second debridement, the testis was placed back into the scrotum with a drainage tube. Apart from a small wound breakdown at the inguinal region requiring secondary suturing, all other sutures remained intact. The patient had no external defect or scar apart from a fine line running from the left inguinal region down to the left perineum. The scrotal skin survived 100%. The robust circulation of the scrotum and its excellent wound healing properties gives an opportunity to preserve the scrotal skin when there is no obvious necrosis. This is useful in avoiding complications such as painful testes retraction and the need for scrotal reconstruction using skin grafts or flaps.

Unilateral Cleft Lip - Proposal of A New Severity Rating Scale

Abstract Presenter
Amaka Ehighibe MD

Abstract Co-Author
Ifeanyi Onah

BACKGROUND: Orofacial clefts (OFC) are among the most common congenital anomalies. OFCs usually describe clefts around the mouth and are commonly divided into cleft lip, cleft palate or a combination of the two. OFCs may be syndromic or non-syndromic. There is a myriad of classification systems used to describe these deformities but no universally accepted objective anthropometric classification which describes the severity of the defect. This study seeks to describe the severity of the unilateral cleft lip deformity using a scale derived from the cleft side nostril width.

METHODOLOGY: All patients between the ages of 0 and 6months with unilateral cleft lip deformity presenting for cleft lip repair at the Armed Forces Specialist Hospital Kano, Nigeria were recruited into the study. The cleft side nostril width was measured under general anesthesia using a castroveijo caliper. Frontal and basal photographic views of participants' faces were taken. These photographs were given to five expert cleft surgeons who were blinded to the anthropometric measurements taken. The assessors were asked to grade the defects in the photographs into mild, moderate and severe categories and the anthropometric measurements taken were thereafter statistically matched to the categories.

RESULTS: There was good inter-rater reliability amongst all five assessors. There was a clear difference between the mild and moderate groups but this was not the case between the moderate and severe groups as there were significant overlaps in the anthropometric measurements for the patients that were assigned to these groups.

CONCLUSION:
Subjective assessment of the severity of the unilateral cleft lip defect is a valid form of assessment. Categorization of the defect into anthropometric ranges using the subjective assessment as a base, yielded only two distinct categories, mild and moderate-severe.

Abdominal Liposuction post-surgical management controlled with kinesiotherapy.

Abstract Presenter
Adan Araujo López

INTRODUCTION: Body contouring in plastic surgery encompasses a range of procedures, including abdominal wall reconstruction for hernias, pedicled flaps in breast reconstruction, and aesthetic uses in abdominoplasties and lipoabdominoplasties. Although body contouring is often employed to enhance abdominal aesthetics, post-surgical edema management remains a challenge. Kinesiotherapy, in the form of continuous abdominal bandages, has been shown to be effective in this regard.

METHODOLOGY: This prospective clinical study involved a sample of 50 patients who underwent surgery at the General Hospital of Mexico plastic surgery department between March 2022 and March 2023. The patients were divided into two groups, experimental and control, each comprising 25 patients.
The study included patients with similar characteristics: ages between 18 and 65 years, any sex, no comorbidities, BMI < 30 kg/m², and no abdominal hernia.

ANALYSIS: A total of 50 patients were analyzed, divided into two groups of 25. The experimental group included 20 females and 5 males, with an average age of 36 years. All patients in this group had a BMI < 28, indicating they were suitable candidates for the procedure. Kinesiotape was introduced as a treatment for controlling post-surgical edema in abdominal liposuction, with varying application patterns. Pattern 1 proved more challenging to apply and maintain, whereas pattern 2 was easier to use and preferred by the plastic surgery team in 64% of cases.
MRI was an invaluable tool in this study, revealing significant information even when seromas were not visible .
Statistical analyses, including Chi-square and Pearson correlation tests, were conducted to compare edema in both groups, as measured by MRI .

RESULTS: The study's hypothesis considered the uncertain outcomes regarding edema control, seroma, ecchymosis, and pain. Edema was analyzed in both groups after surgery, at 7 and 21 days post-operation .

The study showed a decrease in edema measured by cm2 in MRI, with an average reduction of 373 cm2 in the control group compared to 635 cm2 in the experimental group, leading to decreased edema, ecchymosis, pain, and seroma.

DISCUSSION: Liposuction is a widely used surgical technique for removing fat to improve body contour. However, some patients may experience an excessively flat abdomen. Kinesotherapy, a daily-use intervention, has shown proactive benefits in managing post-surgical complications related to body contouring.

CONCLUSIONS: In conclusion, kinesiotherapy is an effective option for postoperative management of abdominoplasty. This adjunctive therapy improves recovery, reduces swelling, decreases pain, and enhances the patient's quality of life. Medical and kinesiotherapy professionals should collaborate to provide the best possible care for patients after abdominal liposuction surgery. Kinesiotherapy may also offer psychological benefits, such as reducing stress and anxiety related to the surgical procedure.

Our study demonstrates that with proper knowledge of tape placement and two types of patterns, edema can be decreased, resulting in mild edema if present. Additionally, the more practical pattern (number 2) was preferred by surgeons, fellows, and residents, making it easier to teach other surgeons.

The use of kinesiotherapy as a complementary treatment for patients undergoing abdominoplasty may be a valuable addition to post-surgical management, potentially improving patient outcomes and overall satisfaction with the procedure. Further research is needed to fully understand kinesiotherapy's effectiveness in this context and to identify specific protocols and techniques that are most beneficial.

This study concludes that using kinesiotherapy, with the appropriate pattern and correct application, can decrease edema and post-surgical complications such as pain, ecchymosis, and seroma by more than 35%. It is a safe option for patients, even when used alongside a girdle.

Botulunim Toxin type A followed by TAR (Transversus Abdominal Release) with Abdominoplasty as the best combination for Big Hernia Repair.

Abstract Presenter
Adan Araujo López

INTRODUCTION: An incisional hernia of the abdominal wall is any defect with or without an increase in volume in an area of a postoperative scar that is perceptible or palpable by clinical or imaging examination. The current incidence of incisional hernia is up to 11% . Repairing an incisional hernia has a probability of recurrence of 33%, the third and fourth attempts are associated with even greater recurrence, up to 64% after tension plasty and 32% after mesh plasty.
Due to the high recurrence rate associated with the closure of hernial defects of the abdominal wall, novel techniques such as the use of pneumoperitoneum have been tried. This paper explores the use of preoperatively applied botulinum toxin to improve abdominal wall reconstruction and achieve tension-free midline wall coping.

METHODOLOGY: A Universe of 59 patients operated by the set of two services, Plastic and General Surgery in the General Hospital of Mexico, during 1 year (from March 2022 to March 2023), in a clinical essay, prospective study.
The patients were divided by 2 groups, the experimental and the control, with 26 and 33 patients. In the study we analyzed patients with a very similar characteristics; age between 18 to 65 years, any sex, no comorbidities, BMI < 30 m/k2, with midline hernia > 12 cm2 visualized by a CT Scan. Relative contraindications where patients with intestinal stomas, (if they were young, no comorbidities, and BMI < 30 m2).
The objective of this clinical essay is to make a perfect treatment in the knowledge of big hernia repair. It is not a hernia repair, every patient has to be perfect evaluated, and with the dissection during the surgery will be better for the closure of the middle line, and all the skin flaccidity will be out of it with the abdominoplasty.
All the study was made by the same surgeon, and groups of surgeon, including the General Surgery Team, and the Plastic Surgery Team, the surgery was made at the operation room, with and average of surgery time of 4 hours , with the beginning of the surgery by the general surgery team, if they have something to do at the bowels, and then we prepare the abdominal wall to the transversus abdominal release, and the abdominoplasty by the end.

ANALYSIS: We analyzed 59 patients, divides 2 groups, the experimental group with 26 patients, in the variables there where 7 feminine, and 18 male, with an average of age about 40 years, all patients in this group where evaluated, and admitted with a 2 filters of Services[Algorithm 1], once they have the date of surgery,- 1 Mont Before Surgery - the Toxin Botulinum Type A (Dysport 500 UI – Dilution - [Figure 1]) has had injected by direct view (Lineal Transductor Ultrasound of 8 MHz of Skeletal Muscle View – with Radiology Intervention) at the transverse muscle by the 3 points [Figure 2] at the semilunar of the abdominal wall.
The Toxin Botulinum type A (TBA) It was placed by ultrasound, we take pictures before colocation (1 month) doing contraction [Figure 3], we measure the length of the hernia and compare with his Computerized Tomography Scan (CT), then we take another picture – doing contraction (1 month)[Figure 4] after the TBA, to measure what the length has decrease in millimeters.

RESULTS: The analysis of this study was with the hypothesis, we might not be sure if the dissection of the transversus abdominus will close the midline, in all patients, even the experimental group.
In both groups, we analyze complications and improves of the surgery, in the surgery, after the surgery and we divided by immediately and lately.
Within the observed analyzes, the RESULTS were divided into trans-surgical (99% of the patients closed the midline), immediate post-surgical (Pain, Seroma and Infection < 1%) and late (with < 3% recurrence) in the experimental group.

DISCUSION: Botox is a neurotoxin derived from the bacterium Clostridium botulinum (botulinum toxin type A) that has been observed at the sensory level causing atrophy in the extrafusal and intrafusal muscle fibers. Repair of the abdominal wall after incisional hernias has been a great challenge with recurrence rates of 11%. Performing the release of the transverse muscle has a recurrence of 6%, as well as the compensation of skin flaps are ideal for proper

management.

CONCLUSIONS: The main objective of this study, was done; creating a reliable, positive, learned technique, that can be teached by the head resident, to others, but the most important thought is about the perfect protocolization of the patients, and well know, that not all patients are good candidate for this technique, and the TBA is not a magical thing that close the abdominal wall without a big dissection, that the mesh is all.
The close of the midline is one of the big problems, in the big hernia repair, if the dissection is well done, you will have 5 o 7 cms of each side and can solve it.

Volumetric evaluation of autologous fat transfer for total breast reconstruction

Abstract Presenter
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BACKGROUND: Reconstructive surgeons have shifted from correcting contour irregularities using autologous fat transfer (AFT) toward reconstructing full breasts. Although many studies have researched the volumetric aspects of AFT, some outcomes such as fat graft survival and viability, as well as possible confounders for graft survival, remain unclear. This study aimed to answer these questions.

METHODS: Post-mastectomy women of the multicenter prospective BREAST-trial were randomized to either AFT breast reconstruction or implant-based reconstruction (IBR). Volumes were assessed using the Vectra 3D imaging system and compared at 12 months postoperative. Graft survival was defined as the augmented volume divided by the lipofilling volume. Significant confounders for graft survival were identified using multivariable regression analysis.

RESULTS: A total of 148 patients (75 AFT, 73 IBR) were included in the final analyses. Postoperative volumes differed significantly at 12 months in favor of the IBR group (83.8ml, $p<0.001$). For AFT patients, graft survival did not decrease between 6 and 12 months, with a mean graft survival of 37.1% at 12 months. Significant confounders for graft survival included chest circumference ($\beta=1.107$, $p=0.001$), comorbidities ($\beta=28.567$, $p=0.002$), age ($\beta=-0.514$, $p=0.007$) and total lipofilling ($\beta=-0.028$, $p<0.001$).

CONCLUSION: Plastic surgeons can reconstruct voluminous breasts post-mastectomy using only AFT, these breast volumes stabilize at six months and VECTRA 3D is reliable for breast volume measurement. About a third of the grafted fat survives postoperative and reconstructive surgeons should be aware not to transfer too much fat in one session.

Analysis of blood stream infection in major burns in the burns ICU in khoula hospital in Oman

Abstract Presenter
Ahmed Al Jabri MD

BACKGROUND: A major cause of death among patients with major burns is bloodstream infections, which are
known to be caused by microorganisms. The study on bacteremia helps identify the appropriate antibiotics before the culture test RESULTS are revealed.

AIMS & OBJECTIVES: The aim of this study is to analyze the most common organism that contribute to the development
of a bloodstream infection in patients in burn intensive care unit.

PATIENTS / MATERIALS & METHODS: This is a retrospective, observational follow-up study of a cohort of patients admitted to khoula
hospital Burns Unit in Oman. The data collected from the khoula hospital burns ICU from 2014 to
2019 included all episodes of BSI. The inclusion criteria included patients with a 20% or more total body surface area burned. The changes in BSI during the early and late hospitalizations were
analyzed.

RESULTS: A total of 155 patient was analyzed. Whom 79 patients showed a positive BSI. Age range 2–80
years (mean:32.45). Number of males:89/57.42%. Number of females:66/42.58%. Survival rate 74.84%. Number of expired patients:39/ 25.16%. Mortality among +ve blood culture 34.17%. Mortality among -ve blood culture 15.78%. The most common pathogen causing BSI is Gramnegative
Acinetobacter species. Many cultures showed multi-organism growth. Total number of expired patients is 39. 27 of them have +ve blood.

DISCUSSION & CONCLUSION: The most common pathogen causing BSI is Gram-negative Acinetobacter species over the 5-year
period and during the course of hospitalization. The problematic increase in multidrug organisms in major burns highlights the need for new antimicrobial stewardship policies and antibiotic prescribing protocols.

"Mucosal Rugosity Unfolding Technique for Closure of Anterior Palatal Fistulae"

Abstract Presenter
Ghulam Qadir Fayyaz MD

INTRODUCTION: Palatal fistulae have been classified by many surgeons in different time periods and the idea behind each classification was to provide good information about the location of the fistula, its size and expected difficulty in the management. Veau, Smith DM, Ohsumi and Richardson (Veau, 1931, Smith DM, 2007, Ohsumi N, 1993 and Richardson S, 2014) have elaborated useful criteria to help and plan the management of palatal fistulae. Fayyaz GQ et al(2019) proposed a new system of classification for palatal fistula based on Location, size & Velopharyngeal functional status of the patient.

MATERIALS & METHODS: Anterior fistulae in the palate are known complication after palate repair. Anterior fistulae are not always easy to be managed due to paucity of tissues, available for oral layer cover. We usually elevate the tip of the mucoperiosteal flap, before developing the turn in flap for nasal layer closure. The mucosalized undersurface of the mucoperiosteal flap is unfolded & opened up with a sharp blade, thus leading to increase in the length of mucoperiosteal flap. Nasal layer is now developed all around the fistulae. After the nasal layer closure, the lengthened Mucoperiosteal flap provides ample amount of tissue for oral layer cover.

RESULTS: Using this technique, we have covered most of the anterior palatal fistulae comfortably and successfully. This approach eliminates the need for more complex procedures such as tongue flap, buccinator flap/s, FAMM flaps, or free flap.

CONCLUSION: In selected cases, the Mucosal Rugosity Unfolding Technique offers a single-stage procedure for the closure of challenging anterior palatal fistulae. This technique provides an effective alternative to more complex reconstructive options.

KEYWORDS: Anterior palatal fistula, Unfolding of the mucosal Rugosity, Lengthened Mucoperiosteal flap.

Otoplasty, Simple and Anatomical Approach

Abstract Presenter
Guillermo Wiegering Cecchi MD, MSc, PH.D, FACS.

Approximately 5.6% of the population has prominent ears; there are more than 200 otoplasty techniques, and more than 800 related articles in Pub med, meaning, that there is not only one technique by itself to solve the problem completely. Suture placement and cartilage incision are the two main approaches, represented by modified Mustarde and Converse techniques that are considered best practice today.
Otoplasty does not mean just bringing the ears closer to the skull; All structures must be present

naturally, without visible marks.
We present here the technique base in John Clark Mustarde work from Scotland, with some modification and tips (Hidrodissection) to make it simple and natural. This, Being a short duration procedure 1-1.5 hours, Ambulatory, under local anesthesia, with very fast recovery and very little or non-complications.

Orthoplastic approach in lower leg and foot surgery

Abstract Presenter
Alexandru Georgescu MD., PhD

BACKGROUND: The reconstruction of lower leg and foot is very challenging due to their anatomical characteristics. In complex injuries of the lower leg and foot or after oncological surgery we should understand that the reconstruction does not mean just the skin coverage, but should address to more requirements, as: replacing like with like; preparing a good bed for other reconstructed elements (bones, tendons, nerves, vessels); obtaining a good cosmetic appearance; low donor site morbidity. The final aim should be the correction of the functional impairment. In the last half century, we assisted to a dramatical change in thinking and approaching the lower leg and foot complex tissue defects. This became possible due to the new knowledge in vascular anatomy and advances in microsurgical techniques and instrumentation.

AIMS & OBJECTIVES: The main way to well treat this kind of lesions is to ensure a multidisciplinary approach by collaboration between the specialists involved in approaching them. That's why, in the later part of the last millennium, a new concept appeared: Orthoplastic Surgery.

PATIENTS / MATERIALS & METHODS: Will be analysed the trauma cases involving the lower leg and foot solved in our department in the last 25 years. The cases were solved by a single surgeon with both plastic and orthopaedic competences.

RESULTS: Will be presented the important role of debridement, bone fixation and as soon as possible reconstruction by using both traditional and free/local perforator flaps.
Discussion & Conclusion: The orthoplastic approach contributes to: • Save unnecessary or extra operations • Reduce the risk of complications • Optimize time, services, and resources • Bring numerous benefits in term of cost-efficiency, quality of care and patient safety

Utilising the subunit concept to achieve better outcomes in lower limb reconstruction: A clinical experience in an Asian population

Abstract Presenter
Qi En Hong MBBS

Intra-tendinous Platelet Rich Plasma Injection Therapy for Healing Wounds with Exposed Tendons: A Clinical Case Series

Abstract Presenter
Mahendra Daya MD

INTRODUCTION: Platelets are rich in cytokines and growth factors. Exposed tendons in wounds do not naturally heal by granulation and epithelization. The study aimed to explore the effects of PRP injection therapy on exposed tendons in open wounds and determine if the tendon could support wound healing.

MATERIALS AND METHODS: A retrospective observational clinical study was undertaken from 2012 to 2018 to assess wound healing from exposed tendons in wounds in patients treated with PRP injections and occlusive dressings. Parameters studied included patient and management factors, wound and functional outcomes, wound healing progression, and the direct effects of PRP therapy on tissues.

RESULTS: Twenty-three patients with several co-morbidities received treatment. The average age of patients was 56 years, with an age range of 25 to 79 years. Twenty of the 23 patients (87%) reached complete healing. Eighteen of the 20 (90%) had good tendon excursion and associated joint movement for the limb's function. The complication rate was low. PRP injection therapy produced a response of increased vascularity, the proliferation of granulation tissue from the tendon, and epithelialization from the surrounding skin.

CONCLUSION: Intra-tendinous PRP injections used with occlusive dressings can heal the exposed tendon and open wound by process of granulation and epithelization, restoring adequate limb function.

A Novel, Deep Learning Based, Automatic Photometric Analysis Software for Breast Aesthetic Scoring

Abstract Presenter
Joseph Park MD

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BACKGROUND: Automatic evaluation of breast aesthetics is in need both for clinical and research purposes. However, traditional software are time-consuming, which limits their use in

the clinical setting. To improve the efficiency of aesthetic analysis, we developed the Seoul Breast Esthetic Scoring Tool (S-BEST), a deep-learning-based automatic photometric analysis software for improved breast landmarks and feature assessments.

METHODS: S-BEST was developed using frontal breast photographs as input and trained using deep learning (DenseNet-264) to automatically provide landmark detection and breast asymmetry indices. To validate the accuracy of S-BEST in providing breast asymmetry indices, physical measurements of breast landmarks were compared to those obtained by S-BEST in 100 females diagnosed with breast cancer using a paired t-test and Bland-Altman plots.

R**ESULTS:** S-BEST showed accurate automatic landmark localization and measurements, with no statistically significant differences between the physical examination and S-BEST's automatic measurements for most distances. However, the nipple-to-inframammary fold distance showed a high bias. S-BEST provided accurate breast asymmetry indices based on these measurements.

CONCLUSIONS: S-BEST is an accurate, fast, and automatic photometric analysis tool for clinical and research purposes in breast aesthetics. Further studies are needed to validate its accuracy and applicability to other breast conditions.

An Algorithm For Facial Paralysis Reconstruction After 376 Consecutive Cases

Abstract Presenter
Miriam Vicente-Ruiz MD

Abstract Co-Author
Bernardo Hontanilla MD

INTRODUCTION: In the surgical reconstruction of facial paralysis, the available techniques have evolved substantially over the last two decades based on the available technology and, more importantly, on the evaluation of the aesthetic RESULTS, complications, and patient satisfaction. The purpose of this work is to relay the lessons learned after 376 consecutive cases and present a treatment algorithm.

MATERIAL & METHODS: We retrospectively reviewed 376 patients treated surgically for facial paralysis in the last 23 years in our center. Clinical data including characteristics of the paralysis were collected, as well as objective outcome measures with a focus on the recovery of facial symmetry and smile spontaneity.

RESULTS: For the rehabilitation of incomplete facial paralysis, the use of masseteric to facial nerve transfer offers the best RESULTS, with a greater capacity to restore spontaneity in women. In bilateral facial paralysis, the technique of choice is bilateral gracilis muscle transplantation in two stages, with the masseter nerve as the source of innervation. As an alternative or adjunct to the dynamic techniques, static techniques can restore facial symmetry and improve the quality of

life of patients. The choice of surgical technique is determined firstly by the time of evolution of the paralysis, as well as the laterality and the type of paralysis. In addition, the result is conditioned by age and sex, with better recovery of spontaneity in children and women. All these factors need to be considered, along with patient preferences, to achieve an optimal result.

CONCLUSIONS: The proposed algorithm, based on our experience after 376 cases, simplifies the reconstruction of facial paralysis, mainly taking into account the characteristics of the paralysis and the patient's gender as factors that influence smile recovery.

Alterations of Alu methylation and Aging markers in Non-Syndromic Cleft Lip and Palate

Abstract Presenter
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BACKGROUND: Non-syndromic cleft lip with or without cleft palate (NSCL/P) is one of the most common craniofacial anomalies with multifactorial genetic and environmental etiologies. Senescence, as indicated by senescence-associated markers, including Alu methylation, AGE, RAGE and p16 expressions may be the pathogenesis of NSCL/P. However, link between those senescence-associated markers and the severity of NSCL/P has not been investigated. Thus, the present study aimed to explore the association of senescence-associated markers and the severity of NSCL/P.

METHODS: Prospective cohort study was conducted from January 2022 to January 2023. The Alu methylation and aging marker, as indicated by AGE, RAGE and p16 expression, were examined in NSCL/P patients and their mothers. The NSCL/P white blood cells (WBCs)-Alu methylation were evaluated in three phases of patients, including 0-3 months old, 3-6 months old (cheiloplasty), and 9-12 months old (palatoplasty). WBCs-Alu methylation of mothers was examined only at the first visit. We also investigated for tissue specific Alu methylation, such as lip and palate from discarded tissues in cheiloplasty and palatoplasty.

RESULTS: 39 NSCL/P patients (cleft lip only (CLO: n=6); cleft palate only (CPO: n=9); cleft lip with palate (CLP: n=24) and their mothers were enrolled. 48.7% of patients were male. Our RESULTS showed that an increase in RAGE expression of WBCs-patients was positively correlated with severity of cleft subtypes ($p<0.05$). In mother, an increase in WBCs-Alu

methylation was observed in CLP group, compared with CPO group, whereas WBCs-Alu methylation was not different between CLO and CPO groups. However, mean WBCs-Alu methylation in patients were 64.3 ± 2.9%, 66.0 ± 1.8%, 61.8 ± 6.0% for CLO, CPO, CLP, respectively ($p > 0.05$). For tissue Alu methylation, mean Alu methylation were 62.2 ± 4.1%, 66.1 ± 5.3% for lip and palatal tissues, respectively, and there was not statistically significant between groups. We found no significant correlation between senescence-associated markers in tissues and cleft specific subtypes.

CONCLUSIONS: Our findings suggest a link between systemic aging-senescence-associated markers in patients, increased WBCs-Alu methylation in mothers, and the severity of NSCL/P. Therefore, NSCL/P pathogenesis may be influenced by the maternal aging process and senescence of the patients.

KEYWORDS: Cleft lip and palate; Alu methylation; Aging process; Senescence

AFFILIATION: This work (Grant No. RGNS 64-056) was supported by Office of the Permanent Secretary, Ministry of Higher Education , Science, Research and Innovation (OPS MHESI), Thailand Science Research and Innovation (TSRI) and Chiang Mai University, Thailand.

Inhibition of the pro-tumorigenic effects of adipose derived stem cells (ADSCs) in lipofilling to the breast: Systemic Tamoxifen treatment and the lasting effect on the neoplastic traits of ER+ breast cancer

Abstract Presenter
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AIM: The co-location of ADSCs in the breast cancer microenvironment has been the focus of numerous scientific studies, and the origin of the modern safety debate. While ADSCs isolated from healthy patients have been shown to confer a malignant advantage when co-located with breast cancer in-vitro, they fail to provide a truly analogous model for the clinical cohort undergoing reconstruction. Systemic treatment with ER+ antagonists (Tamoxifen) is hypothesised to have a long-term effect on ADSC function, inhibiting their pro-tumorigenic potential and altering their interaction with ER+ breast cancer (MCF-7 and T47D).

METHODS: Primary ADSC lines were isolated from breast cancer patients (n=10) established on systemic Tamoxifen (>12 months) alongside ADSCs isolated form a healthy control group (n=6). Indirect (conditioned media) and direct (3D non-contact co-culture) models were utilised to interrogate systemic ADSC exposure to Tamoxifen on their effect on the neoplastic traits (proliferation, cell adhesion, protein expression, migration, invasion, bioenergetics, and cellular

morphology) of two ER+ breast cancer cell lines (MCF-7 and T47D).

RESULTS: Comparing the effects of ADSCs on the key cancer hallmarks, there was a statistically significant difference ($p<0.005$) in the neoplastic traits of both ER+ cell lines when comparing both the indirect (n=16) and direct effects (n=12) of ADSCs isolated from patients undergoing systemic treatment compared with the healthy ADSC controls. Systemic Tamoxifen exposure inhibited the pro-tumorigenic effects of ADSCs, with this patient population failing to consistently upregulate neoplastic behaviour, unlike their healthy counterparts. This novel finding elucidates the potential impact systemic hormone treatment may have on the ADSCs within free fat grafts, accounting for the disparity seen between clinical and lab-based studies.

CONCLUSION: This novel study illustrates the divergence of ADSC behaviour in the microenvironment of breast cancer following systemic hormone receptor modulation. This may in part explain the disparity in scientific and clinical studies, highlighting the need for further research on factors that influence ADSC behaviour, and the safety of lipofilling.

REFERENCES:
Emman J Thomson 1,2, Thomas H Jovic 1,2, Iain S Whitaker 1,2, Shareen H Doak 3
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HAND

Factors Associated with Loss of Reduction of Volar Ulnar Rim Fragments following Volar Locking Plate Fixation of Intra-articular Distal Radius Fractures

Abstract Presenter
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HYPOTHESIS: To assess factors associated with loss of reduction of volar ulnar fragments following volar locking plate (VLP) fixation of intra-articular distal radius fractures. We hypothesized that volar ulnar fragment (VUF) size and plate placement would be critical

variables driving the incidence of volar rim loss of reduction.

METHODS: All patients with a volarly displaced, intra-articular distal radius fracture treated with a VLP within the ICUC database, an international collaborative and publicly available dataset, were identified. The primary outcome was volar rim loss of reduction on follow-up imaging, defined as a change in radiographic alignment from intra-operative fluoroscopy, teardrop angle less than 50 degrees, or loss of normal radiocarpal alignment. Secondary outcomes were final range of motion (ROM) of the affected extremity. Radiographic Soong classification was used to grade plate position. Traditional descriptive statistics were used to compare patient, fracture, and treatment characteristics with volar rim loss of reduction. A Random Forest supervised machine learning algorithm was used to classify variable importance for predicting the primary outcome.

RESULTS AND CONCLUSION: Fifty patients with volarly displaced, intra-articular distal radius fractures treated with VLP were identified. Six patients were observed to have a volar rim loss of reduction, but none required reoperation. Volar ulnar fragment size, Soong grade 0, and post-fixation axial plate position in relation to the sigmoid notch were significantly associated ($p<0.05$) with volar rim loss of reduction. All cases of volar rim loss of reduction occurred when VUF was 10.8 mm or less. The size of the VUF was the most important variable for predicting volar rim loss of reduction, followed by post-fixation axial plate position in relation to the sigmoid notch and the number of volar fragments in the Random Forest machine learning algorithm.

SUMMARY:
• Size of the volar ulnar fragment was the variable classified as having the most importance for volar rim reduction loss after VLP and occurred when the size was less than 10.8 mm.
• Variables significantly associated ($p<0.05$) with volar rim reduction loss include volar ulnar fragment size, Soong grade 0, and post-fixation axial plate position in relation to the sigmoid notch.
• Fracture characteristics can influence the treatment approach to address these risk factors.

Safety and Efficacy of Platelet-Rich Plasma Injections in Basal Thumb Osteoarthritis; Should We Offer It or Not?

Abstract Presenter
Omar El Sewify

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PURPOSE: In recent times, intra-articular platelet-rich plasma (PRP) injections have been demonstrated to be effective in the treatment of hip and knee osteoarthritis (OA). This systematic review aims to describe the outcomes of intra-articular PRP injections in carpometacarpal (CMC) OA and its safety profile.

METHODS: PRISMA guidelines were respected for the conduct of this systematic review. The title and abstract as well as the full-text assessment were performed in duplicate. Full texts and their data were extracted by two reviewers; and collected data was confirmed by the principal investigator. Any disagreements were resolved through consensus by the third reviewer. Patient characteristics and functional outcomes were analysed as means of central tendency.

RESULTS: 16 citations were retrieved; six papers were retained, including 77 total patients. The average follow-up time was 6 months, with four patients lost to follow-up. The time between PRP injections was 3.2 weeks, and the volume per injection was 1.3 mL. Among 56 patients, there was a 62.5% patient satisfaction rate. Regarding functional outcomes, VAS scores decreased by an average of 5.5 (9.4-3.9), Quick Dash scores decreased by an average of 32 (51-19.2) points while no changes were found in Grip strength. Finally two minor adverse events (4.76%) were found among 42 patients.

CONCLUSION:
PRP injection is a reliable short-term option for a select group of patients in the treatment of basal thumb OA given its favourable functional profile namely pain reduction, grip strength, patient satisfaction, and reasonable safety characters.

SURGICAL PRACTICE PEARLS:
• Participants will be able to identify a novel modality to combat carpometacarpal joint osteoarthritis.
• Participants will be able to quantify improvement in functional outcomes and categorize adverse events associated with PRP injections for CMC OA.
• Participants will be able to learn to stratify their CMC OA patients in terms of treatment approach and in turn learn who would benefit the most from the PRP injection.

CT EVIDENCE OF EPL DAMAGE OCCURRING AT THE TIME OF ACUTE DISTAL RADIUS FRACTURE

Abstract Presenter
Charlotte Laane MD

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PURPOSE: Extensor pollicis longus (EPL) rupture is described as a complication after volar plate fixation in distal radius fractures. Although protrusion of screw tips through the dorsal cortex of the distal radius may cause a substantial proportion of EPL ruptures, it may not be the sole cause for EPL rupture after distal radius fracture. The PURPOSE of this study was to identify cases with EPL damage on the acute preoperative Computed Tomography (CT) scan for distal radius fracture.

METHODS: This retrospective study included adults (≥18 years) with operatively treated distal radius fracture and available preoperative CT within two weeks of injury between January 1st 2017 and July 31st 2018. The cohort consisted of 97 wrists in 96 patients. The median age was 54 (IQR 38-64), 68% (65/96) was female, and median follow-up was 56 months (IQR 24-61). A concomitant fracture was apparent in 63% (61/97). CT scans were reviewed by 3 fellowship-trained musculoskeletal radiologists.

RESULTS: Lister's Tubercle was involved in 75 % (73/97), of these 73 patients, 13 patients had an entrapped EPL tendon (13/73, 18%). There were two clinically diagnosed EPL ruptures, one of which had EPL entrapment on the injury CT and did not have protruding screws on x-ray. The other patient had Listers' tubercle fracture involvement on the acute CT and the at the time of surgery with dorsal plating was noted to have intra-operative bony spike at Listers' tubercle that was damaging the EPL. Additionally, one patient had visible EPL damage on CT (1/97, 1%), but did not have a documented rupture.

CONCLUSION:
- 75% of cases involved fracture extending into Lister's tubercle .
- In 18% of those fractures, the EPL was engaged by fragments of a fractured Lister's tubercle.
- EPL injury by Listers' tubercle fragments may be an underrecognized cause of tendon rupture

Investigating Hand Infection Incidence as a Predictor for Social Determinants of Health

Abstract Presenter
Raymond Yin

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INTRODUCTION: Hand infections represent a significant source of morbidity for patients, limiting activities of daily living and often requiring surgical intervention for complete healing.

Since these patients often voluntarily seek medical treatment, it presents an excellent opportunity to screen for other social determinants of health (SDOH) that may be related to the etiology of their hand infection. This study aims to utilize demographic data from hand infection patients to explore linkages between hand infection incidence and SDOH.

METHODS: A retrospective chart review was conducted for patients who presented to the emergency department of a large community hospital with hand infection during a 1-year window (2021-2022). A variety of patient demographics and social characteristics (employment status, drug use, primary care attachment, social support) were collected from medical records and compiled. This data was then summarized and used to calculate risk ratios (RR) to identify any key risk factors. The most recent Census and city government data was pulled from public sources to determine population demographics for comparison with cohort.

RESULTS: 125 patients met the inclusion criteria (positive for hand infection, age > 18) for analysis. Individuals identifying as Black, Hispanic, American Indian, or Native Hawaiian were disproportionately overrepresented in the cohort when compared to country demographics. Cisgender males represented the majority of patients (83.2%), with the remaining patients consisting almost entirely of cisgender females. Average age was 43.4 years with a standard deviation of 12.9 years. Of covariates examined, homelessness and unemployment status were found to have significant positive risk ratios for hand infection incidence (RR: 348.3, $p<0.0001$, RR: 76.4, $p<0.0001$ respectively). 55.2% of patients represented were homeless, and 66.4% were unemployed. Upon visualization of the data, additional factors such as social support, primary care provider attachment status, and active recreational drug use were also noted to have potential contributions to hand infection incidence. Risk ratios were not calculated for these characteristics as wider population data was not available for comparison.

CONCLUSION: The RESULTS of this study suggest that a disproportionate majority of hand infections are acquired by homeless and/or unemployed individuals in the community. In these individuals, the lack of social support, absence of a primary care provider, and active recreational drug use further increases the risk of developing hand infections. While these patterns may be generally REFERENCEd in other papers, this study quantitatively defines the strength of association and frequency of associated SDOH factors. These findings strongly advocate for more extensive SDOH screening of patients who present with hand infection.

Using Preoperative Lab Values to Predict Medical Complications in Carpal Tunnel Decompression Surgery: A NSQIP Analysis

Abstract Presenter
Anitesh Bajaj

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INTRODUCTION: Previous studies in surgery have identified preoperative laboratory values as markers of operative risk.1 The present study analyzes the effects of preoperative serum hematocrit, albumin, and creatinine on postoperative outcomes in patients undergoing carpal tunnel decompression surgery.

METHODS: The American College of Surgeons National Quality Improvement Program (NSQIP) database was queried for carpal tunnel decompression surgeries (CPT 29848, 64721) from 2005-2020. Preoperative serum lab values within 90 days for hematocrit, creatinine, and albumin were collected for each patient, alongside relevant demographic and clinic covariates. Outcomes included return to operating room, non-home discharge, extended postoperative length of stay (75th percentile in our cohort), 30-day medical complication and 30-day wound complication. Since not all patients had all preoperative lab values recorded within the preoperative window, each lab value was assessed in separate cohorts.

Bivariate t-tests and multivariate logistic regressions controlling for covariates were conducted. For any outcome-lab value pairs with significance on regression, area-under-the-receiver-operating-characteristic-curve (AUROC) and corresponding stratifying cut-points were identified. These cutoffs were derived for the entire cohort in the case of albumin and separately for males and females when analyzing hematocrit and creatinine due to sex-specific REFERENCE ranges. Each cutoff point was further validated through an additional multivariate logistic regression.

RESULTS: A total of 3,138 patients with hematocrit, 1,440 patients with albumin, and 3,159 patients with creatinine levels were identified.

On multivariate logistic regression, increased hematocrit reduced the odds of medical complications (aOR: 0.889, $p<0.001$). A predictive hematocrit cutoff of $\leq 39.7\%$ (AUC: 0.77, $p<0.001$) was identified for medical complications amongst male patients and patients with hematocrit $\leq 39.7\%$ experienced increased odds of medical complications (aOR: 3.555, $p=0.010$). A predictive hematocrit cutoff $\leq 36.6\%$ (AUC: 0.74, $p<0.001$) was identified for medical complications in female patients, and patients with hematocrit $\leq 36.6\%$ experienced increased odds of medical complications (aOR: 2.815, $p=0.013$).

Increased serum albumin was associated with lower odds of medical complications (aOR: 0.479, $p=0.035$). An overall cohort cutoff of ≤ 3.5 g/dL (AUC: 0.79, $p<0.001$) was predictive of medical complications and significant on logistic regression when tested as a categorical variable (aOR: 3.144, $p=0.007$).

Similarly, increased serum creatinine was associated with greater odds of medical complications (aOR: 1.684, $p=0.006$). A creatinine cutoff of ≥ 1.2 mg/dL (AUC: 0.58, $p=0.033$) exhibited predictive capabilities for medical complications among male patients. Male patients with creatinine ≥ 1.2 mg/dL had increased odds of medical complications (aOR: 3.024, $p=0.033$). For

female patients, AUROC analysis identified ≥ 1.0 mg/dL (AUC: 0.59, p=0.039) as a threshold for increased medical complications, and female patients with ≥ 1.0 mg/dL creatinine had heightened odds of medical complications (aOR: 3.160, p=0.016).

C**ONCLUSION:** Multiple preoperative serum values were found to be predictive of post-operative medical complications and discriminative lab value thresholds were identified in this carpal tunnel decompression cohort.

REFERENCES:
Gibbs J, Cull W, Henderson W, Daley J, Hur K, Khuri SF. Preoperative Serum Albumin Level as a Predictor of Operative Mortality and Morbidity: RESULTS From the National VA Surgical Risk Study. Arch Surg. 1999;134(1):36-42. doi:10.1001/archsurg.134.1.36

Primary recurrence rates and patient characteristics in Dupuytren's disease: A systematic review and Meta-Analysis

Abstract Presenter
Omar El Sewify

Abstract Co-Author(s)
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PURPOSE: To compare the primary recurrence rate of Dupuytren's disease and patient reported outcomes after various established interventions.

METHOD: A systematic review was completed following PRISMA guidelines using Medline, Embase and Cochrane. The title and abstract as well as the full-texts were screened in duplicate. Data was extracted by two independent reviewers and conflicts were resolved through consensus or by the third reviewer. Patient demographics, functional outcomes and recurrence rates were collected. Meta-analysis was completed using RevMan 5.4.1 comparing different interventions using a random-effects model at 95% significance.

RESULTS: A total of 44 articles were included, yielding 5413 patients accounting for 3111 Collagenase Clostridium histolyticum injections (CCH), 1760 percutaneous needle fasciotomies (NF), and 1023 open fasciectomies. The average age was 64.82 years old, and men were predominant (83.2%). Average wait time for treatment was 34.33 months. DASH scores improved from on average 15.75 to 5.1, from 18.08 to 2.98, and from 55.00 to 6.97 for CCH, NF, and open fasciectomy, respectively. Forest plots totalling eight articles comparing CCH and NF did not show a significant difference in terms of recurrence rate (p= 0.86), although open fasciectomy had a significantly lower recurrence rate than CCH (p= 0.004). All Forest plots showed low heterogeneity (I2 of 0 to 28%).

CONCLUSIONS: Open fasciectomy for Dupuytren's disease was significantly associated with lower rates of recurrence relative to CCH and by inference to NF. All interventions showed improvement in patient reported outcomes, although selection of treatment should remain tailored to the needs of each patient.

LEARNING OBJECTIVES:
1) Learn about the current evidence for recurrence rates after different interventions for Dupuytren's disease
2) To better understand the demographics of patients with Dupuytren's disease.

Discrepancies In Dupuytren's Contracture Progression and Recurrence In Those Receiving Collagenase Versus Fasciectomy: A 10-Year Review

Abstract Presenter
Cyrus Steppe

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PURPOSE: Dupuytren's disease (DD) is one of the most common disorders of the hand, affecting 5.7-11.7% of the global population. This study seeks to evaluate the long-term efficacy of the two most prominent treatment modalities, injectable collagenase Clostridium histolyticum versus open fasciectomy. We hypothesize that those who had an open fasciectomy to treat their contracture will have significantly less recurrence, greater degree of deformity improvement, and fewer procedural interventions in the long-term.

METHODS: We conducted a retrospective review of all electronic medical records of patients who underwent open fasciectomy or collagenase injection to treat their persistent Dupuytren's contracture between April 2011 and April 2021. All procedures were performed by one of five senior surgeons at the same Veterans Affairs Hospital hand surgical center. Therapeutic administration and documentation for both fasciectomy and collagenase injection patients were managed by a single licensed hand therapist.

RESULTS: Two hundred and thirty-two patients were treated for DD, with 247 collagenase injections and 44 open fasciectomies performed in this sample. At the time of review, collagenase patients were on average 6.51 years post-intervention, with 162 patients more than 5 years. Open fasciectomy patients were on average 4.56 years post-operation, with 12 patients more than 5 years at the time of review. The average decrease in flexion deformity was significantly different between groups; collagenase decreased contractures on average by 29.40°, whereas open fasciectomy decreased contractures on average by 38.59° ($P < 0.001$). The frequency of contracture resolution across all joints was significantly lower in the collagenase

group compared to the fasciectomy group, with 38.18% (155 of 406 treated joints) vs 70.0% (56 of 80 treated joints) of contractures resolved, respectively ($P < 0.001$). A significant difference was observed in the rate of recurrence after resolution between groups; of the contractures that were initially classified as resolved, 50 of 155 (32.2%) treated with collagenase and 6 of 56 (10.7%) treated with open fasciectomy recurred ($P = 0.0017$). In a multivariable binary logistic regression, The use of open fasciectomy compared to collagenase injections to treat contracture was associated with a 74.2% decrease in the likelihood of recurrence.

CONCLUSION: This study found that treatment of DD with collagenase injection is associated with a significantly lower degree of deformity correction, lower rate of resolution, and increased rate of recurrence, prolonging treatment trajectory when compared to open fasciectomy.

The Effect of the Virtual Hand Fellowship Application Process on Applicants and Program Directors

Abstract Presenter
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BACKGROUND: While several studies have investigated the impact of COVID-19 on residency and fellowship from the applicants' perspective, fewer studies have investigated the program director's perspective. Therefore, the aim of this study is to assess the impact of virtual interviews on the hand fellowship matching process by surveying program directors.

METHODS: A 21-question survey was conducted through Google Forms and distributed through a standardized email to hand fellowship program directors. Questions utilized a 5-point Likert scale with the opportunity for respondents to answer some questions in a free-response format. All data was imported into Microsoft Excel (Redmond, Washington) which was used to create tables, figures, and perform statistical analysis. The Mann-Whitney U Test and Kruskal-Wallis Test were used to obtain statistical significance. P-values < 0.05 were considered to be statistically significant RESULTS.

RESULTS: A total of 93 surveys were distributed, of which 35 responses were obtained, corresponding to a 37.6% response rate. 17 program directors (48.6%) were an Orthopedic hand fellowship, 9 program directors (25.7%) were a Plastic Surgery hand fellowship, and 9 program directors (25.7%) were from a combined program. Overall, 62.9% of program directors reported moderate to high levels of satisfaction with the virtual interview process. Program directors

reported to place more emphasis on applicant's CV, calls from colleagues, and applicants that they had met previously. When surveys were stratified by program director age (30-50 and 51+), we determined that there was a significant difference in respondents' confidence in their ability to match their top choice to the same extent had interviews been in person (P-value=0.03572). When surveys were stratified by type of program, we found that there were no significant differences between questions. Lastly, when surveys were stratified by length of program director tenure (0-5 years and 6+ years), we determined that there was a significant difference in the convenience of virtual interviews when compared to that of in-person interviews (P-value=0.03752). Furthermore, most program directors stated that they were highly likely to continue to offer virtual interviews in future cycles

DISCUSSION: With several parenting organizations and program directors affirming that they are comfortable with proceeding with virtual interviews, it is essential for hand fellowship applicants to understand what factors program directors may perceive as more important during the application process. The virtual interview process is a long-term solution for minimizing costs and time to applicants and institutions alike. It is possible that the virtual interview process may effectively achieve suitable matches between applicants and institutions.

Treatment of Glenohumeral Dysplasia in Brachial Plexus Birth Injury with an End-to- Side Spinal Accessory Nerve to Suprascapular Nerve Transfer

Abstract Presenter
Joey Kurtzman

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PURPOSE: Brachial plexus birth injury (BPBI) is a common birth injury that has a variable incidence rate worldwide. The spectrum of disease prognosis ranges from spontaneous recovery to lifelong debilitating disability, particularly of the shoulder joint. Surgery is the mainstay treatment for patients with BPBI to prevent shoulder deformity in the form of glenohumeral dysplasia (GHD), however, there is no clear-cut criteria for applying various surgical interventions. The surgical procedures can range from nerve grafting to nerve transfer or tendon transfer for restoring shoulder function. Herein, we report three cases of infants who underwent end-to-side spinal accessory nerve to suprascapular nerve transfers for treatment of GHD due to brachial plexus birth injury.

METHODS: Three infants who underwent end-to-side nerve transfer of the spinal accessory nerve to the suprascapular nerve for the treatment of GHD due to BPBI were followed. Preoperative diagnosis, pre- and postoperative Active Motion Scale (AMS) scores, pre- and postoperative ultrasound findings, surgical exploration findings, surgical techniques, postoperative complications, postoperative rehabilitation, and postoperative range of motion

RESULTS are included in this report.

RESULTS: The age range for the three subjects was 4 months to 7 months. All patients presented with a history of BPBI and subsequent GHD. Each patient had participated in therapy since birth and used a Sup-ER splint. Preoperative ultrasound of the shoulder joint demonstrated an ossific nucleus posterior to the scapular line in all cases. The patients underwent brachial plexus exploration, which revealed C5/C6 or C6/C7 neuromas. External rotation was not observed in any patient with 0.5mA and 2.0mA stimulation. Therefore, all patients were indicated for an end-to-side transfer of the spinal accessory nerve to the suprascapular nerve. No patients experienced complications. Postoperative therapy was continued, but bracing was discontinued. At 4 months, 7 months, and 10 months postoperative for the 3 patients respectively, each patient demonstrated full shoulder range of motion, shoulder AMS improvement, and ultrasound revealed an ossific nucleus anterior to the scapular line.

CONCLUSIONS: We report 3 cases of patients with BPBI and concurrent GHD who were successfully treated with end-to-side spinal accessory to suprascapular nerve transfers. This is a novel procedure that addresses gray areas in which patients may not be indicated for a tendon transfer nor an end-to-end nerve transfer. Due to the incidence of BPBI and the lack of definitive treatment protocols, we believe that this report may help guide pediatric hand and upper extremity surgeons in tackling this common problem.

Scientific Abstract Presentations: Hand 2
Event: Plastic Surgery 2023
Thu, 10/26/2023: 5:00 PM - 6:00 PM
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Abstracts

ACC
Published Room: Meeting Room 10C
Moderator(s)
Glenn Becker MD
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Tracks
Hand & Upper Extremity
Plastic Surgery 2023
Presentations
A Randomized Controlled Trial Comparing Single-Injection versus Continuous Brachial Plexus Block for Postoperative Pain Control after Open Reduction and Internal fixation of Distal Radius Fractures (Top Medical Student)
PURPOSE

Successful treatment of distal radius fractures involves stable anatomic reduction, postoperative pain control, and rehabilitation. We hypothesized that patients treated with a continuous brachial

plexus block (cPNB) would have less postoperative narcotic use and better postoperative pain control than patients treated with a single-injection block (siPNB).

METHODS

Adult patients with distal radius fractures scheduled to undergo volar plate fixation were eligible for enrollment in an IRB-approved single-blinded randomized clinical trial beginning in 2018. All patients consented to the treatment plan and were randomized into either the siPNB or cPNB group. All blocks were performed preoperatively by the same team. Operations were performed by one of two fellowship-trained hand surgeons, and the postoperative pain treatment regimen was standardized. Patients were contacted by phone at each of the following time points: eight hours after surgery and on postoperative days 1-5. Pills taken and visual analogue scale (VAS) pain scores were assessed at each time point.
Functional assessments at postoperative follow-up visits included 2-point discrimination, grip strength, and wrist range of motion. Patient-reported outcome measures (PROMs) included the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire; Patient Rated Wrist Evaluation (PRWE); and Boston Carpal Tunnel Questionnaire (BCTQ) scores. Single comparisons for continuous variables were tested using unpaired t-tests. Data collected were compared between the two groups and a p-value <0.05 was considered significant.

RESULTS

There were 22 patients enrolled in the siPNB group and 17 patients enrolled in the cPNB group. Both groups were predominately composed of female patients (86% siPNB vs. 65% cPNB, p=0.11) of similar ages (54±15 siPNB vs. 49±15 cPNB, p=0.29). Total operative time did not differ significantly between treatment groups (100±21 siPNB, vs. 95±22 cPNB). Opioid utilization and VAS pain scores were not significantly different among the two groups at any time point.

Functional outcomes evaluated 98±57 days postoperatively were also comparable between the two groups: two-point discrimination (6±1mm siPNB vs. 7±¬1mm cPNB, p=0.21), and grip strength (16±8 kg siPNB vs. 20±9 kg cPNB, p=0.24). Wrist range of motion (ROM) did not reveal any significant differences between groups in flexion (46±13º siPNB vs. 45±16º cPNB, p=0.74), extension (56±14º siPNB vs. 49±20º cPNB, p=0.26), radial deviation (18±7º siPNB vs. 17±6º cPNB, p=0.57), nor ulnar deviation (20±10º siPNB vs. 25±7º cPNB, p=0.28). Patients from each group also scored similarly on patient-reported outcome measures (PROMs): DASH (15±26 siPNB vs. 16±16 cPNB, p=0.93), DASH Work Module (11±28 siPNB vs. 28±40 cPNB, p=0.59), PRWE Pain (13±13 siPNB vs. 12±4 cPNB, p=0.98), PRWE Function (8±16 siPNB vs. 10±16 cPNB, p=0.91), PRWE Total (23±32 siPNB vs. 23±16 cPNB, p=0.98), BCTQ Symptom Severity (1±1 siPNB vs. 2±1 cPNB, p=0.24), and BCTQ Functional Status (2±1 siPNB vs. 2±1 cPNB, p=0.90).

CONCLUSION

Patients receiving continuous brachial plexus block (cPNB) reported similar opioid use and pain scores when compared to patients who received a single-injection block (siPNB). Both groups

also had similar functional outcomes, PROM scores, and excellent pain control, suggesting that both anesthetic METHODS remain viable options for open reduction and internal fixation of distal radius fractures.

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Use of Virtual Reality in Emergency Room Hand Procedures

Abstract Presenter
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INTRODUCTION: Emergency department (ED) minor procedures can often be distressing and anxiety-provoking, especially when patients are forced to watch themselves being operated on. The PURPOSE of this study was to determine whether virtual reality (VR) can help improve pain and anxiety related to ED room hand procedures on adults and ultimately improve the patient experience. We hypothesized that VR will significantly improve patient pain, anxiety, and overall satisfaction.

METHODS: This was an IRB-approved, interventional study at a Level I trauma center evaluating 20 adult patients in the ED requiring minor hand procedures. After obtaining informed consent, patients had an Oculus Quest 2 headset applied prior to injection of local anesthetic and were given the ability to choose an immersive 3D experience. Pain, anxiety, and satisfaction levels were measured using 10-point Likert scale questions before application of the VR headset and after the procedure was completed. Data was analyzed using paired sample t-tests.

RESULTS: Patients with VR reported a significant reduction in mean anxiety scores during the

procedure compared to prior to the procedure (1 vs. 3.75, $p < 0.001$). There was no significant change in mean pain scores (8 vs. 7.50, $p = 0.16$), and all 20 patients strongly agreed that VR helped them relax throughout the procedure (mean = 10). Furthermore, all patients reported high overall satisfaction levels with VR and would recommend the experience to other patients (mean = 10). 13 patients (66.67%) reported never having used a VR headset prior to this study.

CONCLUSION: This study demonstrates that VR is an underutilized intraoperative tool that enhances the overall patient experience during minor hand procedures in the ER. By engaging multiple senses, VR successfully distracts patients to reduce anxiety and control pain levels. Patients with VR are also more cooperative and relaxed, which makes minor procedures easier to perform. Given the very low risk and accessibility of this technology, VR is a valuable adjunct when performing minor procedures in the ER.

A novel multimodal biosensor detects pressure elevation, decreased capillary blood flow, and decreased muscle tissue oxygenation in a porcine balloon compression model of hindlimb compartment syndrome.

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BACKGROUND: Compartment syndrome (CS) remains difficult to diagnose early in its clinical course. Pressure transducer catheters have been used to directly measure intercompartmental pressure (ICP), but this method is unreliable, with a false positive rate of 35%. We have previously used intramuscular near infrared spectroscopy (NIRS) to detect changes in tissue oxygen saturation (StO2) in response to increasing ICP using a novel implantable probe. However, measuring StO2 may not be sufficient to identify CS in the clinical setting. Here we present a novel, implantable probe capable of simultaneous measurement of ICP, StO2, and microvascular flow velocity in a porcine model of acute CS.

METHODS: The intra-tissue device includes a flow-sensing component consisting of a resistive heater and 4 thermistors, a StO2-measuring component utilizing NIRS, and a high sensitivity pressure-sensing component. This device also contains a small battery and a BluetoothTM chip which allows connection to a smart device. We deployed this device in a porcine model of acute CS. Sensors were placed via stab incision into the muscle of the anterior compartment of the porcine hindlimb alongside a balloon and traditional pressure transducer catheter. The balloon volume was increased by 2 cc every minute until the ICP (as measured by the pressure transducer) was greater than 30mmHg above the mean arterial pressure (MAP). Pressure was maintained for 20 minutes (short-term) or 3 hours (long-term) before the volume

was removed by 2 cc every minute. During the period of elevated ICP, volume was intermittently added by 1 cc to maintain the desired ICP.

RESULTS: We tested this device on 2 pigs and 3 hindlimbs over two separate days. One long-term and two short-term experiments were completed. Increased balloon volume corresponded with increased ICP, as measured by both the pressure transducer and our novel device. Increases in pressure corresponded with declines in StO2 and microvascular flow velocity. These findings were consistent across short-term and long-term experiments.

CONCLUSIONS: As a balloon in the anterior compartment of a porcine hindlimb was inflated, the novel multimodal sensor reliably detected pressure elevation and corresponding reversible reductions in microvascular flow rate and tissue oxygenation. This study substantiates our basic understanding of compartment syndrome pathophysiology and will facilitate moving beyond the flawed concept of isolated assessment. In the future, measurement of not only pressure, but also of muscular blood flow and oxygen delivery using this single probe may improve our ability to detect CS with high sensitivity and specificity.

Peripheral Nerve Injury as Treatment for Muscle Spasticity: Understanding Mechanisms and Improving Surgical Interventions

Abstract Presenter
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PURPOSE: Muscle spasticity is defined as a velocity-dependent hyper-excitability of the stretch reflex leading to a syndrome of hypertonia, hyperreflexia, and involuntary spasms. Muscle spasticity is estimated to affect 12 million people globally and can interfere with activities of daily living and contribute to pain and contractures. Hyperselective neurectomy (HSN) is a surgical intervention that has been demonstrated to durably reduce spastic muscle tone in the upper limb with minimal loss in long-term functional muscle strength. However, the mechanisms underlying this treatment effect are poorly understood. Recent evidence suggests that deafferentation of the stretch reflex at the spinal cord level may play a significant role. We hypothesize that nerve crush or transection with primary epineural repair will effectively leverage this mechanism while offering additional benefits such as reduced operative time and

patient morbidity. This study aimed to compare these modalities against HSN in a rodent model of spinal cord injury to assess their efficacy in reducing spastic muscle tone.

METHODS: A total of 23 Male Lewis rats underwent complete spinal transection at the T8/T9 level. Six weeks following spinal cord injury, rats were randomized into 5 groups: sham surgery (n=5), transection without repair of the tibial nerve (n=5), transection with primary epineural repair of the tibial nerve (n=5), crush injury to the tibial nerve (n=4), and HSN of the lateral and medial gastrocnemius and soleus muscles (n=4). Muscle resistance to varying degrees and velocity of ankle dorsiflexion was measured with a custom ankle resistance meter immediately before and at 12 weeks following hindlimb surgery. Modified-Ashworth scale (MAS) was assessed by two blinded, independent raters at 12 weeks in bilateral hindlimbs. One-way ANOVA and Tukey post hoc statistical analysis was performed.

RESULTS: At 12 weeks following hindlimb surgery, both nerve transection without repair and transection with primary repair demonstrated significantly reduced velocity-dependent resistance (mean reduction -0.14N, p=0.01 and -0.10N, p=0.03 respectively) and muscle resistance at mid-range ankle dorsiflexion (mean reduction -0.11N, p=0.02 and -0.15N, p=0.006) when compared to sham. MAS scores were also significantly lower in the treated hindlimb after transection without repair (mean difference -2.00, p=0.007) and transection with primary epineural repair (mean difference -2.20, p=0.003) when compared to sham. In contrast, nerve crush and HSN did not demonstrate reductions in spastic tone.

CONCLUSIONS: Tibial nerve transection with primary epineural repair resulted in significant long-term reduction in spastic muscle tone in a rodent model of spinal cord injury. Peripheral nerve transection with primary epineural repair may offer a more efficient and effective surgical option for treatment of muscle spasticity when compared to hyperselective neurectomy.

The Association between Lymphedema and Autoimmunity: A Large Case Control Study

Abstract Presenter
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BACKGROUND: Despite the emerging evidence highlighting the role of immune responses in the development of cancer related lymphedema, there is lack of data on the role of autoimmune reactions in the pathophysiology of lymphedema. The PURPOSE of this large case control study was to investigate the association between a wide range of autoimmune diseases and lymphedema development after axillary lymph node dissection (ALND).

METHODS: Patients who received ALND at a tertiary cancer center between 1995 and 2023 were included. Demographic data, chemotherapy and radiation history, lymphedema development after ALND, and history of preexisting autoimmune disorders were analyzed.

RESULTS: A total of 13,670 patients aged 49.0±10.2 with a mean follow-up time of 88.9±65 months were included. 1381 patients had one or more preexisting autoimmune disorders (10.1%) and lymphedema developed in 1056 patients (7.7%). Lymphedema development after ALND was significantly associated with one or more autoimmune diseases (OR 1.9, 95% CI 1.6-2.2, p<0.0001). The association was strongest for autoimmune disorders involving the skin (OR 2.4, 95% CI 1.5-3.7, p<0.0001), endocrine disorders (OR 2.0, 95% CI 1.6-2.5, p<0.0001) and rheumatic disorders (OR 1.5, 95% CI 1.1-2.0, p=0.006). Preexisting diagnoses of atopic dermatitis (OR 5.5, 95% CI 2.4-12.0, p<0.0001), diabetes (OR 2.2, 95% CI 1.7-2,8, p<0.0001), grave's disease (OR 1.9, 95% CI 1.1-2.9, p=0.009) and rheumatoid arthritis (OR 1.5, 95% CI 1.0-2.2, p=0.042) were highly predictive of lymphedema development following ALND. These findings remained stable in multivariable analyses after adjustment for age, gender, ethnicity, BMI, radiation and chemotherapy history.

CONCLUSION: This is the first and largest study to date to investigate the link between preexisting autoimmune conditions and lymphedema development. Our analysis demonstrated significant autoimmune comorbidity of patients with cancer-related lymphedema, suggesting that autoimmunity might play a role in the pathophysiology of lymphedema development after ALND.

Investigating Predictors of Patient-Directed Discharge in Hand Infection Hospitalizations

Abstract Presenter
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INTRODUCTION: Patients who leave the hospital prior to completing recommended medical treatment have elevated readmission and mortality rates compared to conventionally discharged (CD) patients (1). Patients with substance use disorders cite staff interactions, withdrawal symptoms, and hospital restrictions as reasons for patient-directed discharge (PDD) (2). Adequate housing and social support may also play an important role in patient experience and health outcomes (3). The aim of this retrospective review was to provide insight into the factors that led to PDD in patients admitted with hand infections.

METHODS: A retrospective review was conducted of Emergency Department (ED) consults for adult hand infections at an urban safety net hospital over the study period of 2021 to 2022. Patients were surveyed on race, intravenous drug use (IVDU), and housing status. Information regarding inpatient addiction care consults was also collected. In this study, we utilized the term "unstable housing" to encompass a wide range of living situations including homelessness, temporary housing arrangements, shelter stays, and Single Room Occupancy (SRO) dwellings. Patients who discharged themselves against medical advice (AMA) or were absent without leave (AWOL) were said to have undergone PDD. A chi-squared test was performed to examine the association between these factors and PDD. Risk Ratios (RR) were also calculated.

RESULTS: 131 patients met the inclusion criteria. The mean age was 43.4. 67.2% of patients had unstable housing, 71% lived alone, and 54.2% had IVDU. 27.5% of discharges were PDD. Patients with IVDU were 4.2 times more likely to undergo PDD compared to non-IVDU (P=.0060). Patients living alone were 4.5 times more likely to undergo PDD than those living with family, friends, or strangers (P=.0085). Those with unstable housing were 3.9 times more likely to undergo PDD compared to housed patients (P=.0060). There was no significant relationship between race or inpatient addiction care team assessment on PDD.

CONCLUSION: Patients with housing insecurity, living alone, or IVDU are more likely to undergo PDD. These findings underscore opportunities for the healthcare system to consider patients' background information during seemingly straightforward hospital admissions. Further studies should identify why these populations are more prone to PDD, so more targeted interventions could be utilized to reduce recidivism and improve outcomes.

REFERENCES:

(1) Stearns CR, Bakamjian A, Sattar S, Weintraub MR. Discharges Against Medical Advice at a County Hospital: Provider Perceptions and Practice. J Hosp Med. 2017 Jan;12(1):11-17. doi: 10.1002/jhm.2672. PMID: 28125826.
(2) Simon R, Snow R, Wakeman S. Understanding why patients with substance use disorders leave the hospital against medical advice: A qualitative study. Subst Abus. 2020;41(4):519-525. doi: 10.1080/08897077.2019.1671942. Epub 2019 Oct 22. PMID: 31638862.
(3) Pollini RA, Paquette CE, Drvar T, Marshalek P, Ang-Rabanes M, Feinberg J, Haut MW. A qualitative assessment of discharge against medical advice among patients hospitalized for injection-related bacterial infections in West Virginia. Int J Drug Policy. 2021 Aug;94:103206. doi: 10.1016/j.drugpo.2021.103206. Epub 2021 Mar 23. PMID: 33765516; PMCID: PMC8373672.

Septic Wrist or Wrist Inflammation? A 19-Year Review

Abstract Presenter
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BACKGROUND: The existing diagnostic criteria for septic wrist are non-specific and patients with non-infectious etiologies risk undergoing unnecessary surgeries. This study aimed to identify predictive parameters to differentiate septic wrist from other etiologies.

METHODS: An IRB approved retrospective review was conducted on patients with a presumed diagnosis of septic wrist presenting to our institution between 2003 and 2022. Patients were excluded if they did not undergo arthrocentesis or open drainage and lavage or did not receive a final diagnosis. Bivariate and multiple regression analyses were performed to identify correlations between septic wrist and comorbidities (autoimmune diseases, immunosuppression, inflammatory arthritis, IV drug use, smoking), penetrating trauma, imaging evidence of septic wrist, serum uric acids, synovial fluid analysis, blood culture, and inflammatory markers (ESR, CRP, and WBC). A subgroup comparison was also conducted between septic wrist and crystalline arthropathy using the same parameters.

RESULTS: Two hundred and sixty-seven patients were identified, with 135 (46 females and 89 males) satisfying the inclusion criteria. The average age was 61.6±16.5. The median length of hospitalization was 6[7] days, with a follow-up of 1[3] months. Eighty-five (63%) patients had septic wrist confirmed with Gram stain/culture, while 50 (37%) patients received alternative diagnoses including crystalline arthropathy (64%), cellulitis/tenosynovitis/abscess (18%), exacerbation of osteoarthritis (6%) or rheumatoid arthritis (2%), and tendon/ligament injury (8%). Concomitant infection of septic wrist and crystalline arthropathy was identified only in 1 patient (0.7%). Arthrocentesis was performed in 107 (79.3%) patients and open drainage and lavage in 90 (66.7%). Four (3.8%) patients received suboptimal arthrocentesis, as reflected by insufficient fluid volume in contrast to the significant purulence observed during open drainage . Out of the 50 patients who received alternative diagnoses, 12 (24%) underwent open drainage. Bivariate analyses revealed correlations between septic wrist and positive blood culture ($p<0.0001$), elevated synovial WBC ($p=0.04$), signs of joint effusion, thickened synovium, or soft tissue edema on CT/MRI ($p=0.03$), negative synovial crystals ($p<0.0001$), active smoker ($p=0.04$), and prior history of septic arthritis ($p=0.02$). However, only negative synovial crystals ($p=0.007$) were found to significantly correlate with septic wrist on multiple regression analysis. In the subgroup analysis comparing septic wrist to crystalline arthropathy, negative synovial crystals ($p=0.008$) and positive blood culture ($p=0.01$) were both identified as significant predictors of septic wrist.

CONCLUSION: The high percentage of non-septic wrist patients undergoing surgery highlights the inadequacy of diagnostic approaches. Image-guided arthrocentesis should be performed in all patients with suspected septic wrist and can minimize technical errors associated with a blind approach. Elevated synovial WBC alone should not prompt an open drainage if crystals were present.

Getting Out of Hand? The Association of Opiate Use with Soft Tissue Infection: A Nationwide Readmissions Database Analysis

Abstract Presenter
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PURPOSE: The opioid epidemic has attracted a lot of attention in recent years, particularly its associated mortality. However, management of this growing population remains to be challenging, and the morbidity of opioid use related to plastic surgical practice and the economic burden to the health system is under-researched. Our practice has observed more hand surgery consultations in the context of opioid use (OU) that mirrors this growing opioid epidemic. Injection drug use has been shown to be associated with the need for greater healthcare utilization. This study aimed to quantify the national burden of hand morbidity from upper extremity infections and outcomes with respect to opioid use.

MATERIALS AND METHODS: All primary hospitalizations for upper extremity soft tissue infections (UEI) in the nationwide readmission database (2015-2019) were included. Patients were stratified by history of OU. Demographics, hospital characteristics, procedures during admission, length of stay, costs, and readmissions were compared.

RESULTS: A total of 328,385 patients were identified of which 50,918 (15.5%) had a diagnosis of opiate use disorder. The OU cohort was younger (38 years vs. 53 years, $P<0.001$), mostly male (62% vs 59%, $P<0.001$), and more likely to be publicly insured (64% vs 54.8%, $P<0.001$). OU patients were more likely to undergo incision and drainage procedures (OR: 1.23, $P<0.001$), undergo more procedures overall during admission (0.18 procedures, $P<0.001$), have an unplanned 30-day readmission (OR: 1.33, $P<0.001$), longer length of stay (0.22 days, $P<0.001$), and incurred a higher incremental cost of admission (USD $1,435, $P<0.001$).

CONCLUSIONS: Patients with history of OU are more likely to require more complex care for UEIs along with greater unplanned readmissions, thereby imposing a higher relative cost to the

health system. These RESULTS portend that OU patients may have different physiological and sociocultural challenges from repeated injection in the upper extremity that increase their likelihood of UEI and make it more difficult to treat them. These findings underscore the economic burden notwithstanding the often discussed increasing mortality from OU and importance of studying and promoting strategies to address the epidemic. By pointing out this serious problem, we challenge medical practitioners, policy makers, and hospital administrators to propose strategies that can improve care, such as decreasing readmissions. If we can understand this population better, and anticipate their hurdles to care, we can better take care of these patients.

Effects of Autoimmune Rheumatic Disease on Carpal Tunnel Release Outcomes: A Single-Institution Propensity-Matched Analysis

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INTRODUCTION: Few studies have investigated the outcomes of carpal tunnel release (CTR) in autoimmune rheumatic disease patients. Our aims were to 1) compare CTR complication and revision rates in this population to controls and 2) determine predictive factors associated with worse outcomes.

METHODS: A retrospective study was conducted to evaluate CTR outcomes in patients with and without autoimmune rheumatic disease at the Cleveland Clinic from 2010 to 2020. Demographic information, comorbidities, clinical exam findings, and electromyography were collected. The primary outcome was postoperative complication rate. Secondary outcomes were revision surgery and improvement in Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH) scores. Propensity-score matching was used to assemble cohorts with similar baseline characteristics.

RESULTS: A total of in 1,037 patient charts were collected. After propensity score matching, there were 448 patients in the autoimmune and control cohorts each. Complication rates in the rheumatic cohort (n = 131, 29.2%) were significantly higher than the control cohort (n = 25, 6.5%) ($p<0.001$; RR, 5.24). Postoperative pain/paresthesia was the most common complication (n = 108, 82.4% versus n = 12, 48%, $p < 0.001$; RR, 9), followed by surgical site infection (n =

17, 13% versus n = 6, 24%; p = 0.02; RR, 2.83), surgical reoperation (n = 13, 9.9% versus n = 3, 12%; p = 0.002; RR, 4.33), and prolonged edema (n = 9, 6.9% versus n = 1, 4%; p = 0.01; RR, 9). Wound dehiscence (n = 11, 8.4% versus n = 6, 24%; p = 0.20; RR, 1.83) was not significantly different. Revision rates were significantly higher in the rheumatic group (n = 21, 4.7% versus n = 7, 1.6%, p = 0.007). Improvement in DASH scores were not significantly different (30.5 versus 25.3, p=0.11).

CONCLUSION: Complication and reoperation rates are higher in autoimmune rheumatic disease patients without significant differences in DASH scores after CTR.

Close

Anatomic Relationship of Hand Intrinsic Musculature in Saddle Syndrome: A Cadaveric Study

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PURPOSE: Saddle syndrome is thought to be caused by post-traumatic adhesions at the interosseous-lumbrical junction (ILJ) distal to the deep transverse metacarpal ligament (TML) at the metacarpophalangeal joint (MCPJ). Adhesions in this location can impinge on the TML or MCPJ during intrinsic muscle activation, causing pain and restricted range of motion. Given limited indications for surgical exposure of the intrinsics, detailed knowledge of this anatomy is lacking. The PURPOSE of this study was to investigate the intrinsic musculotendinous anatomy surrounding the metacarpal head utilizing cadaveric dissections, and to evaluate the dynamic relationship of the ILJ and TML as it would pertain to the diagnosis of saddle syndrome.

METHODS: Ten fresh frozen, matched-pair cadaver arms were used. Skin and palmar fascia were excised from the digitopalmar crease to mid-palm of the index through small fingers. The lumbrical and interosseous muscles were gently dissected within the 2nd through 4th webspaces. Bridging the ILJ and TML, we found a clear delineation of non-tendinous fibrous tissue we referred to as "pseudotendon" (PT). The following distances were measured within each webspace using digital calipers and 2.5x loupe magnification: (A) distal edge of TML to proximal edge of PT, (B) distal edge of TML to intersection of the lumbrical and interosseous tendons or "true tendon" (TT). These were measured with the finger in full extension and in intrinsic(+), achieved by manually positioning the MCPJ in 90° flexion and tensioning the lumbrical tendon with tissue forceps. A value of zero was used for no measurable gap between structures.

RESULTS: TT to TML distance in both neutral and intrinsic(+) was largest in the 2nd webspace

and progressively decreased towards the ulnar digits. In intrinsic(+), PT to TML distance was 0mm at all webspaces for every specimen. When moving from neutral to intrinsic(+), TT to TML distance decreased more in the 3rd (63%) and 4th (59%) compared to the 2nd (48%) webspace, consistent with the trend towards a smaller ILJ to TML gap in the ulnar digits. The lumbricals generally had consistent anatomy with short, broad tendinous insertions fusing with the interossei tendons before entering the extensor hood. However, two specimens had 2nd lumbrical muscles with longer, thinner tendons at the ILJ.

CONCLUSIONS: We are the first to describe a fibrous pseudo-tendinous region at the ILJ lacking the organization and thickness of the proper interosseous and lumbrical tendons. In the intrinsic(+) position, this tissue abutted the TML in all fingers of every specimen. If this tissue were to scar down following hand trauma and cause a more proximal tissue bridge between the interosseous and lumbrical tendons, TML impingement would occur with intrinsic muscle activation. Furthermore, our evaluation demonstrated a progressively decreasing ILJ to TML gap towards the ulnar digits. However, we found the largest gap loss when moving the finger from neutral to intrinsic(+) at the 3rd webspace, which may support the predilection for saddle deformity within the 3rd webspace in previous reports. Further anatomic studies could help better discern if this phenomenon exists on a larger scale.

Role of Neurectomy in Four-Corner Arthrodesis and Proximal Row Carpectomy: A Review of the Current Evidence

Abstract Presenter
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PURPOSE: Proximal Row Carpectomy (PRC) and scaphoid excision with four-corner fusion (4CF) are common motion-preserving, salvage procedures for the treatment of radiocarpal arthritis resulting from scapholunate or scaphoid nonunion advanced collapse. Denervation of the anterior and posterior interosseous nerves (AIN and PIN) has also been described for treatment of severe osteoarthritis. While PIN denervation is performed in combination with PRC or 4CF for treatment of degenerative wrist arthritis, the exact role of neurectomy remains unknown. This study systematically reviews the contribution of PIN neurectomy to PRC and 4CF surgeries in improving postoperative pain and functional outcomes of patients with degenerative arthritis of the wrist.

METHODS: A literature search was conducted in the Ovid MEDLINE, Ovid EMBASE, and Scopus databases to extract articles published through December 2022. The following keywords were employed in the search: "Four Corner Arthrodesis" OR "Four Corner Fusion" OR

"Proximal Row Carpectomy" AND "Neurectomy" OR "PIN Neurectomy" OR "Wrist Neurectomy" AND "Quality of Life" OR "Wrist Function." Original articles were included if they met the following criteria: (1) observational, retrospective, or prospective human design, (2) reported outcomes on patients who had undergone PRC or 4CF with PIN or AIN neurectomy, and (3) reported data on objective or subjective clinical RESULTS of such a combination. Extracted data comprised study size, indication for surgery, surgical technique, type of neurectomy performed, presence of control group, duration of follow-up, and reported objective and subjective outcomes.

RESULTS: A total of 8 studies met inclusion criteria. The majority (5) were retrospective in nature, while one was prospective, and two were case series. Five examined PRC alone, two examined 4CF, and one examined both PRC and 4CF. Standardized score reporting included Disabilities of Arm, Shoulder and Hand (DASH; evaluates function of upper extremity, not specific to the hand/wrist), Pain-Related Wrist Evaluation (PRWE; specific to wrist function), Mayo Wrist Score, and range of motion. Only one of four studies examining rates of conversion to total wrist arthrodesis (TWA) found that neurectomy was associated with decreased rates of reoperation at 8.1 year follow-up. PRC with PIN neurectomy was associated with improved pain in one retrospective case-control study, while two studies did not find improvement in pain or ROM following isolated PIN neurectomy. Regarding 4CF, no studies examining the effect of neurectomy on pain with an adequate control group were identified.

CONCLUSION: Our literature review revealed a limited number of studies examining the role of neurectomy in 4CF and PRC. The RESULTS of these studies may be limited by the heterogeneity of methodology and reported outcomes as well as lack of control groups. Only one comparative study was found, suggesting no improvement from the addition of PIN neurectomy to PRC. The majority of studies identified did not demonstrate a decreased rate of conversion to TWA following neurectomy. Future case-control studies are needed to elucidate the benefit of neurectomy in PRC and 4CF.

Outcomes of Internal Brace Augmentation Technique for Scapholunate Ligament Repair

Abstract Presenter
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PURPOSE: Injury to the scapholunate (SL) interosseous ligament (SLIL) is a common cause of carpal instability. Various reconstructive procedures for SL instability have been described, yet no consensus exists regarding the optimal surgical technique. The internal brace augmentation technique, which uses a durable nonabsorbable "suture tape" to enhance stability of the tendon repair, has been utilized in a variety of ligament repair procedures. However, investigation of its

clinical outcomes in hand surgery and its more recent application for SLIL injuries is lacking. The aim of this study was to describe clinical outcomes for patients who underwent SLIL repair with internal brace augmentation.

METHODS: Following institutional review board approval, patients who underwent SLIL repair with internal brace augmentation by one of three fellowship-trained hand surgeons at a single institution were identified via database search. All patients who underwent surgery greater than one year prior to May 1, 2022 were contacted. Participating patients completed the Quick-DASH (qDASH) and Patient-Rated Wrist Evaluation (PRWE) surveys as well as rated their satisfaction with the surgery on a scale of 1 to 5. Additionally, patients were asked to return to the office for new radiographs and physical examination. Outcomes assessed were wrist range of motion, grip strength, Watson scaphoid shift test, and radiographic measurements including SL angle, SL interval, and evidence of radiocarpal arthritis. If patients could not be contacted but had wrist radiographs and a physical examination performed greater than one year post-operatively, these data were collected in the same fashion.

RESULTS: Outcome data was available for 14 SLIL repairs among 13 patients (12 male). Injuries were considered acute in 8 cases and chronic in 6 cases. Mean length of follow-up was 41 months (n=14, 17 to 64). Mean calculated qDASH and PRWE scores at latest follow-up were 6.1 (0 to 43.2) and 9.6 (0 to 65), respectively, indicating minimal to no pain or disability. The average qDASH score decreased by 32.5 points ($P<.05$) from before surgery to latest follow-up. Mean patient satisfaction with their surgery was 4.6 out of 5 (3.5 to 5). Only one patient did not feel that they returned to full functional status following surgery, although many noted minor loss of active motion in their injured wrist. Radiographic alignment of the carpal bones was maintained postoperatively. From before surgery to latest follow-up, SL gap decreased from a mean of 4.2 mm (2 to 6.7 mm) to 3.3 mm (2 to 5 mm) ($P<0.5$), and SL angle decreased from a mean of 79.5° (67° to 97°) to 67.3° (51° to 85°) ($P<0.5$). There was no radiocarpal joint space narrowing or other radiographic signs of degeneration. All Watson tests were stable.

CONCLUSIONS: Our series demonstrated that internal brace augmentation for SLIL repair is an effective technique that may provide long-term wrist stability, as evidenced by our clinical and radiographic findings. Patients are generally satisfied with RESULTS of the procedure and are able to return to prior functional status, although minor loss of motion in the injured wrist should be anticipated.

Comparison of Low Dose Computed Tomography to Conventional Dose Computed Tomography in the Evaluation of Intraarticular Distal Radius Fractures

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BACKGROUND: Distal radius fractures (DRFs) are the most common upper extremity fracture and require surgical fixation when the fracture is intraarticular. Preoperative CT has emerged as a surgical planning tool to evaluate intraarticular DRFs. While CT affords additional detail in periarticular fractures, it exposes patients to higher doses of radiation than standard radiographs. Our aim is to develop a low dose CT (L-CT) protocol that can be used to decrease the amount of radiation exposure in patients with intraarticular DRFs while still providing a scan with adequate detail to guide surgical decision-making.

METHODS: A single institution prospective study, powered to 41 observations, was conducted on patients with intraarticular DRFs who underwent closed reduction and application of a below-elbow plaster splint that would otherwise undergo CT scan of the wrist as a part of their diagnostic work-up. Observations were defined as total measurements taken by reviewers, with each view undergoing 44 measurements. Patients underwent two CT scans: our standard dose CT scan and another with a 10x dose reduction. Four reviewers recorded articular step and gap measurements in the sagittal and coronal images.

RESULTS: A total of 11 patients were enrolled in the study, which included 7 females and 4 males. The mean age of the study population was 55 years (SD = 20.1). There was a total of 4 reviewers: one attending surgeon, two resident physicians, and one medical student. When comparing low and conventional-dose CTs, there were no significant differences in articular step and gap measurements across all 4 reviewers.

CONCLUSION: This study demonstrated that a L-CT protocol provides comparable imaging as a conventional dose CT (C-CT) without significant diagnostic decay in the setting of DRFs. This comes with the added benefit of a 10-fold reduction in radiation exposure to patients. These RESULTS suggest that L-CT is an opportunity to reduce effective radiation in patients while also providing clinicians with beneficial pre-operative imaging for intraarticular DRFs.

Sex Differences in Thumb Carpometacarpal Osteoarthritis Randomized Clinical Trials: A Systematic Review, and a Meta-Analysis

Abstract Presenter
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PURPOSE: The thumb carpometacarpal joint is the second most affected osteoarthritic joint in the hand, while also being the most operated upon (1). Both epidemiologic and clinical studies demonstrate a female predominance in the prevalence of thumb carpometacarpal osteoarthritis (CMCOA) (2, 3). We aimed to explore sex differences in thumb CMCOA treatment selection, outcomes, adverse events, and study design in existing RCTs.

METHODS: In accordance with PRISMA-E 2012 criteria, we searched MEDLINE, Embase, Cochrane CENTRAL, and CINAHL to locate adult thumb CMCOA RCTs. Studies not in English nor assessing isolated thumb CMCOA were excluded. Following retrieval, half were screened by 2 independent reviewers. The remainder were screened in duplicate by a Machine Learning model and 1 reviewer. Full text studies were then assessed, and data was extracted by 2 independent reviewers. A meta-analysis with a random effect model on the proportion of included female patients was performed.

RESULTS: A total of 4628 studies were retrieved, and 280 underwent full-text review, resulting in 75 RCTs included, encompassing 4756 patients. 74 (98.7%) studies reported the sex of the participants. The random effect model indicated the proportion of female participants in thumb CMCOA RCTs was 88.2% [95% CI: 85.1% to 91.1%]. Exclusive female enrolment was seen in 16 RCTs (21.3%). Sex distribution in treatment arms was reported in 66 (88.0%) studies. Subgroup analysis based on sex was performed only in 4 (5.3%) studies, of which 4 (5.3%) assessed efficacy and 1 (1.3%) complication rates.

CONCLUSIONS: Sex differences are rarely explored in thumb CMCOA RCTs. Very few studies assessed sex differences in clinical outcomes, efficacy, or complication rates. Future RCTs should aim to examine differences in outcomes based on sex.

REFERENCES:

1. Batra S, Kanvinde R. Osteoarthritis of the thumb trapeziometacarpal joint. Curr. Orthop. 2007;21:135–144.
2. Armstrong AL, Hunter JB, Davis TR. The prevalence of degenerative arthritis of the base of the thumb in post-menopausal women. J. Hand Surg. Br. 1994;19:340–341.
3. Dahaghin S. Prevalence and pattern of radiographic hand osteoarthritis and association with pain and disability (the Rotterdam study). Annals of the Rheumatic Diseases 2005;64:682–687. Available at: http://dx.doi.org/10.1136/ard.2004.023564.

Comorbidities and Demographic Associations With Radial Tunnel Release

Abstract Presenter

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PURPOSE: Radial tunnel syndrome (RTS) is a painful compressive neuropathy of the the posterior interosseous nerve, often associated with by repetitive motion and manual labor. Surgical release of the PIN in the forearm is an effective treatment for these symptoms. It is common for patients with RTS to present with multiple compressive neuropathies of the upper extremity, which may be related to these same demographic or occupational factors. This study assesses the relationship between patient demographic data, occupational data, and the likelihood of radial tunnel release surgery being performed concurrently with additional procedures on the upper extremity.

METHODS: An IRB-approved, retrospective chart review was conducted of all patients who underwent radial tunnel release (RTR) for RTS at our institution between 2015 and 2021.Data were collected and analyzed from electronic medical records and billing sheets at the operating surgeon's clinic and corresponding hospitals. RTR performed prophylactically at time of radial nerve laceration repair or other nerve surgery were excluded. Descriptive statistics were computed for all study variables. Comparisons between categorical variables were compared with Chi-square or Fishers test and continuous variables were compared via Wilcoxon tests.

RESULTS: Of the764 patient records identified, 110 records (surgeries) met inclusion criteria. 55.96% were female, and 43.52% had Medicaid listed for primary insurance. The mean BMI at the time of injury was 32.92 (SD±6.63). The mean age at the time of surgery was 50.09 years (SD±11.71). Nearly all surgeries (97.27%) were diagnosed with at least one related diagnosis. The three most common were Carpal Tunnel Syndrome (82.73%), Cubital Tunnel Syndrome (50.91%) and Pronator Syndrome (35.45%). Ninety-six surgeries had a concurrent upper extremity nerve release (performed at the same time as RTR), of which 78.18% was Carpal Tunnel. There were 23 records that had concurrent upper extremity surgery (performed at the same time as RTR), with Trigger Finger Release (n=5) being the most common after the 'Other' category. Females had a significantly higher distribution of number of related diagnoses ($p=0.0117$) and number of concurrent upper extremity surgeries ($p= 0.0444$) occurring at the same time as RTR. The likelihood of having at least 1 related diagnosis was 98.36% vs 95.83%, in females vs males respectively ($p=0.5816$). There was a higher percentage of females who had a concurrent upper extremity nerve release compared to males (91.80% vs 81.25%, $p=0.1021$). There was no significant relationship between BMI nor Age with related diagnosis, concurrent upper extremity nerve decompression or surgery.

CONCLUSION: Carpal Tunnel Syndrome is the most prevalent comorbid compressive neuropathy and most common concurrent surgical procedure with RTR. A majority of patients

treated with surgical decompression of the radial tunnel underwent decompression of an additional upper extremity nerve. There is no clear effect of demographics on comorbid diagnosis, concurrent nerve decompression or surgery. The next phase of this study will be to evaluate our institutional outcomes after radial tunnel release and the effect these factors have on symptomatic relief.

Autologous Fascia Nerve Wrap as an Adjunct to Primary Epineurial Repair

Abstract Presenter
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PURPOSE: Nerve wraps may be used to bolster nerve repair sites, particularly in the case of size-mismatched coaptations or cable grafts. Although more commonly used for compressive neuropathies to prevent adhesions and recurrent stenosis, the primary goal of nerve wraps at coaptation sites is to restore epineurial continuity, thus theoretically reducing axonal escape and intraneural scar infiltration. We posit that autologous fascia has the potential to serve as an ideal nerve wrap, as it is composed of native collagen and has a composition closely resembling epineurium. Specifically, we hypothesize that autologous fascia nerve wraps will (1) readily incorporate into the epineurium at the coaptation site and (2) provide a barrier to contain regenerating axons and reduce inflammatory cell infiltration. We evaluated these hypotheses in a rat sciatic nerve transection and repair model as well as a size-mismatched sciatic-to-common peroneal nerve transfer model.

MATERIALS AND METHODS: A total of 84 Lewis rats were divided into six groups (n = 14 per group): sciatic transection with repair +/- fascia wrap (matched repair), sciatic-to-common peroneal nerve transfer +/-fascia wrap (mismatched repair), sciatic transection without repair (positive control), and sham surgery (negative control). Fascia grafts were obtained from gluteal muscles near the coaptation sites. Animals were harvested at either 4 weeks or 12 weeks post-operative for histologic evaluation of the coaptation site and evaluation of cytokine expression in the nerve and dorsal root ganglia (DRG) using ELISA.

RESULTS: At 4 weeks post-operative, groups that received fascia nerve wraps demonstrated significantly reduced expression of pro-inflammatory cytokines, TNF-α and IL-1β, at the DRG

relative to groups that underwent nerve repair alone. Additionally, fascia wrap groups demonstrated significantly greater expression of anti-inflammatory cytokines, TGF-β and IL-10, relative to nerve repair alone.

CONCLUSION: Autologous fascia wraps are a simple adjunct that can reduce inflammation in both size-matched and size-mismatched nerve coaptations. Fascia grafts are technically straightforward to harvest, ubiquitously available, and may be a useful tool in the peripheral nerve surgeon's armamentarium.

Reoperation After Thumb Metacarpophalangeal Arthrodesis

Abstract Presenter
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INTRODUCTION: Arthrodesis of the metacarpophalangeal (MP) joint of the thumb is a common procedure to treat patients with arthritis or instability. Studies reporting hardware complications and nonunion rates after thumb MP joint arthrodesis report on small sample sizes. We aim to describe the hardware complication and nonunion rate among patients undergoing thumb MP joint arthrodesis and compare the nonunion rate and time to radiographic union between 2 arthrodesis techniques.

METHODS: A database spanning 5 urban hospitals in a single metropolitan region in the United States was searched for patients that underwent thumb MP joint arthrodesis between January 1, 2004, and January 1, 2020. After reviewing patient records, we identified 122 thumbs that underwent MP joint arthrodesis and had a minimum follow-up of 3 months. The primary outcome was unexpected reoperation after hardware complications and non-union. A bivariate analysis was performed to compare the nonunion rate and time to radiographic union between tension band and screw fixation arthrodesis.

RESULTS: Twenty-one out of 122 thumbs (17%) had hardware complications after MP joint arthrodesis, and 11 out of 122 thumbs (9%) developed a nonunion. Patients who underwent screw fixation arthrodesis had no events of hardware complications and subsequent hardware removal. There were no significant differences between the tension band arthrodesis group and the screw fixation arthrodesis group in terms of the nonunion rate (9/65 vs 2/45) and time to radiographic union (108 days vs 90 days).

CONCLUSION: Although the used surgical technique for thumb MP joint arthrodesis should be decided on an individual basis, our data suggests that screw fixation has fewer hardware complications and, as a consequence, fewer reoperations.

Evaluating YouTube Video Quality in Trigger Finger Release Patient Education

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INTRODUCTION: The most popular video hosting website and overall second-most visited website is YouTube - a resource commonly used by patients. Trigger finger, also known as stenosing tenosynovitis, has a prevalence of approximately two percent in the general population. However, the quality, reliability, and comprehensiveness of relevant information available on YouTube regarding surgical treatments have not been studied. Therefore, the PURPOSE of this study is to assess the quality of YouTube videos discussing trigger finger release. The effects of video category, author type, and search term on video quality were also investigated.

METHODS: In February 2023, three search terms were utilized to identify videos discussing trigger finger release on YouTube: "open trigger finger release surgery", "percutaneous trigger finger release surgery", and "steroid injection trigger finger". The top 50 video RESULTS for each search term were recorded. Two trained reviewers used the modified Ensuring Quality Information for Patients (EQIP) criteria to systematically score each video on a scale of 0 to 27 with consideration of video content, identification, and structure. Interrater reliability was assessed using the Kappa interrater agreement score, where a score of 1 represents perfect agreement between raters. Videos with a score of 13 or above, representing the 75th percentile, were considered high-quality. The average view count, length, and EQIP scores were compared based on search terms and authorship.

RESULTS: After removing duplicates, a total of 103 unique videos were assessed with an average score of 10.53 (SE 0.340) overall. The Kappa interrater agreement score was 0.886, which signifies strong agreement. The average video length was 4.05 minutes and the average view count was 100,065 views. "Open trigger finger release surgery" had the highest average score of 11.74 (SE 0.465), followed by "Percutaneous trigger finger release surgery" with an average score of 11.04 (SE 0.543), and "Steroid injection trigger finger" with an average score of 10.40 (SE 0.472). However, there was not a significant difference between the mean scores of the three search terms ($p = 0.163$). Physicians authored the majority of videos (79.6%) with an

average score of 10.59, of which 59.8% were orthopedic surgeons and 19.5% were plastic surgeons. Patients authored only 1.9% of all videos. There was no significant difference in scores based on physician type ($p = 0.413$) . Of all videos, only 31 had a score of 13 or greater, deeming them high-quality. Physicians authored 80.6% of the high-quality videos.

CONCLUSION: YouTube is a free, accessible resource for patients, but it contains minimal quality-control measures or peer-review processes to confirm the validity of health-education videos. This study demonstrates that high-quality YouTube videos on trigger finger release are most commonly created by physicians. Hand surgeons should be encouraged to create more educational content on YouTube in order to provide trustworthy, accessible content to the patient population. Given that trigger finger typically presents in middle aged patients, surgeons should consider tailoring their educational content to this audience. Further, older audiences are more susceptible to misinformation online, so promoting trusted educational resources is especially important.

Free Flap Reconstruction of Soft Tissue Defects of the Elbow: A Fifteen-Year Institutional Experience

Abstract Presenter
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PURPOSE: The elbow is a complex joint that is vital for proper function of the upper extremity. Reconstruction of soft tissue defects over the joint space remains challenging, and outcomes following free tissue transfer remain underreported in the literature. The purpose of this study was to evaluate the rate of limb salvage, joint function, and clinical complications following microvascular free flap coverage of the elbow.

METHODS: This retrospective study utilized surgical logs of the senior authors to identify patients who underwent microvascular free flap elbow reconstruction between January 2007 and December 2021. Patient demographics and medical history were collected from the medical chart. Operative notes were reviewed to determine the type of flap procedure performed. The achievement of definitive soft tissue coverage, joint function, and limb salvage status at one year was determined from post-operative visit notes.

RESULTS: Twenty-one patients (14 male, 7 female, median age 43) underwent free tissue transfer for coverage of soft tissue defects of the elbow. The most common indication for free tissue transfer was traumatic elbow fracture with soft tissue loss [n = 12, (57%)]. Among the 21 free flaps performed, 71% (n = 15) were anterolateral thigh flaps, 14% (n = 3) were latissimus

dorsi flaps, and 5% (n = 1) were transverse rectus abdominis flaps. Flap success was 100% (n = 21). At one year, all 21 patients achieved limb salvage and definitive soft tissue coverage. Of the 17 patients with functional data available, 47% (n = 8) had regained at least 120 degrees of elbow flexion/extension.

CONCLUSION: Microvascular free flap reconstruction is a safe and effective method of providing definitive soft tissue coverage of elbow defects, as evidenced by high rates of limb salvage and functional recovery following reconstruction.

Diagnosing Amyloidosis Following Carpal Tunnel Release: A Systematic Review

Abstract Presenter
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PURPOSE: Carpal tunnel syndrome is one of the earliest manifestations of amyloidosis. Consequently, there is an interest in risk-stratifying patients at the time of carpal tunnel release (CTR) to predict who will develop systemic manifestations of amyloidosis. The primary objective of this systematic review was to examine the factors associated with the diagnosis of amyloidosis following CTR, and secondarily, assess the incidence of amyloidosis following CTR.

METHODS AND MATERIALS: A systematic review was performed using PubMed, Scopus, and Web of Science, following modified Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA). Two independent reviewers screened 983 studies and 23 studies evaluating the diagnosis of amyloidosis following carpal tunnel release were included. Case series and case studies were excluded. Data on patient factors associated with amyloidosis diagnosis, amyloid subtypes, tenosynovial biopsies, study design, and patient demographics were collected.

RESULTS: Factors significantly associated with amyloidosis diagnosis following CTR were older age (79% of studies), >1 CTR (66.7% of studies), and male sex (75% of studies). The reported incidence of amyloidosis following carpal tunnel release was 3.8% (IQR: 0.6% - 10.9%). The median sample size was 114 (IQR: 83 – 217.5) CTR patients, and the median age of the patient cohorts was 66.7 (IQR: 57 – 71.3). In the 16 studies that examined tenosynovial biopsies during CTR, 11.6% (IQR: 5.1% - 25.6%) of biopsies were positive for amyloid. Of the (n=11) studies that reported follow-up, the median follow-up length was 8 years (IQR: 7.9 – 15)

CONCLUSION: Most studies found that older age, male sex, and >1 CTR are associated with a higher incidence of amyloidosis following CTR. The absolute incidence of amyloidosis diagnosis following CTR varies depending on patient selection criteria, but the development of appropriate risk stratification may help diagnose patients in earlier stages of amyloidosis.

Implications of Prophylactic Fasciotomy Following Upper Extremity Revascularization

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PURPOSE: Acute limb ischemia (ALI) is a vascular emergency requiring immediate treatment via surgical revascularization to preserve the limb, as prolonged ischemia can cause ischemia-reperfusion injury (IRI) leading to compartment syndrome (CS). If CS can be anticipated, revascularization can be immediately followed by a prophylactic fasciotomy to limit additional injury. While the extent of IRI has been shown to be influenced by both the magnitude and duration of ischemia, there is currently limited literature on the indications for prophylactic fasciotomy following revascularization for ALI, especially for the upper extremity. The objective of this study is to investigate the incidence of CS after upper extremity revascularization and compare the outcomes following prophylactic versus therapeutic compartment release.

METHODS: Patients within the Cleveland Clinic Healthcare System who received an upper extremity revascularization for acute limb ischemia between 2003 and 2022 were reviewed. Patients who did not show signs of CS but underwent fasciotomy due to high risk of developing CS were considered to have had a "prophylactic" fasciotomy, while those who underwent fasciotomy after manifesting CS symptoms were classified as having a "therapeutic" fasciotomy. Demographic information, medical history, ischemia duration and etiology, available physical exam findings, length of hospitalization, and complications were recorded. Ischemia duration was compared between the prophylactic and therapeutic fasciotomy groups using Mann-Whitney U tests, and Fisher's exact tests were used to compare complications rates between the groups. Pearson's test was used to find correlations between ischemia time and outcomes.

RESULTS: A total of 384 patients underwent revascularization for ALI during the study period. Fifty-one patients of these patients were reviewed. The average age of the patients 67±2.3 years, and 49% were female. The etiology of limb ischemia included arterial thrombus or embolus (92%), aneurysm repair (4%), or iatrogenic aortic dissection from a previous intervention (4%). Of these, 11 patients (24%) received a prophylactic fasciotomy, and 11 (24%) developed

compartment syndrome intraoperatively or within 24 hours of the revascularization procedure and subsequently underwent a therapeutic fasciotomy. The median ischemia time was 16 hours (IQR=22) for the prophylactic group and 8 hours (IQR=8) in the therapeutic group (p=0.008). The patients who underwent revascularization but did not receive a fasciotomy (27) had an ischemia time of 8 hours (IQR=19), suggesting a trend toward a difference with the prophylactic fasciotomy group (p=0.08). The median length of hospitalization for the prophylactic and therapeutic groups was 10 (IQR=16) and 17 (IQR=13) days, respectively (p=0.58). For all patients, length of hospitalization positively correlated with ischemia duration prior to revascularization (r=0.35, p=0.14). The complications in the prophylactic and therapeutic groups respectively included hematoma (9% vs. 18%, p=0.5), muscle necrosis (9% vs. 36%, p=0.16), and limb amputation (9% vs. 18%, p=0.5), showing a higher complication rate in the therapeutic group.

CONCLUSION: Ischemia time is a significant factor in the decision to perform upper extremity prophylactic fasciotomy following revascularization. Prophylactic fasciotomy may result in lower postoperative complication rates than therapeutic fasciotomy.

Characterization of Upper Extremity Injuries Due to Electrical Burns from 2017 to 2021

Abstract Presenter
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PURPOSE: Electrical burns to the upper extremity are the most common type of electrical burn and a preventable cause of emergency department visits. This project aims to characterize the demographic trends and common causes of upper extremity electrical burns from 2017 to 2021.

METHODS: The National Electronic Injury Surveillance System database, which surveys emergency department visits, was retrospectively queried for all electrical burns to the upper extremity from 2017 to 2021. Information about patient demographics, area of upper extremity injury, location of patient during injury, and cause of injury was gathered and analyzed.

RESULTS: There were 520 total electrical burn injuries from 2017 to 2021, which accounted for 3.3% of all burn injuries. Four hundred twenty-four (81.5%) electrical burns were in the upper extremity, primarily in the hand (49.5%) or fingers (43.9%). Patients who were male (57.3%), less than 10 years old (61.0%), or white (39.6%) sustained the most injuries. Electrical items that were most commonly responsible were electrical outlets or receptacles (20.3%), hair curlers/curling iron/clips and hairpins (12.3%), electrical wiring (6.4%), and desk supplies

(5.9%). Patients were most commonly injured in their own home (63.0%) or at school (7.1%).

CONCLUSION: This data indicates that electrical burns prompting emergency department visits occur most often at home, and children are usually the victims. Recognizing and acknowledging the factors that contribute to electrical burns can prevent them from happening and alleviate emergency department burden from these injuries.

Under-diagnosis of Post-Amputation Neuroma Formation in Disadvantaged Groups, Lower Incidence with Older Age and Comorbidities: A Cohort of Over 25,000 Patients

Abstract Presenter
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PURPOSE: Complications after major amputation can lead to requiring additional procedures, delayed recovery and decreased quality of life. Stump infection and neuroma formation, two common post-amputation complications, are analyzed in this study. Besides biological criteria such as age, sex and comorbidities, we investigated the lesser explored impact of race, socioeconomic status, insurance and the hospital care received.

METHODS: The National Inpatient Sample (NIS), a large, all-payer inpatient care database in the United States was utilized for our investigation. We relied on diagnosis-related group (DRG) codes to create a dataset of patients with musculoskeletal amputations. ICD-9 codes were subsequently used to identify neuroma formation and stump infections. Multivariate logistic regression model, controlling for a variety of relevant patient/hospital characteristics, was employed to assess the various relationships within our study.

RESULTS: The multivariate regression model predicted mostly contrasting patterns in the two complications studied. Lower socioeconomic status and non-white race was associated with a significantly higher risk of infection and lower risk of neuroma. Patients on Medicaid, in comparison to those who are privately insured, were 46% percent less likely to receive a neuroma diagnosis and 30% more likely to be diagnosed with post-amputation infection. White race was associated with 54% higher diagnosis of neuroma and 33% less of infection. In regard to the impact of older age and comorbidities, every year increase in age contributed to 2% decrease in neuroma formation and 0.5% increase in likelihood of infection post-amputation. Each added chronic condition added 5% to the risk of infection and separately analyzed, these

conditions decreased the rate of neuroma formation by at least 34%.

CONCLUSION: The observed impact of chronic conditions and age on infection and neuroma formation reflect the underlying pathophysiology and incidence of these complications. Contrarily, the relationship between socioeconomic status and rate of neuroma formation is likely due to barriers to follow-up care reflecting as lower diagnosis of neuroma formation and higher rates of infection, indicating an important need for increased surveillance in vulnerable populations towards improving post-amputation outcomes.

Inequality in the Upper Extremities: A Comprehensive Look at Disparities in Non-Traumatic Upper Extremity Pathologies

Abstract Presenter
Graham Grogan

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INTRODUCTION: Carpal tunnel syndrome (CTS), cubital tunnel syndrome (CuTS), thumb carpometacarpal (CMC) arthritis, and wrist ganglion cysts are common pathologies affecting the upper extremity. Despite their high incidence, there is a lack of comprehensive analysis regarding demographic disparities associated with these conditions. Our study aims to quantify prevalence of these conditions and treatment rates and identify any delays in management of these pathologies.

METHODS: Utilizing PearlDiver Mariner insurance claims database, the Medicare 5% national sample administrative (SAF5) dataset was analyzed for diagnosis and treatment of these common UE pathologies based on race and gender from 2015 to 2016. Inclusion criteria were records with male or female gender designations as well as racial designations of either White, Black, Asian, Hispanic, or Native American. Outcomes include diagnosis rates, treatment rates, and time from diagnosis to treatment.

RESULTS: The study included 96,811 patients of which the majority were White and female. Comorbidity burden was higher in all non-white racial groups except Native American. Diagnosis trends included lower rates of diagnoses of all pathologies except CTS in most minority groups. Males had higher rates of CTS and CuTS with lower rates of thumb CMC arthritis and ganglion cysts. Disparities in treatment offered across ethnicity were most prominent in CTS and thumb CMC arthritis, with the majority of non-White racial groups exhibiting higher odds of no treatment and lower odds of both operative and non-operative management compared to White patients. Black and Hispanic patients were most severely affected, having a degree of disadvantaged treatment in all four diagnoses. Males had unfavorable odds of treatment in all diagnoses with the exception of a higher rate of operative

management in both CTS and CuTS. The most prominent disparity in time from diagnosis to treatment was seen in the management of CTS, where Black, Hispanic, Native American, and female patients had a delay in referral for non-operative treatment, operative treatment, or both.

CONCLUSION: Our study sheds light on health disparities in the management of upper extremity pathologies and highlights the importance of providing timely and appropriate treatment options for these vulnerable patient populations.

Risk Factors for Perinatal Brachial Plexus Palsy: A Retrospective Review of a Single-Institution's Eleven-Year Experience

Abstract Presenter
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INTRODUCTION: Perinatal brachial plexus palsy (PBPP) is a flaccid paralysis of the upper extremity that occurs due to trauma during birth. While the incidence is low, numerous risk factors are associated with PBPP, many of which are related to large fetal size or birth-related trauma. Our study characterizes risk factors for PBPP and quantifies the importance of these risk factors to predicting likelihood of PBPP.

METHODS: A retrospective review of patients with PBPP presenting to our institution between 2008 and 2020 was conducted. Variables collected included demographic information, birth history, and the presence of risk factors e.g., shoulder dystocia, maternal diabetes, fetal macrosomia, history of a prior child with PBPP, prolonged labor (>24 hours), and difficult birth requiring vacuum or forceps. Active Movement Scale (AMS) scores, management (surgical vs. conservative) and outcomes were also recorded for each patient.

RESULTS: 173 patients presented to our institution with PBPP between 2008 and 2020. Our cohort was 54.9% Male and 45.1% Female. 86.5% of births were vaginal deliveries and 14.5% were Cesarean; all were single gestations. Within our cohort, 73 patients (42.2%) had the presence of at least one risk factor. Among these patients, 48 (27.7%) had shoulder dystocia, 13 (7.5%) had maternal diabetes mellitus, 10 (5.8%) had prolonged labor, 6 (3.5%) had fetal macrosomia, 1 (0.01%) had a difficult birth that ultimately required forceps, and 43 (24.9%) had another reported risk factor. Other reported risk factors included difficult birth (n=18, 10.4%), maternal preeclampsia (n=6, 3.5%), induced labor (n=3, 1.7%), and head dystocia (n=2, 1.2%). No patients were born to parents who had history of a prior child with PBPP. Fetal macrosomia

was associated with 10.45 times greater risk of PBPP (RR 10.45, CI 1.25-87.32, p=0.007) and shoulder dystocia was associated with a 9.05 times greater risk of PBPP (RR 9.05, CI 4.72-17.36, p<0.001). Long labor (>24 hours) was associated with 8.36 times greater risk of PBPP (RR 8.36, CI 1.83-38.07, p<0.001) and maternal diabetes mellitus was associated with 4.7 times greater risk of PBPP (RR 4.70, CI 1.51-14.61, p=0.003).

CONCLUSION: Numerous risk factors were identified that increase the risk of delivering a child with PBPP, most notably: fetal macrosomia, shoulder dystocia and prolonged labor. These risk factors may be utilized to screen patients to prepare families for the possibility of delivering a child with PBPP, and ultimately may be used by our OBGYN colleagues to inform their decision-making during the delivery process.

Outcomes of Combined Flexor Digitorium Profundus and Superficialis Repair versus Isolated Flexor Digitorum Profundus Repair in Zone 2 Flexor Tendon Injuries: a Systematic Review

Abstract Presenter
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PURPOSE: Zone 2 flexor tendon lacerations involving both the flexor digitorum profundus (FDP) and flexor digitorum superficialis (FDS) are managed with either isolated repair of the FDP tendon or concomitant repair of the FDP and FDS tendons. The purpose of this systematic review is to review outcomes and complications of isolated FDP repair in comparison to combined FDP and FDS repair for zone 2 flexor tendon injuries.

METHODS: A systematic review was carried out in accordance with PRISMA guidelines. The electronic databases of MEDLINE, EMBASE and PubMed were searched for relevant studies from inception to April 2022. Studies reporting outcomes for adult patients with acute primary surgical repair of zone 2 flexor tendon injuries involving both FDS and FDP tendons were included. Quantitative analyses were conducted using the Mantel-Haenszel method and random effects models. Pooled RESULTS were reported as odds ratios (OR) with 95% confidence intervals (CI). All statistical tests were two-tailed with a priori statical significance defined as p<0.05. Statistical heterogeneity was assessed using the I2 statistic.

RESULTS: Eleven studies with 494 digits were included. Meta-analyses of studies comparing

postoperative outcomes of isolated FDP repair against combined FDS with FDP repair using the Strickland criteria (n=4; OR = 1.16, p = 0.78) and Tang criteria (n = 2; OR = 0.99, p = 0.98) favored combined repair, however not statistically significant. Additionally, no significant differences were found in studies (n=5) that compared reoperation rates in the two treatment groups, with meta-analysis favoring combined repair (OR = 1.09, p = 0.88).

CONCLUSION: This review suggests that in primary repair of zone 2 flexor tendon injuries, isolated repair of FDP provides no significant differences in post-operative range of motion and reoperation rates to repair of FDP with FDS. Future prospective comparative studies are needed to confirm this finding.

The Role of Early Latissimus Dorsi Tendon Transfers for Shoulder Movement and Stability in Neonatal Brachial Plexus Injury

Abstract Presenter
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INTRODUCTION: Neonatal brachial plexus injury (BPI) is a rare but devastating complication of birth. An upper trunk BPI can result in the loss of shoulder external rotation and abduction and often leads to glenohumeral joint dysplasia (GJD). The latissimus dorsi/teres major tendon transfer (LTT) is a procedure used to restore external rotation and shoulder abduction and potentially reduce the incidence of GJD. Historically, this tendon transfer has been performed when the child is older and has demonstrated impaired shoulder function. In this study, we sought to assess feasibility and short-term outcomes of LTT combined with BPI reconstruction.

METHODS: A retrospective review of patients was performed. Inclusion criteria were patients under 18 years of age at Riley Children's Hospital with BPI who underwent LTT between 2021-2022.

RESULTS: Eighteen patients underwent LTT between 2021-2022 at the mean age of 2.2 +/- 2.2 years. Five patients (27.8%) underwent the transfer concurrently with BPI nerve reconstruction, 8 (44.4%) underwent staged LTT, and 5 (27.8%) patients underwent LTT with no previous or concurrent BPI reconstruction. Of the 8 patients that underwent staged repair, 7/8 (88%) had MRI evidence of GJD prior to their tendon transfer. There were no major complications in any subgroup. Average follow-up was 7.54 months. The mean age at surgery for patients undergoing

staged LTT was 2.1 years old compared to 6 months in the concurrent group. In the staged cohort, available post-operative mean AMS scores were 3.5 for shoulder abduction, 1.67 for shoulder external rotation. and 4.83 for shoulder forward flexion. In the concurrent cohort, mean AMS scores were 3.2 for shoulder abduction, 1.8 for external rotation, and 3.6 for shoulder forward flexion.

C**ONCLUSIONS**: In this study, we found that LTT can be safely and efficiently combined with BPI reconstruction. Patients in the concurrent surgery cohort achieved similar shoulder functional scores as those in the staged surgery cohort, but these scores were achieved at a younger age (i.e. 1.5 years earlier) and without a second surgery. In addition, a simultaneous or early approach may provide the very young pediatric patient shoulder stability needed to prevent GJD while also avoiding the need for a second anesthetic exposure. Future studies will focus on comparative assessment of long-term shoulder functional outcomes.

Hemi Hamate Arthroplasty is Safe and Effective in the Pediatric Population

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BACKGROUND AND METHODS: Intra-articular fracture dislocations of the proximal interphalangeal joint (PIPJ) are complex injuries that can be difficult to treat. These fractures commonly occur secondary to sports injuries with axial force and hyperextension of the digits. Surgical intervention depends on the extent of joint surface involvement; greater than 50% joint surface involvement requires surgical intervention. Treatment options include open reduction and internal fixation, volar plate arthroplasty, external traction pinning, and hemi-hamate arthroplasty (HHA). HHA aims to restore the buttressing effect of the palmar lip of the middle phalanx to prevent hyperextension and subluxation of the PIPJ. Many of the current reports of HHA outcomes do not include pediatric patients; the mean age of patients in these reports is around 30 years old. Further information is needed regarding the outcomes of HHA in pediatric patients especially due to the high incidence of sports injuries in this population. This case series describes three patients ranging from 13 - 15 years old who underwent HHA for dorsal PIPJ fracture dislocations.

RESULTS/PATIENTS: A 15-year-old female presented two weeks after injuring her right index finger while catching a softball with a non-gloved hand. She had distal interphalangeal joint (DIPJ) extensor lag and decreased range of motion (ROM) at both the DIPJ and PIPJ.

Imaging revealed an unstable, comminuted volar lip fracture with dorsal dislocation of the PIPJ involving 40% of the base of the middle phalanx. Treatment included closed reduction percutaneous pinning of the distal phalanx and HHA of the middle phalanx one month after the initial injury. Ten weeks post-operatively, imaging confirmed incorporation of the hamate graft with improved congruence of the articular surface and improved ROM on exam.
A 14-year-old male presented for evaluation 3.5 months after sustaining an axial load injury to the right ring finger while playing football. On exam, he had a PIP flexion contracture with significantly limited ROM at the PIPJ. Imaging revealed a comminuted volar lip fracture of the middle phalanx volar base involving 50% of the joint surface. Eight weeks postoperatively he reported intermittent pain with activity however his ROM improved on exam.
A 13-year-old male presented for evaluation of pain and inability to flex the left index finger PIPJ one month after sustaining an injury playing basketball. Imaging confirmed an unstable volar lip fracture of the middle phalanx with dorsal dislocation. One month after treatment with HHA, the patient had full ROM with no pain, swelling, or neurovascular deficits.

CONCLUSIONS: Each patient in this case series had successful incorporation of the hamate graft at the middle phalanx with improved ROM of the injured digits. None of the patients had evidence of adhesions, traumatic arthritis, or recurrent subluxation of the PIPJ postoperatively. This case series demonstrates HHA is a feasible surgical option for treatment of PIPJ fracture dislocations in the pediatric population. Further research is required to assess the incidence of long-term outcomes and complications that may be unique to the pediatric population.

Gamma Delta T-cells and Their Role in Lymphedema-Related Infections

Abstract Presenter
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BACKGROUND: Recurrent cutaneous infections are a common and morbid reality for patients with secondary lymphedema (LE). These conditions range from cellulitis, erysipelas, lymphangitis, and lymphadenitis. Between 2012-2017, 92% of LE-related hospitalizations in the United States were for cellulitis. In addition, a recent meta-analysis of reports of lymphedema-related infections found that 35% of patients sustained one or more episodes of cellulitis within 1-3 years of a LE diagnosis. In this study, we expand on the current understanding of lymphatic impairment and cutaneous disease in LE by highlighting the immunological processes that contribute to this risk.

METHODS: Matched, full-thickness skin biopsies (5mm) were obtained from the normal and LE limb of ten patients with unilateral upper extremity lymphedema. Five patients were

identified as having a history of recurrent cellulitis, however, no patients had active disease at the time of biopsy collection. The presence of dermal IL-17-producing CD4+ Tcells and γδ T-cell subsets in both limbs was assessed by immunohistochemistry (IHC) and Immunofluorescence (IF). This was repeated in a mouse model of lymphedema in the presence or absence of Staphylococcus antigen and cytokine production was assessed by qualitative polymerase chain reaction (Q-PCR) and Flow cytometry.

RESULTS: Dermal IL-17-producing cells were higher in LE biopsies when compared to normal. Infection history was not significantly correlated with the quantity of IL-17-producing CD4+ Tcells detected between the normal and LE limbs. Compared to normal skin, the γδ T-cell population was increased in the LE biopsy samples between both groups. A significant increase in IL-17-producing γδ T-cells was observed in patients with a history of infection ($p=0.046$). In the LE-mouse model, we observed a significant increase in IL-17 producing γδ T-cells in the hindlimb at 11 weeks on flow cytometry in mice inoculated with Staphylococcal epidermidis (S. epidermidis) compared to phosphate buffer saline (PBS) alone ($p=0.0171$). Similarly, IL-17 mRNA was increased on QPCR in the S.epidermidis treated mice when compared to WT and untreated mice.

CONCLUSIONS: T-cells play a major role in LE pathophysiology. Recent clonal studies identify an expansion of unique αβ-Tcells in LE-clinical biopsy samples; however, there are no studies that examine the role of γδ T-cells in the pathogenesis of the disease. Several studies characterize the role of γδ T-cells in chronic inflammatory skin diseases, with recent studies implicating its role in the pathogenesis of autoimmune disorders. With increasing evidence that both autoinflammatory and autoimmune components contribute to the pathophysiology of secondary LE, we investigated the role of this cell type in recurrent infections in this patient population. Identification of IL-17-producing, γδ T-cells as a major source of pathogenic cytokines in patients with recurrent infections, highlights its potential as a therapeutic target for modulating infectious episodes in secondary lymphedema.

Psychosocial and Physical Outcomes in Patients with Heterotrophic Ossification: A Burn Model System Study

Abstract Presenter
Paul Won

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INTRODUCTION: Heterotopic ossification (HO) is an uncommon but debilitating sequela of burn injury with an incidence of approximately 5%. Although HO is a feared and debilitating problem in burn recovery, little is known about long-term outcomes of people living with HO. The purpose of this study was to identify demographic characteristics of individuals who develop HO as well as compare patient reported outcomes in the following domains: anxiety, depression, social integration, pain, fatigue, sleep, and physical function to the general burn population.

METHODS: Using the Burn Model System National Longitudinal Database, participant demographics, injury characteristics, and PROMIS-29 scores were collected from 2015-2022. Participants with HO were included. We analyzed PROMIS-29 outcomes including domains of anxiety, depression, fatigue, sleep, pain, physical function, and social integration across three time points (discharge, six- and 12- months post injury). Mixed-effects linear regression models were used to compare PROMIS scores across all three longitudinal measurements. Models were adjusted for age, sex, race/ethnicity, HO status, and burn size.

RESULTS: Of the 630 participants with data concerning HO, 20 were diagnosed with HO (3% of participants). Most patients with HO were male (n = 15, 75%) and had an average age of 41 +/-14 years. Fourteen participants (70%) were Non-Hispanic White and 6 participants (30%) were Hispanic/Latino. Participants with HO had significantly larger burn size (48 +/-24% TBSA) than those without HO (16 +/-16%, $p<0.001$). After adjusting for covariables, patients with HO reported significantly lower physical function than patients without HO. There were no differences in anxiety, depression, fatigue, sleep interference, pain interference, and social integration between patients with and without HO. Regardless of HO status, older age was associated with worse physical function ($\beta= -0.18$, $p<0.001$), pain interference ($\beta=0.07$, $p<0.001$), and social integration ($\beta= -0.07$, $p=0.001$) at all time points across the study period. Larger burn size and female sex were associated with worse outcomes across all seven domains at all study time-periods.

CONCLUSIONS: Physical functioning was consistently lower in patients with HO compared to those without. However, psychosocial outcome measures were not significantly different amongst the two populations. While HO can RESULT in physical limitations, the translation to psychosocial impairments were not evident. A focus on maximizing physical function for populations at risk for HO should be the focus in recovery.

Comparison of Innervated and Non-innervated Free Glabrous Skin Flap Transfers for Volar Digital Defect Reconstructions - A patient-reported outcome study

Abstract Presenter
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Soft tissue defects of the volar digits can be challenging to reconstruct. Toe pulp flaps and medialis pedis flaps are two commonly used flaps for volar digital soft tissue reconstruction, each with its advantages and disadvantages. Toe pulp flaps offer similar anatomical features to the pulp of fingers and thumbs, and digital nerves can be coapted for flap innervation. (1,2) However, toe pulp flaps require more donor site management, which may RESULT in complications such as numbness, pain, and hypersensitivity. Medialis pedis flaps, on the other hand, provide glabrous skin for reconstruction, which minimizes donor site morbidity. (2) Nevertheless, medialis pedis flaps are not innervated and may not provide adequate sensory recovery. The purpose of this study was to compare the functional outcomes, sensibility, and subjective complaints of patients who received either toe pulp flaps or medialis pedis flaps for volar digital soft tissue reconstruction. This study aimed to provide evidence-based guidance on selecting the most suitable flap for volar digital soft tissue reconstruction.

A total of 101 patients who underwent toe pulp flap or medialis pedis flap reconstruction for volar digital defects between 1998 and 2017 were included in this study. Patient-reported outcomes were evaluated by three questionnaires, including the Michigan Hand Outcomes Questionnaire (MHQ), Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH), and Development of the Foot and Ankle Disability Index Questionnaire (FADI). Sensory recovery was evaluated by static two-point discrimination test (s2PD), moving two-point discrimination test (m2PD), and Semmes-Weinstein monofilament (SWM) test. Donor and recipient site subjective complaints were also collected, and the donor site scars were evaluated by the Vancouver Scar Scale.

The results showed that both the toe pulp flap and medialis pedis flap reconstruction provided satisfactory patient-reported functional outcomes and comparable sensory recovery. No significant difference was observed in the sensory recovery between the two groups, although toe pulp flaps were innervated with digital nerves. However, donor site discomfort was more common in the toe pulp flap group, which was mainly due to the use of skin grafts for donor site closure. The medialis pedis flap can be preferred for defects with a width greater than 1.5 cm to avoid skin graft reconstruction to the donor site.

In conclusion, the toe pulp flap and medialis pedis flap are both feasible for volar digital soft tissue reconstruction. The choice of the flap should be based on the defect size and the preference of the surgeon.

REFERENCES:

1. Lin, C. H., Lin, Y. T., Sassu, P., Lin, C. H., Wei, F. C. Functional assessment of the reconstructed fingertips after free toe pulp transfer. Plastic and Reconstructive Surgery 2007;120:1315-1321.
2. Koshima, I., Inagawa, K., Urushibara, K., Okumoto, K., Moriguchi, T. Fingertip reconstructions using partial-toe transfers. Plast Reconstr Surg 2000;105:1666-1674.
3. Tsai, F. C., Cheng, M. H., Chen, H. C., Wei, F. C. Microsurgical medialis pedis flaps for reconstruction of soft-tissue defects in the hand. Ann Plast Surg 2002;48:41-47.

Original Surgical Treatment for the Traumatic Mallet Finger: The Deepithelialized Skin Flap

Abstract Presenter
Alexandru Georgescu MD., PhD

AIM: Mallet finger deformity is one of the most frequent pathological entities after extensor tendons injuries, which appears as result of the disruption of extensor tendon continuity over the distal interphalangeal joint. Despite the fact that a lot of
methods were used in managing this deformity, the treatment of mallet finger is still a much-debated subject.

MATERIAL AND METHOD: We present a new surgical method by using a dorsal deepithelia-lised flap reinserted through the bone. The procedure consists in performing an intra-dermal incision that delimitates a flap on the dorsal aspect of the second phalanx, the distal end of the flap coinciding to the DIP joint; the width of the flap is of 3-5 mm. The flap is de-epithelialized and raised superficial to the tendon. At the level of extensor insertion a hole of 1-1.5 mm is done. A 4/0 steel thread is passed through the distal end of the flap and is then passed through the intra-osseous hole and knotted palmary in a tie-over manner. The extensor tendon is sutured with 4/0 absorbable threads to the flap. The skin is closed over the flap. Postoperatively we immobilise only the DIP joint. The Kirschner wire is removed after three weeks, the steel thread after four weeks and the immobilization after five weeks. We used this method in 97 cases.

RESULTS: The patients regain 95-100% of DIP stability and mobility, with an extension deficit of 0 to 10 degrees.

CONCLUSION: This simple and effective method avoids a prolonged and uncertain immobilization and has a significantly high rate of success. The method uses local resources and avoids the rejection phenomenon related to allograft materials. The distal trans-osseous reinsertion and centro-medular wiring are important technical adjuvant and improve the final results.

Long-Term Results after Muscle-Rib Flap Transfer for Reconstruction of Composite Upper Limb Defects

Abstract Presenter
Alexandru Georgescu MD., PhD

INTRODUCTION: Direct traumatic open fractures or their complications, as osteomyelitis and nonunion, represent the main etiology of bone defects. If soft tissue defects are also present, the management of these lesions becomes more challenging. The most used flaps in these cases are the vascularized fibula osteoseptocutaneous flap, the vascularized iliac osteocutaneous flap, and the vascularized muscular-rib flap. We previously reported about the advantages and the few complications by using the muscle-rib flap, and about the advantages of all-in-one reconstruction

in complex injuries of the limbs involving both bone and soft tissue defects by using these flaps.

MATERIALS AND METHODS: The study refers to 32 patients operated for acute or sequelar traumatic composite bone and soft tissue defects in upper limb, between March 1997 and March 2023, 8 females and 24 males, with an average age of 30,5 years (range, 5 to 66 years). The etiology of the defects was an acute trauma in 17 cases, and a posttraumatic complication in 15 cases. The average length of the bone defect was 5,2 cm (range, 3 to 8 cm), and the surface of soft tissue defect ranged between 6 and 475 cm2. The flap used was the SA-R in 14 cases, the LD-R in 11 cases, and the LD-SA-R in the remaining 7 cases; from these, 23 were free flaps, and 9 pedicled flaps.

RESULTS: The average follow-up in our 32 patients was 23,1 months (range, 12 to 48 months). We had complete flap survival in all the cases. In only one case we registered a superficial wound infection, which was solved conservatively. Regarding the long term results, we registered a rate of primary bone union of 100%, with an average time of 6,6 months.

CONCLUSIONS: The vascularized rib(s) as part of a composite flap represents a good indication especially in bone defects associated with large soft tissue defects

The dorsal pentagonal flap for reconstruction of the web space in congenital hand syndactyly: the result evaluation.

Abstract Presenter
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Abstract Co-Author
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INTRODUCTION: Several variations of local skin flaps have been described for syndactyly web space reconstruction, including the dorsal rectangular flap, dorsal triangular flap, or the interdigitating V-flap. The dorsal pentagonal advancement flap incorporates more dorsal skin and promotes a better web design, and as a unique flap decreases the surgical time. There is a need to evaluate objectively the final RESULT with a concrete parameter. We studied the distance between the neo-web and the distal palmar crease.

PATIENTS AND METHODS: From January 2017 to July 2022, 20 patients, 3 to 5 years old, were included in this study with unilateral congenital hand syndactyly, at the third web space, presenting complete or incomplete fusion. They were treated with dorsal pentagonal flap for web space reconstruction and rectangular interdigitating flaps for finger border coverage. Two proximal areas needed skin grafting; the contralateral retroauricular full-thickness skin was used. The long axis of the pentagonal flap was calculated based on the distance from the a normal contralateral metacarpo-falangeal eminence to the web. The distance between the medial point of neo-interdigital border and the distal palmar crease was measured at the and of the procedure and 180 days post-surgery. The same measurements were done in the normal hand. The RESULTS

were classified in 3 levels: 1. "Good" – normal depth, perfect skin coverage and no retractions. "Satisfactory"- small level of web anteriorization, discrete skin retractions without functional impairment. 3. "Poor"- need for surgical revision.

RESULTS: The results were considered "Good" in 17 patients and in in 3 considered "Satisfactory". No one needed surgical revision. The measured distance between the neo-web and the distal crest increased in all cases, in the 17 good RESULTS the increase was less than 10%, in the 3 patients were considered "Satisfactory" the increase was between 13 and 15% of the initial measure.
CONCLUSION: The advantage of using the pentagonal flap is to reconstruct the dorsal depression and to have the web aligned with the ventral surface with an anatomical normal aspect. A unique flap instead of two triangular guaranties a better RESULT even the skin grafts doesn't integrate completely. The use of the distance between the web and the distal palmar crease is a good REFERENCE to compare and classify RESULTS.

An Innovative One-staged Hand Functional Reconstruction with Full-thickness Skin Graft After Burn Injury: Simultaneous Correction of Burn Claw Hand Deformity, Burn Syndactyly and Web Space Contracture

Abstract Presenter
Jo-Chun Hsiao MD

PURPOSE: The functionality of hands determines the quality of life in burn survivors. Deep dermal in concomitant with full-thickness burn that involves dorsum and volar hands RESULTS in narrowing web space, clawing of the fingers, and burn syndactyly leading to functional impairment of hands. Unique anatomical characteristics of hand including pliable soft tissue over dorsal hand and glabrous skin of the palm make optimal functional restoration for burn hand contracture challenging for plastic surgeon. Our purpose is to share our experience in one-stage hand reconstruction and to present the optimal outcome of full-fist position and acceptable donor site aesthetics.

MATERIALS AND METHODS: Regardless of the medical history, patients who underwent extensive hypertrophic scar excision at fingers and dorsum of hand combined with full thickness skin graft resurfacing in a single surgery for post scar contracture correction in hand in our institute from March 2016 to October 2017 were recruited. Patient profile, injured mechanism, and range-of-motion of finger joints were recorded.

RESULTS: 36 patients (17 males, 18 females) with 70 hands were included in the study. All hands have shown scar contracture over fingers, web space or dorsum of hand. The pre-operative supination-pronation test and range of motion over metacarpal phalangeal joint, phalangeal joint and wrist joint were measured with goniometer and physical examination. Limitations ranged from -10 degree to 70 degree were recorded. In addition to scar excision and full thickness skin graft resurfacing, 10 hands underwent simultaneous tendon lengthening. All donor sites were

primary closed with optimal aesthetic outcome achieved. Only one patient presented minimal hematoma as a minor complication, which resolute itself spontaneously after weeks.
After surgical correction, 90% of the hands can reach full-fist position and full fingers abduction. Patients regained some simple hand functions like grasp and opposition within 3 months.

CONCLUSION: Postburn syndactyly, webspace scar contracture and claw hand are the most common functional limiting sequela of burned hands. Restoration of range of motion of hands may take much effort and multiple revision surgeries are usually required to reach satisfactory outcome. Instead of free tissue transfer plus repetitive local flap surgeries, we would like to share an innovative procedure, which emphasize sufficient scar release in concomitant with adequate skin coverage for wide and radical scar contracture on hands. One stage reconstruction with full-fist position outcome provide the advantages including lower anesthesia risk, less donor side morbidity, satisfactory aesthetic outcome, and better cost effectiveness

Current Ethics of Hand Transplants in Immunocompetent Children

Abstract Presenter
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PURPOSE: Twenty-five years after the firsthand transplant, the procedure is offered at many major academic medical centers and has been performed in patients as young as 8-years-old. A child's inability to weigh the tradeoffs for him/herself requires the deployment of the Best Interest standard and the Harm Principle, aiming either to maximize good or to not place the child at significant and preventable harm. Hand transplants in an immunocompetent child require the initiation of immunosuppressants, which have substantial health implications, including organ failure and early death.

METHODS: A review of the literature was performed to identify current evidence on outcomes for hand transplants in both children and adults, in addition to immunosuppressant sequelae. Clinical ethics principles were applied to the current evidence.

RESULTS: At the current time, only two pediatric hand transplants have been performed-one in a twin and the other in a child already on immunosuppressants. Thus, any benefits to the child have yet to be shown, and current publications use adult-specific data to make ableist arguments that otherwise healthy children would benefit from a hand transplant despite immunosuppressants' clear harm. Current literature suggests that limb functionality appears improved as compared to pre-transplantation function, in adults. Yet, psychosocial implications

in the pediatric transplant population are complex with both benefits and harms.

CONCLUSIONS: We determine that hand transplants should not be performed in children who would require the initiation of immunosuppressants for the following reasons: (1) Immunosuppressants have immediate and long-term morbid consequences, and (2) long-term outcomes of pediatric hand transplants remain unknown. As there is not a finite window for a hand transplantation, and the risks to children are so great, only adults should be permitted to decide to do transplantation if immunosuppression initiation is required.

Atraumatic Upper Extremity Compartment Syndrome is Associated with a High Risk of Mortality

Abstract Presenter
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BACKGROUND: Upper extremity (UE) acute compartment syndrome (ACS) requires emergent fasciotomy to avoid irreversible sequelae. While trauma is the most common cause of ACS, atraumatic etiologies require a high index-of-suspicion. We evaluated indications and outcomes of UE fasciotomies to better understand this rare but critical diagnosis.

METHODS: All patients who underwent forearm fasciotomy at a single institution were retrospectively reviewed from 2007-2022. Demographics, patient comorbidities, etiology and surgical details were gathered. Primary clinical outcomes included complication rates, secondary surgeries, and death.

RESULTS: 46 forearm fasciotomies were performed during the study period. Common fasciotomy indications were: traumatic arterial catheterization (24%), trauma (17%), prophylactic release (15%) and peripheral intravenous extravasation (15%). Compartment pressures were measured in 9% of patients. 39% (n=18) of patients underwent skin closure at the index operation, whereas 61% (n=28) were treated with secondary closure. Reoperation rate following fasciotomy was 41% (n=19), all of which were in the secondary closure cohort. UE fasciotomies in non-traumatic etiologies were associated with higher mortality when compared to traumatic etiologies (18.4% vs 0%). Elevated lactate levels were significantly associated with mortality on both continuous and categorical analyses ($p=0.024$ and $p=0.003$ respectively).

CONCLUSION: Accurate and timely management of UE ACS remains critical. ACS should be acknowledged as a potential risk of arterial catheterization procedures. Primary closure of fasciotomy sites in appropriately selected cases can safely reduce the number of secondary surgeries. The mortality risk after atraumatic UE ACS should be used to counsel patients.

A Colombian´s group experience using contralateral C7 nerve transfer for brachial plexus trauma

Abstract Presenter
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INTRODUCTION: brachial plexus injuries may cause devastating deficits in the upper extremity, with functional, occupational, and social sequelae for lifetime. Within nerve reconstruction treatments, contralateral C7 (CC7) nerve transfer is one of the most encouraging because of its great power of neurotization due to its more myelinated nerve fibers,(1) wide variety of possible functional recovery objectives, and even different surgical techniques, as the retroesophagus route described to shorten the distance between the C7 root and nerve target often obviating the need for nerve grafts.(2) However, its effectiveness and donor morbidity reported by current literature are still confusing with very little reports coming from developing countries that as we know may carry significant access barriers and impact final RESULTS.(3) Our purpose is to describe in detail our technique and share our experience employing it.

METHODS: Our series consists of 61 patients with preganglionic upper brachial plexus injury who underwent CC7 nerve transfer using a retroesophagus tunneling technique in a center from Medellin (Colombia) since January 2000 with a minimum of follow-up of 5 years and a maximum of 17 years, with a systematic electrodiagnostic and physical evaluation using Medical Research Council–based (MRC) outcome scale for motor function in all cases.

RESULTS: There was a total of 61 patients, from which 55 (90.2%) achieved at least MRC grade M3 to M4 motor recovery for shoulder abduction or flexion, or elbow flexion, and 6 patients (9,8%) only obtained MRC grade M2 motor recovery in shoulder abduction. We observed sensitive recovery in some patients, but it was not reproducible in most patients from our series. Regarding donor morbidity, we had a case of neuropraxia for wrist and finger extension, and sensory symptoms in 3 patients, that resolved spontaneously. Finally, respecting complications, dysphagia was identified in 15 patients, but we performed esophagus studies without finding significant changes in their anatomy; we also had a case of subclavian vein trauma requiring reconstruction with a saphenous graft and a patient that required to be explored because of a hematoma.

CONCLUSION: Traumatic injuries to the brachial plexus tend to be very disabling, the surgeon can directly influence the overall RESULT but it is unpredictable to ensure a functional restoration; access to physical rehabilitation and patient cooperation are also critical definitive factors, especially in cases of nerve transfers. Despite all this, today we can be more optimistic

than before regarding the treatment of this pathology even in developing countries, and the CC7 nerve transfer, using a retro esophagus tunnel, is a safe and effective manner for motor and sensitive restoration.

REFERENCES:

1. Chuang DC. Neurotization procedures for brachial plexus injuries. Hand Clin. 1995;11(4):633-645.
2. Mcguiness CN, Kay SP. The prespinal route in contralateral C7 nerve root transfer for brachial plexus avulsion injuries. J Hand Surg Br. 2002;27(2):159-160. doi:10.1054/jhsb.2001.0665
3. Yang G, Chang KW, Chung KC. A Systematic Review of Contralateral C7 Transfer for the Treatment of Traumatic Brachial Plexus Injury: Part 1. Overall Outcomes. Plast Reconstr Surg. 2015;136(4):794-809. doi:10.1097/PRS.0000000000001494

Secondary Lymphedema: Autoimmune, Auto inflammatory, or Both?

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BACKGROUND: Activation of T-helper (Th) inflammatory responses is an established pathophysiology concept for the development of secondary lymphedema (LE). However, recent evidence of an oligoclonal T-cell response in sequenced biopsy samples from LE patients, demonstrates a repertoire of T-cell receptors (TCR's) that recognize the self-antigen, insulin, suggesting that some patients should be classified as suffering from an autoimmune disorder rather than merely an autoinflammatory condition. The hypothesis of an autoreactive component to secondary LE is influenced by several factors: 1) single nucleotide polymorphisms (SNPs) in human leukocyte antigen (HLA) class I and II predict a higher risk of podoconiosis, a form of secondary lymphedema; 2) evidence from a large retrospective study found that LE development following axillary lymph node dissection (ALND) is significantly associated with one or more autoimmune diseases; 3) there is a proven pathogenic role of autoreactive T-lymphocytes in the most clinically relevant inflammatory skin diseases. In this study, we investigate the HLA allelic genotypes associated with LE, classify them as either risk-increasing or protective, and identify putative autoantigens with a strong affinity to these LE-associated alleles.

METHODS: We conducted a genome wide association (GWAS) study in patients who did or did not develop breast cancer-related lymphedema (BCRL) following ALND. Two models were run: 1) the allelic model tested the odds of lymphedema in the presence of each HLA allele; 2) the genotypic model tested the odds of lymphedema among patients having a given HLA genotype compared to those that did not have that genotype. Using a validated HLA database,

we mapped the alleles of interest to the highest affinity epitope.

RESULTS: In the allelic model, the HLA class I significantly associated with LE was HLA-A-02:05 (OR 1.66, 95% CI 1.02-2.71, p=0.043). The HLA class II's with the highest association included HLA-DQB1-3:02 (OR 1.66, 95% CI 1.02-2.71, p=0.043) and HLA-DRB1-08:04 (OR 1.65, 95% CI 1.00-2.70, p=0.046). In the genotypic model, HLA-B-07:02 (OR 1.59, 95% CI 1.05-2.40, p=0.028) and HLA-DQA1-05:01 (OR 1.63, 95% CI 1.04-2.55, p=0.034), were among the most significant HLA class I and class II's, respectively. All three alleles were presented at similar proportions in patients that developed LE and absent in patients that did not develop LE. In the allelic model, HLA-B-44:02 (OR 0.78, CI 0.63-0.96, p=0.020) was expressed at a significantly higher proportion (n=17; n=6) in patients that did not develop disease when compared to patients who did. Allelic-epitope mapping of the risk increasing alleles, HLA-DQB1-03:02 and HLA DQA1-05:01, demonstrates a high affinity to autoantigens insulin and myelin basic protein. Mapping was inconclusive for HLA-DRB1-08:04.

CONCLUSION: The role of T-cell immune responses in triggering LE development has been demonstrated in clinical specimens and mouse models. Only recently, has there been insight into the putative antigens activating these responses. Identification of an HLA, LE- risk allele is provided as evidence for an antigen-driven, possibly autoimmune pathogenesis to LE development. Additionally, it provides a unique potential to develop HLA-dependent immunotherapies to prevent progression of lymphedema.

Effectiveness of Using Vibration Device to Ease Pain During Upper Extremity Injections: A Randomized Controlled Trial

Abstract Presenter
Hatan Mortada MD

INTRODUCTION: Injection-related pain can cause anxiety and discomfort for patients. Vibration devices have been proposed as a potential method for reducing injection-related pain. However, its effectiveness has mostly been studied in dental or facial procedures, and little is known in upper extremity injections. Our study aimed to assess the effectiveness of vibration stimulation on post-injection pain following upper extremity injections.

METHODS: This single-blinded, randomized controlled trial included patients aged 18 years or older who were scheduled to receive an injection in the upper extremity. A total of 60 patients were enrolled and randomized to either the intervention group or the control group using a computer-generated randomization sequence. Level of satisfaction and pain levels were assessed using a visual analog scale (VAS). The study was conducted in accordance with the Declaration of Helsinki and approved by the institutional review board.

RESULTS: The mean pain score immediately after the injection was 4.03 ±2.11 out of 10 in the Vibration group (n = 30), compared to 7.4 ±1.37 out of 10 in the Control group (n = 30)

($p<0.001$). Patients in the Vibration group also reported higher levels of satisfaction and comfort during the injection ($p<0.001$). No adverse events were reported in either group.

CONCLUSION: Our study proves that using a vibration device during upper extremity injections can effectively reduce post-injection pain and improve patient satisfaction. Further research is needed to explore the long-term effects and feasibility of this intervention in different clinical settings.

Assessment of Clinical and Patient-Reported Recovery after Perilunate Injuries: A Systematic Review of Open Treatment Approaches

Abstract Presenter
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PURPOSE: Open reduction and fixation of perilunate injuries (PLIs) has been described using a dorsal, volar, or combined dorsal and volar approach. This systematic review assesses the effect of approach on clinical outcomes in the open treatment of PLIs. A secondary aim is to assess patient-reported outcome (PRO) measures in the evaluation of PLIs.

MATERIALS & METHODS: A systematic review was performed from January 2001 to January 2023 to identify original studies describing clinical and patient-reported outcome measures following open treatment of PLIs. Collected variables included patient demographics, surgical characteristics, time of immobilization, flexion-extension arc, scapholunate (SL) interval, and PRO scores. All included studies were independently evaluated using Methodological Index for Non-Randomized Studies (MINORS) non-comparative study criteria.

RESULTS: Sixteen studies met inclusion criteria; all studies were case series. MINORS scores for included studies ranged 8-11 points, demonstrating moderate quality. A total of 249 patients (94.8% male) were included in the analysis: 165 had a dorsal approach, 28 had a volar approach, and 56 had a combined approach. Average age was 33.8±3.7 years. Average time of immobilization was 8.2±2.1 weeks. Average follow up was 20.4±20.7 months (6-288 months). Flexion-extension arc significantly differed between all groups, with an average arc of 85.2° in the combined group, 96.8° in the dorsal group, and 110.6° in the volar group ($p<0.001$). SL interval was larger in the combined group (2.1±0.3 mm) compared to the volar group (1.7±0.3 mm, $p = 0.03$) but did not differ between any other approaches.
Disabilities of the Arm, Shoulder, and Hand scores were significantly higher in the combined group (37.9 points) compared to both the dorsal and volar approaches (24.0 and 24.7 points,

respectively, p<0.001). Modified Mayo Wrist scores were lowest in the combined group (67.9 points), which significantly differed from the dorsal and volar groups (70.5 and 72.4 points, respectively, p<0.001).

CONCLUSIONS: Patients with PLIs have significant deficits in flexion-extension arc that may significantly affect activities of daily living, particularly in the combined approach group. PRO measures also demonstrate higher pain and disability with the combined approach. An isolated volar or dorsal approach to PLIs RESULTS in improved wrist range of motion and PROs compared to a combined volar/dorsal approach.

Location of Initial Encounter Predicts Surgical Intervention for Distal Radius Fractures: A Retrospective Cohort Study

Abstract Presenter
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PURPOSE: When distal radius fracture (DRF) patients seek care at community healthcare facilities in our area, they often have delayed presentation to our academic medical center with inadequate or no attempt at closed reduction. The primary aim of this retrospective cohort analysis was to determine if a patient's location of initial presentation to a community or academic provider predicted surgical intervention.

METHODS AND MATERIALS: We included consecutive patients of all ages who sustained a DRF and presented to our academic medical center or neighboring community providers over a one-year period. Three patients were excluded due to insufficient information on fracture management. A manual chart review was performed to collect data on demographics, location of initial encounter, and fracture management for all patients.

RESULTS: A total of 1,038 DRFs were included. The mean age at the time of presentation was 36.2 years (26.4), and 57.4% of patients were female. When comparing patients who had initial clinical encounters with academic providers to those with community providers, surgical intervention was higher in the community sub-group (26.8%) than the academic sub-group (16.6%) (p = 0.001). There were no significant differences in age (p = 0.868), sex (p = 0.561), fracture type (p = 0.398), or open or closed fractures (p = 0.204) between the community and academic sub-groups. Multivariable logistic regression revealed that seeking care with a community provider is a significant predictor of surgical intervention (OR 1.80; [95% CI: 1.29 – 2.52], p = <.001, AUC = 0.760).

CONCLUSION: While controlling for age, sex, and fracture characteristics, patients still had a higher likelihood of surgical intervention when presenting to a community provider compared to an academic medical center. Education efforts on reduction techniques with community providers may help prevent unnecessary surgeries.

The Impact of Neighborhood Level Disparities on Distal Radius Fracture Follow-up Adherence: A Retrospective Cohort Study

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BACKGROUND: Socioeconomic disparities pose a significant barrier to clinical follow-up for patients who sustain upper extremity fractures. The area deprivation index (ADI) is a recently developed, comprehensive metric that estimates these disparities at the neighborhood level. The aim of this retrospective cohort study was to assess if the ADI is associated with follow-up non-adherence, and secondarily, determine the individual-level socioeconomic factors associated with follow-up non-adherence after treatment of distal radius fractures (DRF).

METHODS: We included all patients who underwent non-operative and operative management of DRF at an academic level I trauma center between 2019 and 2021. A manual chart review was performed to collect data on ADI, sociodemographic factors, injury characteristics, conservative and surgical interventions, and healthcare utilization.

RESULTS: There was a significant, weak negative Spearman-ranked correlation between ADI state deciles and clinic attendance rates ($r_s(220) = -.144$; [95% CI: -.274, -.009] $p = .032$). Socioeconomic factors associated with significant differences in clinic attendance rates were having a spouse or partner (protective) ($p = .007$), Medicaid insurance ($p = .013$), male sex ($p = .023$), and current smokers ($p = .026$). Factors associated with differences in no show rates were having spouse or partner (OR .326; [95% CI: .123 – .867] $p = .025$), Medicaid insurance (OR 7.78; [95% CI: 2.15 – 28.2] $p = .002$), male sex (OR 4.09; [95% CI: 1.72 – 9.74] $p = .001$), and cigarette use (OR 5.07; [95% CI: 1.65 – 15.6] $p = .005$).

CONCLUSIONS: ADI has a weak, negative correlation with clinic attendance rates following DRF treatment. Significant disparities in clinic follow-up adherence exist between patients with different marital status, insurances, sexes, and cigarette use.

The Role of Surgery for Management of Radiation-Induced Brachial Plexopathy: A Systematic Review

Abstract Presenter
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INTRODUCTION: The role of surgery remains unclear in management of Radiation-induced brachial plexopathy (RIBP), with the predominant approach being conservative therapy.

METHODS: A literature search was performed using the main online databases to find all related articles. Systematic review was performed including 29 studies (n=580) that described the clinical features of RIBP patients and outcomes after surgery.

RESULTS: The most commonly reported symptom was sensory loss (n=295,59.8%), followed by motor deficits (n=279,56.6%), and neuropathic pain (n=267,54.1%). Sixty-five (56.0%) patients had panplexal involvement, and 51 (44.0%) patients had partial plexus involvement. The most common surgical interventions were neurolysis with omental or other flaps (n=108,45.6%), followed by neurolysis alone (n=71,29.9%). Overall, out of 237 patients that underwent surgery, 125 (52.7%) reported improved neuropathic pain. Motor and sensory deficits were improved in 46 (19.4%) and 39 (16.4%) patients, respectively. In patients that underwent surgical neurolysis with omental or other flaps, 57 (52.8%) patients had improvement in pain, followed by improvement in sensory and motor deficits in 17 (15.7%) and 13 (12.0%) patients, respectively. In patients that underwent surgical neurolysis alone, pain (n= 55, 77.5%) was most commonly improved, followed by motor (n= 17, 23.9%) and sensory deficits (n= 15, 21.1%), respectively.

CONCLUSION: Surgery is most effective in in alleviating pain, but has less satisfactory outcomes for motor and sensory improvement. For motor deficits, ulnar nerve fascicular transfer to the biceps branch and cable grafting of the musculocutaneous nerve have shown encouraging results.

Operative Fixation of Perilunate Dislocations: A Systematic Review of Clinical Outcomes and Complications

Abstract Presenter
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INTRODUCTION: Perilunate dislocations are rare, yet serious, high-energy injuries with many limiting functional sequelae, including residual pain, stiffness, and arthritis of the wrist. In this study, we review clinical outcomes and their tools for measurement following operative fixation of perilunate fracture and dislocation.

METHODS: A systematic review of studies pertaining to clinical outcomes following operative management of perilunate dislocations was conducted by querying Web of Science, PubMed/MEDLINE, Cochrane, and Embase databases. PRSIMA guidelines were followed. After removal of duplicates, 246 articles were screened by two independent reviewers.

RESULTS: Forty-four studies met inclusion criteria for the study. Most were retrospective, single center studies, encompassing 885 patients (896 wrists). Most (99.4%) were male, with a mean age of 32.3. Mean follow-up was 50.3 months (minimum average 22.4 months), with 93.3% of wrists having undergone open reduction and internal fixation (ORIF). Most (86.3%) studies reported grip strength (mean: 36.0 kg; 76.4% of contralateral side). The most used clinical scoring assessment was the Mayo Wrist Score (MWS) (N=24 studies; mean: 75.6), followed by the Disabilities of Arm, Shoulder, and Hand (DASH) score (N=15 studies; mean= 21.51) and Patient-Related Wrist Evaluation (PRWE) score (N= 12 studies; mean= 26.7). The most reported complications postoperatively were posttraumatic arthritis and residual wrist pain. Nonunion rate did not differ significantly across surgical techniques (dorsal vs. volar vs. combined vs. arthroscopic).

CONCLUSION: Our systematic review suggests that measurement of clinical outcomes following surgical intervention for perilunate dislocations is not standardized, with a range of clinical scoring assessments being used. Furthermore, even with operative fixation, clinical outcomes for patients with perilunate dislocation remain overall varied, with some patients reporting residual pain and chronic osteoarthrosis.

Beta-blockers as a Risk Factor for Postmastectomy Lymphedema and Cellulitis: A Large-scale Retrospective Data Analysis.

Abstract Presenter
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INTRODUCTION: Breast cancer-related lymphedema is a prevalent cause of upper extremity lymphedema, affecting 17% of breast cancer survivors. Several risk factors, such as age, obesity, radiation, chemotherapy, axillary node dissection, hypertension, and taxane therapy, have been identified through prior studies. However, further research is required to explore other possible risk factors, such as the use of Beta-blockers (BB). Clinical decisions could be made to improve overall patient outcomes by identifying those at the highest risk. We aim to examine the association between BB usage and upper extremity lymphedema and cellulitis in patients who have undergone a mastectomy.

METHODS: Anonymized patient data from 75 healthcare organizations (HCOs) was obtained through the TriNetX platform. The data analysis was performed at healthcare organizations, and the aggregated results returned to the platform. To build the cohorts, we used ICD-10, CPT, and TNX-curated codes. The query and analysis were conducted in February 2023 using the analytic tools from the TriNetX platform. We compared two cohorts of mastectomy patients: one who received BB therapy within one year of surgery (cohort 1) and another who did not receive BB therapy (cohort 2). The cohorts were matched on age at Index, sex, race, ethnicity, body mass index, diabetes mellitus, hypertension, heart failure, chronic kidney disease, cancer, cellulitis and acute lymphangitis, lymphadenectomy, type of mastectomy, type of breast reconstruction, radiotherapy, chemotherapy, and use of calcium channel blockers. The outcomes of interest were the development of cellulitis and lymphedema in the first three years following mastectomy. After matching, the Risk Ratio (RR) with a 95% CI was calculated to evaluate cohort differences.

RESULTS: Between 2003 and 2017, a total of 68,568 subjects met the eligibility criteria. Following the propensity score matching, each cohort had a patient count of 16,128. After matching, the mean age at Index for the cohort 1 and cohort 2 was 61.1 (SD 13.4) and 61.3 (SD 13.1), respectively. Moreover, 97.8% were females, 77.1% were white, 1525 patients developed lymphedema, and 3657 patients developed cellulitis. The cohorts had significant differences in demographic and clinical characteristics, including age at Index ($p=0.006$), ethnicity ($p=0.01$), hypertension ($p=0.002$), heart failure ($p=0.011$), diuretic use ($p<0.001$), and BMI ($p<0.001$). There was a positive association between the use of BB within 1 year of mastectomy and cellulitis (RR = 1.179, 95% CI [1.109, 1.254], [$p<0.001$]). Additionally, the use of BB within 1 year of mastectomy increased the risk of developing lymphedema (RR = 1.121, 95% CI [1.016, 1.237], [$p=0.022$]).

CONCLUSION: Our results propose that using BB within a year of mastectomy increases the risk of developing cellulitis and lymphedema. Further research addressing the unbalanced variables within the cohorts is required to exclude any potential confounders.

A Review of Patient-Reported Outcomes Following Postaxial Polydactyly Ligation and Surgical Excision

Abstract Presenter
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BACKGROUND: Interventions for type B postaxial polydactyly include suture ligation and surgical excision. To date, there is a paucity of literature comparing the long-term outcomes of these procedures. Thus, this study sought to analyze and compare the patient-reported short and long-term outcomes of these procedures.

METHODS: Following institutional review board (IRB) approval, the authors performed a retrospective review of patients who underwent primary suture ligation or surgical excision for type B postaxial polydactyly at our tertiary care institution between 2010 and 2016. Baseline demographic characteristics, age at the time of surgery, type of initial treatment (ligation vs. surgical excision), complications within 30 days after the initial procedure, and additional procedures were recorded. To specifically evaluate the long-term complications, a six-question survey was distributed from January, 2021 to March, 2022. The patients were queried about the incidence of sensitivity or pain, presence of hypertrophic scars, and/or persistent presence of bump ("nubbin") at the site of the excised supernumerary digit.

RESULTS: A total of 158 responses accounting for 258 digits were attained for a 53% response rate. Overall, 67.4% were initially managed surgically (n=174) and 32.6% underwent suture ligation (n=84). Median age at the time of procedure across both cohorts was 49 [IQR 21, 97] days. Patients treated surgically were significantly older at the time of excision (median age 63.0 [33.3, 113.0] vs. 13.0 [0.0, 113.0] days, $p<0.05$). The short-term complication rate was 1.6%, accounting for four cases (ligation 1.5% vs. surgical excision 1.5%, $p=0.964$). Regarding long-term complications, the median age at survey was 8 [IQR 5.4, 10.2] years. Overall, the rate of long-term complications was 39.5% (ligation 51.5% vs. surgical excision 35.4%, $p<0.05$). The likelihood of postoperative sensitivity (ligation 12.1% vs. surgical excision 11.5%, $p=0.88$) and presence of hypertrophic scars (ligation 10.6% vs. surgical excision 15.1%, $p=0.36$) was comparable in both groups. However, the odds of nubbin in the excision group were 57% lower than the ligation group (OR: 0.44; 95% CI: 0.24, 0.78; $P=0.006$). These findings remained significant in the adjusted analysis.

CONCLUSION: This study suggests that suture ligation can be used in select cases without

increasing the prevalence of long-term pain or sensitivity. Time to treatment remains a key variable in deciding either treatment.

Analysis of Nationwide Cost Variation for Digital Replantation

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BACKGROUND: Health care expenditure has been continuously increasing with widespread variation of spending across the United States. In recent years, increased attention has been drawn around a value-based health care system with emphasis to push toward cost-conscious system and improve health outcomes relative to cost. One of the strategies to decrease the costs is uncovering variations in spending. This study aims to investigate nationwide cost variation for digital replantation.

METHODS: The data was retrieved from the Health Cost and Utilization Project National Inpatient Sample (NIS) database from 2016 to 2019. All patients age 18 years or older who had any single digit amputation and underwent replantation were included in this study. Patients were identified by the use of the International Classification of Disease, Tenth Revision (ICD-10) diagnosis and procedure codes. The primary variable of interest was hospital cost. Sociodemographic variables and hospital-level characteristics were analysed. Furthermore, patients were separated into four groups based on the hospital region, defined by NIS as Northeast, Midwest, South and West. Multivariable linear regression was implemented to evaluate predictors for cost variation for digital replantation.

RESULTS: Over the study period from 2016 to 2019, a total of 414 patients underwent digital replantation. The average age was 41 years, with majority of patients being white male (n=250, 85%). Majority of patients had private insurance (n=143, 35%) or other insurance (n=131, 32%). Hospitals performing replantation were more likely to be teaching hospital (n=385, 93%) and have large bedsize (n=293, 71%). The median length of stay was 5 days and median cost of stay was $91,805. Revision amputation was performed in 137 (33%) cases. When comparing regions, there was a statistically significant difference in cost with West being the most expensive and South least (median $114,792 and $78,295, respectively). Using multivariable analysis, increased length of stay (mean difference (95% CI), $10209 ($8458-$11961), $p<0.001$) and

revision amputation (mean difference (95% CI), $30670 ($13049-$48292), p<0.001) were predictive of higher costs, while small bedsize hospital was predictive of lower costs (mean difference (95% CI), -$51473 (-$77563-$25384), p<0.001).

CONCLUSION:
In this study, there was significant nationwide cost variation for digital replantation with hospitals in the West region having highest expenditure. The results of this study highlight the constant need to improve excess utilization costs while maintaining optimal patient outcomes.

Exploring the Association between Breast Cancer-Related Lymphedema and Carpal Tunnel Syndrome: A Retrospective Cohort Study

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INTRODUCTION: Breast cancer-related lymphedema (BCRL) is a chronic, disabling condition that progresses over time, frequently develops following surgical breast cancer treatment, and affects between 2 and 3 million people in the United States. Carpal tunnel syndrome (CTS) is the most common median nerve neuropathy, particularly in women, which accounts for 90% of all neuropathies, with almost 500,000 hand surgery procedures performed annually to correct it.
While lymphedema can potentially increase the susceptibility of median nerve compression, the relationship between BCRL and CTS hasn't been well established yet.
This study aims to explore any association between BCRL and CTS development in order to advance clinical understanding and treatment of both disorders.

METHODS: This study was conducted with anonymized data accessed via the TriNetX platform, which is being increasingly utilized to perform real-world data studies that are helpful in clinical practice. Data from approximately 111,962 patients who underwent mastectomy from 50 HCOs were obtained via TriNetX.
This analysis was run on the Research Network, which has around 108 million patients from 75 HCOs in four countries. The analysis is performed at HCO, with only aggregated results returned to the platform. We utilized ICD-10, CPT, and TNX-curated codes to build our cohorts. After

creating the cohorts, the analysis was conducted on February 2023 using the analytic tools built into the TriNetX platform. We compared mastectomy patients' incidence of CTS based on the BCRL status (cohort 1 patients with lymphedema, cohort 2 patients without lymphedema). In addition, the cohorts were matched on age, sex, race, ethnicity, BMI, hypertension, diabetes mellitus, congestive heart failure, chronic kidney disease, type of mastectomy procedure, and the presence of different kinds of rheumatoid arthritis with and without rheumatoid factor. Patients also got matched based on using Anastrozole and Glucocorticoids, and patients with a history of CTS were excluded from the study. The outcome of interest was the development of CTS in the first 5 years after the incidence of lymphedema.

RESULTS: There were 111,962 mastectomy encounters before matching in the TriNetX database and 9290 after matching during the 5-year period. The mean age at the index for the cohort 1 was 57.9 years (SD 12.5) and for cohort 2 was 58 years (SD 12.7), and 99.4% of patients were females. The mean BMI for the cohort 1 was 30.4 (SD 6.8) and for cohort 2 was 30.2 (SD 6.9). The percentage of patients with comorbidities was 19.7%, 49.7%, and 6.6% for DM, HTN, and at least one type of rheumatoid arthritis disorder, respectively.
After matching, the number of patients with CTS was 443 (4%), and there was no significant difference in the risk of CTS between postmastectomy patients with and without lymphedema (RR 1.091, 95% CI (0.910, 1.308), P= 0.348).
Conclusion: There is no meaningful relationship between BCRL and the risk of CTS development. Therefore, focusing on other possible CTS risk factors in future studies can help to describe and manage this phenomenon.

Body Mass Index and Volume Changes following Lymphovenous Bypass of the Upper Extremity

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INTRODUCTION: Lymphovenous bypass (LVB) is a microsurgical procedure used to restore lymphatic drainage in patients with lymphedema. We sought to determine if the change in limb volume after LVA differed between BMI groups in patients with upper extremity lymphedema.

METHODS: Adult patients that underwent upper extremity LVB were included. The mean percentage change in volume difference was calculated as follows: % Change = [(postoperative difference) – (preoperative difference)/(preoperative difference)] * 100, where postoperative difference is the absolute difference between the affected and unaffected limbs' volume at a specific endpoint and the preoperative difference is the absolute difference between the affected and unaffected limbs' volume preoperatively. The endpoints were 2 weeks , 2 months, and 6 months after the surgery. Subjects were grouped by BMI into 'Normal Weight' (18.5 - 24.9 kg/m2), 'Overweight' (25 - 29.9 kg/m2), and 'Obesity' (≥ 30 kg/m2).Shapiro-Wilk tests were used to assess normality and differences per endpoint among BMI groups were evaluated using Kruskal-Wallis tests. The limb volume change is expressed as a percentage. Data is presented as mean ± standard deviation. All statistical analyses were performed using R version 4.2.2 using the RStudio IDE version 2022.12.0.353.

RESULTS: Sixty-eight patients were identified ('Normal Weight', n=7; 'Overweight', n=24; 'Obesity', n=37). The Kruskal-Wallis test was used to assess for significant differences in endpoint values among the three BMI categories. The test, which compares median values, was not statistically significant at any endpoint ($\chi2 = 1.61$, df = 2, p = 0.45 for week 2; $\chi2 = 3.94$, df = 2, p = 0.14 for month 2; $\chi2 = 4.24$, df = 2, p = 0.12 for month 6; $\chi2 = 0.14$, df = 2, p = 0.93 for year 1). Despite this, large differences in the mean volume change were observed between the BMI categories. The mean percentage change in volume difference among BMI categories at 2 weeks was as follows: 'Normal Weight', -156% ± 169; 'Overweight', -59.88% ± 116; 'Obesity', -45.6% ± 79.6). At 2 months, the mean percentage change in volume difference among BMI categories was the following: 'Normal Weight', 12.3% ± 81.4; 'Overweight', -16.8% ± 68.6; 'Obesity', -38.2% ± 64.3). The mean percentage change in volume difference among BMI categories at 6 months was: 'Normal Weight', -32.5% ± 30.8; 'Overweight', -20.8% ± 26.3; 'Obesity', -55% ± 26.4). At 1 year, the mean percentage change in volume difference among BMI categories was the following: 'Normal Weight', -54.5% ± 102; 'Overweight', -36.6% ± 51.3; 'Obesity', -46% ± 18.4).

CONCLUSION: In conclusion, no significant differences were observed in endpoint values among the three BMI categories using the Kruskal-Wallis test. However, there were notable differences in the mean percentage change in volume difference between BMI categories at different endpoints. These findings suggest that BMI may have an impact on volume change following LVB. However, the relatively small sample size might have affected both the statistical significance and the normality of the endpoints.

Novosorb Bio-Degradable Temporizing Matrix for Reconstruction of Complex Upper Extremity Wounds

Abstract Presenter
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PURPOSE: Reconstruction of upper extremity soft tissue wounds with exposed bone and tendon remains a challenge. Skin substitutes and dermal matrices have been utilized to assist in creating well vascularized wound bed to facilitate skin grafting. Recent literature has demonstrated the use of Novosorb Bio-degradable Temporizing Matrix (BTM) in management of complex wounds. We hypothesize that BTM is safe and effective for reconstruction of complex upper extremity wounds.

METHODS: A retrospective, IRB-approved chart review was performed for all patients who underwent reconstruction of complex upper extremity soft tissue defects with BTM between January 2017 and May 2022. Demographic data, comorbidities, wound etiology, wound size, secondary surgery and complications were recorded.

RESULTS: 51 patients were identified using a CPT query of the electronic medical record. Patient population included 39 males and 12 females with an average age of 44.3 years. Nineteen patients (37.3%) were active smokers and 7 patients (13.7%) had diabetes. Wound etiology included trauma (n=30, 58.8%), burns (n=12, 23.5%), infection (n=8, 15.7%), and vasopressor-related injury (n=1, 2.0%). Twenty-four patients (47.1%) had wounds with exposed bone and 27 patients (52.9%) had exposed tendon/muscle.

The average size of BTM template used was 162.5 (range: 1.5-1000) cm2. Average time from BTM application to complete wound closure was 90.1 (range: 11-207) days. Twenty patients (39.2%) re-epithelialized spontaneously after removal of the sealing layer and did not require skin grafting. Average wound size for these patients was 58.5 (range: 2-200) cm2. Time to wound closure by secondary intent was 123.7 (range: 35-190) days. Twenty-seven patients (52.9%) underwent skin grafting and the average wound size in this cohort was 248.6 (range: 15–1000) cm2. Time to skin grafting from BTM application was 51.7 (range: 24-126) days. When comparing size of wounds, those who did not require skin grafting had significantly smaller wounds compared to those who required skin grafting (58.5 cm2 vs 248.6cm2; $p = 0.002$).

Overall, 49 patients of 51 (96.1%) achieved successful wound closure. The two patients who failed reconstruction required revision finger amputation and secondary flap reconstruction. Complications occurred in 14 patients and included template infection (n=10), template fluid collection (n=5) and template dehiscence (n=3). Five patients required revision surgery for infection and three of these patients required repeat application of BTM.

CONCLUSION: Here, we demonstrate that Novosorb BTM is safe and effective for management of complex upper extremity wounds with exposed bone and tendon. We have also found that secondary skin grafting may not be necessary in patients with smaller wounds.

Relationship Between Lymphovenous Bypass Anastomosis Outcomes and the Number and Types of Anastomosis in the Upper Extremity

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INTRODUCTION: Lymphovenous Bypass (LVB) is many hospitals' first-line treatment for lymphedema. Many aspects of its effects, however, remain unknown. This study aimed to analyze the relationship between LVB anastomosis and the outcomes of surgery for lymphedema in the upper and lower extremities.

METHODS: Adult patients that underwent upper extremity LVB were included. The mean percentage change in volume difference was calculated as follows: % Change = [(postoperative difference) – (preoperative difference)/(preoperative difference)] * 100, where postoperative difference is the absolute difference between the affected and unaffected limbs' volume at a specific endpoint and the preoperative difference is the absolute difference between the affected and unaffected limbs' volume preoperatively. The endpoints were 2 weeks, 2 months, and 6 months after the surgery. Patients were categorized based on the number of anasotmosis ('1 to 4 anastomosis', '5+ anastomosis') and type of anastomosis (combined,' 'end-to-end,' 'end-to-side'). After evaluating the endpoints for normality using Shapiro-Wilk tests, differences per endpoint among the number and the type of anastomosis were evaluated using Kruskal-Wallis tests. The limb volume change is expressed as a percentage. Data is presented as mean ± standard deviation.

RESULTS: 70 patients were identified for this study ('1 to 4 anastomosis' = 57, '5+ anastomosis' = 13 for the number of anastomosis and 'combined' = 27, 'end-to-end' = 28, 'end-to-side' = 15 for the type of anastomosis). Kruskal-Wallis's test assessed for significant differences in endpoint values among the number and type of anastomosis categories.

The comparison between the median values was not significant at any endpoint for the number of anastomosis analyses ($\chi 2 = 3.3826$, df = 1, p-value = 0.06589 for week 2; $\chi 2 = 0.12267$, df = 1, p-value = 0.7262 for month 2; $\chi 2 = 3.0823$, df = 1, p-value = 0.07915 for month 6; $\chi 2 = 3.0925$, df = 1, p-value = 0.07865 for year 1). Despite this, there were large differences in the mean volume changes when looking at the number of anastomosis categories. The mean percentage change in volume difference between the number of anastomosis categories at 2 weeks was '1 to 4 anastomosis', -51.5% ± 72.5 and '5+ anastomosis, -92.6% ± 132. At 2 months, the mean percentage change was '1 to 4 anastomosis', -36.3% ± 49 and '5+ anastomosis, -6.73% ± 99.3. At 6 months, the mean percentage change was '1 to 4 anastomosis', -31.8% ± 26.1 and '5+ anastomosis, -60% ± 31.1. For 1 year, the mean percentage change for the number of

anastomosis categories was '1 to 4 anastomosis', -31.2% ± 43.7 and '5+ anastomosis, -69.1% ± 33. Additionally, the test did not show statistically significant results at any endpoint for the type of anastomosis ($\chi2 = 0.95797$, df = 2, p-value = 0.6194 for week 2; $\chi2 = 0.0048961$, df = 2, p-value = 0.9976 for month 2; $\chi2 = 2.1007$, df = 2, p-value = 0.3498 for month 6; $\chi2 = 0.73709$, df = 2, p-value = 0.6917 for year 1). However, the mean percentage change in volume difference among type of anastomosis categories showed large differences at each endpoint. At 2 weeks, the mean percentage change was 'combined,' -156% ± 169; 'end-to-end,' -59.88% ± 116; 'end-to-side,' -45.6% ± 79.6. At 2 months, the mean percentage change was 'combined,' -156% ± 169; 'end-to-end,' -59.88% ± 116; 'end-to-side,' -45.6% ± 79.6. At 6 months, the mean percentage change was 'combined,' -156% ± 169; 'end-to-end,' -59.88% ± 116; 'end-to-side,' -45.6% ± 79.6. Lastly, at 1 year, the mean percentage change for type of anastomosis categories was 'combined,' -156% ± 169; 'end-to-end,' -59.88% ± 116; 'end-to-side,' -45.6% ± 79.6.

CONCLUSION: In the statistical analysis, our data indicates no relationship between the number or type of anastomosis and lymphedema measurements at each endpoint. However, there are significant differences in the mean percentage change in volume difference between the number and type of anastomosis groups at different endpoints. These findings imply that age may have an effect on volume change following LVB. However, the relatively small sample size may have influenced the statistical significance and normality of the endpoints.

Brachial Gunshot Wounds: Injury Patterns and Considerations for Managing the Abnormal Neurological Exam

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BACKGROUND: Nerve injuries from gunshot wounds to the upper arm can cause significant morbidity and loss of function. However, indications for surgical exploration and nerve reconstruction remain unclear as both low- and high-grade injuries can present with an abnormal neurological exam.

METHODS: Adult patients presenting with a history of isolated gunshot wound to the upper arm between 2010-2019 at a single urban level 1 trauma center were screened for inclusion in this retrospective study. Patient demographics, neurological exam findings, concurrent injuries,

and intra-operative findings were gathered. Bivariate analysis was performed to characterize factors associated with nerve injuries.

RESULTS: There were 139 adult patients with isolated brachial gunshot wounds, and 49 patients (35%) presented with an abnormal neurological exam and significantly associated with concurrent humerus fractures (39% vs 21%, p=0.026) and brachial artery injuries (31% vs 2%, p<0.001). Thirty of these 49 patients were operatively explored. Fifteen patients were found to have observed nerve injuries during operative exploration including 8 patients with nerve transections. The radial nerve was the most commonly transected nerve (6), and among the 16 contused nerves, the median (8) was most common.

CONCLUSIONS: Nerve injury from upper arm gunshot wounds is relatively common with directly traumatized nerves in at least 39% and nerve transection in at least 16% of patients with an abnormal neurological exam. Timely referral to a hand and/or peripheral nerve surgeon for close clinical follow-up and functional reconstruction with nerve grafts, tendon transfers, and nerve transfers is recommended.

Characterizing Factors Associated with Interfacility Transfer for the Management of Pediatric Hand Trauma

Abstract Presenter
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BACKGROUND: Hand injuries represent one of the most common pediatric traumas and account for around 1.7% of pediatric emergency room visits in the United States each year. While most hand fractures are managed conservatively, an estimated 10% will ultimately require surgical intervention. As such, transfer to specialized centers is common for pediatric hand trauma patients. These transfers have the potential to significantly reduce patient morbidity; however, when specialized care is not indicated, they can place undue burden on families to travel outside their communities while diverting resources from urgent cases. Our project aims to identify factors associated with patient transfer in pediatric hand trauma.

METHODS: A retrospective review was performed of patients under 18 years of age who were evaluated for hand trauma at one pediatric Level I trauma center between 2010 and 2020.

Variables studied included patient demographics, etiology of trauma, medical history, and associated injuries. Patients were categorized based on transfer status, and factors associated with increased likelihood of transfer were identified. Finally, choice of management and outcomes were recorded for each hand fracture.

RESULTS: A total of 1151 patients met inclusion criteria. Of these, 308 (26.8%) were transferred from an outside institution. Certain injury types were associated with a significantly higher likelihood of transfer; specifically, scaphoid fractures (RR 7.63, CI 1.80-72.58), index finger injuries (RR 1.57, CI 1.01-2.43), and fingertip injuries (RR 1.62, 1.08-2.44) were more likely to be transferred ($p<0.04$), as opposed to phalangeal or metacarpal fractures. Mechanisms of injury, such as motorized vehicle accidents (MVA), and animal bites were also associated with increased risk of transfer (RR 6.06, CI 1.90-19.35, $p<0.001$; RR 13.47, CI 1.59-114.25, $p=0.002$, respectively). Finally, rural geography was associated with 2.89 times greater risk of transfer compared to patients living in urban or suburban areas (RR 2.89, CI 1.67-5.02, $p<0.001$).

Conclusion: Pediatric hand trauma is one of the most common causes of emergency room visits in the United States each year. Understanding factors that influence the likelihood of transfer to specialized institutions is critical to optimizing patient care in the management of these injuries.

Success in digit replantation and long-term outcomes – a retrospective review

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INTRODUCTION: Traumatic amputations of the finger and thumb comprise some of the most common injuries in the United States each year. However, there is variability in the reported success rates for replantation of digits, which have ranged from 48% to 97%.(1,2) Various factors including sociodemographic, surgical technique, and medical comorbidities have been associated with outcomes.(1,2) The purpose of our study is to assess the outcomes and success rate of digit replantation and identify predictors of digit survival.

METHODS: We conducted a retrospective review to evaluate all patients with operative traumatic digit amputations at our institution from 2012-2022. Data on patient demographics, mechanism of injury, operative details, postoperative complications and follow-up were recorded. Pearson chi-square and independent t-tests were performed, with statistical significance set at $p < 0.05$.

RESULTS: A total of 60 traumatic digit amputations were taken to the operating room for

attempted replant. A total of 29 digit replants (63%) were performed, and 35 revision amputations were performed in the operative room after initial debridement (86.2% males, 68.9 % Hispanic). For digits that were replanted, crush/avulsion was the most common mechanism of injury (72.4%). Average age of patients with attempted replants was 32.5 years (SD 21.2). Average time from arrival at ER to operating room was 4.7 hours (SD 4). Majority of the attempted replants were at the MCPJ or through the metacarpal. The survival rate was 58.6%. Replants with and without vein grafts had similar success rates (58.3% vs 60%, p= 0.95). Digit survival rates were higher in patients with sharp injuries as compared to crush/avulsion injuries (87.5% vs 42.9%, p=0.05). Risk of failure of replant was higher in patients with diabetes and/or hypertension. Mean follow-up was 9.19 months. Of all patients with successful replants, 56.3% were compliant with hand therapy postoperatively.

CONCLUSION: Digit replantation after a traumatic injury may be considered in selected individuals. Careful preoperative assessment of mechanism of injury, comorbidities and demographics play a significant role in short term and long term success of digit replantation.

REFERENCES:
1. Mulders M A, Neuhaus V, Becker S J, Lee S G, Ring D C. Replantation and revascularization vs. amputation in injured digits. Hand (NY) 2013;8(03):267–273.
2. Cheng G L, Pan D D, Yang Z X, Qu Z Y. Replantation of digits amputated at or about the distal interphalangeal joint. Ann Plast Surg. 1985;15(06):465–473.

Are sensory repairs more tolerant of delayed repair than motor nerves? A systematic review and meta-analysis of individual participant data in upper extremity nerve repairs.

Abstract Presenter
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PURPOSE: Early repair of neurotmetic peripheral nerve injury in the upper extremity offers better outcomes than delayed repair. Conventional wisdom suggests that sensory nerves may be more tolerant of delay than motor nerves, but the differential impact of delay on motor and sensory nerves has not been well-characterized. Furthermore, It is unknown how much delay can be tolerated before a nerve repair is futile. This study aims to elucidate how sensory and motor outcomes differ after nerve repair in the upper extremity through a systematic review of the literature and meta-analysis of individual participant data.

METHODS: PubMed was queried for original articles describing outcomes after repair of median, ulnar, or radial nerves published between 1970 and 2022. Articles were included if they

described individual patient outcomes for sensory or motor function according to British Medical Research Council grading. Individuals who had isolated digital nerve injuries were excluded. The effects of clinical variables on sensory and motor outcomes were assessed by univariate and multivariate regressions using generalized linear mixed models. A subset analysis was performed on mixed motor/sensory nerves to further assess the differential effect of delay on sensory and motor outcomes.

RESULTS: Of 3108 articles meeting search criteria, 22 articles reporting on 445 nerve repairs were ultimately included in the analysis. These included 165 (37%) median, 219 (49%) ulnar, and 61 (14%) radial nerve injuries. Five percent were sensory-only, seven percent were motor-only, and 87% were mixed. On univariate analysis, a 9-month delay to repair was associated with a modest decline in satisfactory outcomes for sensory nerves (96% for <9mo delay versus 83% for >9mo delay) but a precipitous decline for motor nerves (74% for <9mo delay versus 48% for >9mo delay). On multivariate regression, older age, the use of a graft, and greater delay were independently associated with worse outcomes in motor nerves ($p<0.05$ for each), while only greater delay was associated with worse outcomes in sensory nerves ($p<0.05$). Subset analysis of mixed nerves in which motor and sensory components were repaired concurrently demonstrated that motor recovery rarely ever outperformed sensory recovery (<1% of the time) while sensory recovery commonly outperformed motor recovery (20% of the time) ($p<0.01$).

CONCLUSION: This literature review of individual participant data for upper extremity nerve repair supports our hypothesis that sensory recovery is more tolerant of delay than motor recovery. Consequently, the absence of sensory recovery after repair of a mixed nerve is highly associated with poor motor recovery. Outcomes after delayed repair in this data set were surprisingly good for both motor and sensory nerves, but this may be due to publication bias. Additional studies are necessary to explain the mechanisms underlying these findings.

Predicting Personalized Improvement in Carpal Tunnel Syndrome Severity Following Intervention Using Artificial Intelligence

Abstract Presenter
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INTRODUCTION: Patient-reported carpal tunnel syndrome (CTS) severity following treatment is difficult to predict using standard analytical methods. Artificial intelligence (AI) and deep learning neural networks commonly outperform other prediction methods. The aim of this study was to design a decision aid predicting personalized patient-reported outcomes following treatment for CTS using AI.

METHODS: We built a deep-learning neural network from a recent prospective comparative study. We used a comprehensive dataset that includes baseline data, medical comorbidities, sensory and motor recovery, and patient-reported outcomes. We held out a testing dataset for internally validating the model that was not used during the training procedure. The model

compared outcomes following carpal tunnel release surgery to nighttime splinting. The outcome was defined as an improvement in CTS severity beyond the minimal clinically important difference for the validated Boston Carpal Tunnel Questionnaire.

RESULTS: A total of 93 patients were included in the study. The mean age was 56 years (SD=12.6), and 63 of the participants (68%) were female. Fifty-seven patients (61%) underwent an open carpal tunnel release, and 36 patients (39%) used nighttime splinting. Following the validation, the model accurately predicted the outcomes in (15/19) 79% of the cases. The model was off by a maximum of 5% probability in all four mispredictions. The area under the curve for the model was 85%, indicating excellent performance.

CONCLUSION: AI models can predict personalized patient-reported outcomes in CTS with excellent performance and can be considered a decision aid for CTS patients. The benefits of personalized predictions will be explored qualitatively in future studies.

Close

Clinical Outcomes of Revision Carpal Tunnel Release Treated with Adipofascial Flap vs Axogen Nerve Wrap

Abstract Presenter
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BACKGROUND: Recalcitrant carpal tunnel syndrome (CTS) represents a clinical challenge for hand surgeons. Perineural adhesions are often identified during revision surgery, and biologic wraps and synthetic grafts may reduce further scarring. There remains a lack of consensus regarding the optimal method of nerve coverage, and our aim is to compare outcomes in patients undergoing either an adipofascial flap or Axogen nerve wrap.

MATERIAL AND METHODS: A retrospective cohort comparison was conducted on patients who underwent revision carpal tunnel release (CTR) with either Axogen nerve wrap or adipofascial flap for coverage of the median nerve. Demographic data (age, gender, race, smoking status, and medical history), pre-operative symptoms, and EMG data were collected. Primary outcomes were postoperative symptoms, VAS, and PROMIS scores.

RESULTS: A total of 77 patients underwent revision CTR, with 51 (66%) receiving adipofascial flap coverage and 26 (34%) synthetic nerve wrap. Of these, 21 patients reported persistent symptoms since index surgery, 54 had recurrent symptoms, and no patients reported new symptoms. No differences were noted in severity noted (p=0.918) and presence of CTS (p=0.168) on preoperative EMG. Intraoperatively, the most common site of nerve compression

was the transverse carpal ligament (TCL) for both the adipofascial (n=33) and nerve wrap (n=10) cohorts, with most patients demonstrating excessive tenosynovium (66% and 58%) and reconstitution of the TCL (78% and 65%). The mean follow-up time was 4.3 months for the adipofascial cohort and 6.7 months for the nerve wrap cohort. While both groups showed improved numbness/tingling and nighttime symptoms; when compared, there were no significant differences seen in post-operative numbness/tingling (p=0.291), nighttime symptoms (p=0.278), and VAS scores (p=0.573). Nerve wrap patients had higher post-operative PROMIS scores (p=0.005).

CONCLUSION: Patients who underwent median nerve coverage with either adipofascial flap or synthetic nerve wrap during revision CTR experienced similar postoperative outcomes in terms of numbness/tingling, nighttime symptoms, and VAS scores. Synthetic nerve wrap patients did report higher PROMIS scores; however, the clinical significance of this is unclear. The results of this study suggest that both adipofascial flap and synthetic nerve wrap may warrant equal consideration in patients suffering from recurrent CTS.

Violence-Related Pediatric Hand Trauma: Epidemiology, Injury Patterns, and Risk Factors

Abstract Presenter
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PURPOSE: Violent hand trauma has devastating implications in pediatric patients, but the epidemiology and injury patterns for this group are not well described. This study characterizes violent injuries among pediatric hand trauma patients in order to identify risks associated with violent hand trauma.

METHODS: A retrospective review was conducted of all pediatric hand trauma patients presenting to our institution between 2010 and 2020. Patients were grouped into violent and non-violent cohorts. All charts were abstracted for demographic and clinical details. Population estimates and socioeconomic data were obtained from the United States Census Bureau. Summary statistics were computed, and a binomial regression was used to compute relative risks (RR). Significance was assessed at alpha=0.05.

RESULTS: 1,311 patients sustained hand trauma, with 124 (9.5%) violent injuries. Among these patients, the average age was 14.1 ± 3.5 years. 27 of these patients (21.8%) were female, and 64 (51.6%) were non-white. The most common violent mechanisms were punching objects (n=46, 37.1%), assault (n=32, 25.8%), punching people (n=28, 22.6%), and accident (n=18, 14.5%). 23 patients (18.5%) required surgery. Displaced fractures, puncture injuries, and tendon injuries were more likely to involve violence (RR 1.55, CI 1.30-1.86, p<0.001; RR 4.94, CI 1.68-

14.50, p=0.001; RR 2.16, CI 1.15-4.05, p=0.02). The small finger (n=65, 52.4%) and ring finger (n=37, 29.8%) were the most injured digits and were more associated with a violent injury mechanism (RR 1.39, CI 1.11-1.75, p=0.008; RR 1.45, CI 1.02-2.06, p=0.04, respectively). Metacarpal fractures were the most common site of injury (n=74, 59.7%) and were more likely to occur with violence (RR 4.85, CI 3.97-5.91, p<0.001). Hand trauma requiring nerve repair had an eight-fold greater likelihood of occurring with violence (RR 8.65, CI 1.23-60.77, p=0.009). Patients with median household incomes between $54,000 and $70,999 had a greater risk for violent hand injury (RR 1.49, CI 1.19-1.86, p=0.001). Finally, male gender, African American race, and age >12 years at the time of injury were all associated with violent injury mechanisms (RR 1.24, CI 1.12-1.37, p<0.001; RR 2.13, CI 1.72-2.62, p<0.001; RR 2.06, CI 1.83-2.31, p<0.001, respectively).

CONCLUSIONS: This represents the largest reported cohort in pediatric hand trauma to date, and our findings highlight several risk factors for violent hand injuries. In our population, adolescent African American males were at the highest risk for violent hand trauma. In addition, injuries to the ring and small finger, metacarpal injuries, and right-sided injuries are more likely to occur by violent mechanisms. These findings have important implications for injury prevention and can help emergency providers triage violent injuries for early referral to hand surgeons.

Surgical management of vascular malformations of the upper extremity: an 11-year retrospective review of pediatric patients

Abstract Presenter
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INTRODUCTION: Vascular malformations (VMs) involving the upper extremity (UE) are a heterogeneous group of lesions that can pose unique functional challenges. Surgery remains amongst the mainstays of VM treatment, but contemporary literature on surgical management of VMs are sparse. This longitudinal retrospective study aims to provide an update on the surgical management and outcomes of pediatric patients with upper extremity VMs a.

METHODS: A retrospective review of patients evaluated at the Children's Hospital of Philadelphia between 2010-2021 was performed. Inclusion criteria were patients under age 18 with UE VMs who had surgery within the study period; exclusion criterion was lack of operative management. Demographics, lesion characteristics, treatments, and outcomes were collected. ANOVA, chi-square, and Fisher's exact tests were used for data analysis.

RESULTS: A total of 34 patients and 43 operations were identified, with an average of 1.26 operations per patient (range 1-3 operations).. Average age was 5.83 years. Patient demographics included: 22 white (64.7%), 24 male (70.6%) patients with 22 right-sided (64.7%) malformations. Venous malformations were the most common (16/34, 47.1%), followed by VMs not otherwise specified (6/34, 17.6%), venolymphatic malformations (5/34, 14.7%) and lymphatic malformations (3/34, 8.8%). Lesions located on the hand were most common (13/34, 38.2%), followed by the forearm (9/34, 26.5%) and upper arm (5/34, 14.7%). The average lesion diameter was 3.64 cm. 29.4% (10/34) of patients had malformations that were associated with a functional deficit, including pain, limited range of motion, and nerve palsy. Four operations were performed after first trialing sclerotherapy. All malformations were managed with direct surgical excision, with 76.7% (33/43) requiring subcutaneous excision and 20.9% (9/43) requiring subfascial/intramuscular excision. Neurolysis was required in 5/43 (11.6%) operations. Forty-one (95.3%) of the excisions were primarily closed, and 1 (2.3%) had full thickness skin graft and 1 (2.3%) had a local flap. Three operations (7%) had complications, including a hematoma, wound necrosis, and intra-operative blood transfusion. Seven patients (16.2%) patients had recurrence requiring additional operative management. Amongst patients with at least one year of documented follow-up, 70.8% (17/24) had no residual VMs, but 29.2% (7/24) had persistent VMs despite treatment.

CONCLUSIONS: Surgery is a safe and effective option for localized, well-delineated UE VMs and can often be used to achieve primary closure on lesions with relatively low complication rates. It may be utilized more often in subcutaneous locations over deeper involvement. In line with other literature, recurrence is fairly common, and a proportion of patients may continue to have residual lesion despite treatment.

Pediatric Firearm Injuries of the Hand

Abstract Presenter
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PURPOSE: Firearms are the second leading cause of mortality in children, but risk factors for pediatric hand firearm injuries are not well described. This study examines the pediatric hand trauma population to identify injury characteristics and risks associated with firearm injuries.

METHODS: This was a retrospective cohort of pediatric hand trauma patients from 2010-2020. Patients were grouped into firearm and non-firearm injury cohorts. All charts were abstracted for demographic and clinical details. Population estimates and socioeconomic data were obtained

from the United States Census Bureau. Summary statistics were computed, and a binomial regression was used to compute relative risks (RR). Significance was assessed at alpha=0.05.

RESULTS: 1,311 patients sustained hand trauma, with 22 (1.7%) firearm injuries. The most common firearms were air rifles (n=11, 50%), and pistols (n=9, 40.9%). Among air rifle injuries, 7 (31.8%) were from BB guns, while 4 (18.2%) were from pellet guns. The most common mechanisms were intentional assault (n=9, 40.9%), accidental assault (n=7, 31.8%), accidental self-inflicted discharge (n=5, 22.7%), and intentional self-inflicted discharge (n=1, 4.5%). 18 patients (81.8%) required ED management, and six (27.3%) required surgery. Injuries of the palm/dorsal hand and webspace were common (n=4, 18.2%, each), associated with greater risk of firearm involvement (RR 10.97, CI 3.51-34.32, p<0.001; RR 34.22, CI 6.74-173.61, p<0.001, respectively). Nerve injuries were less common (n=3, 13.6%), but had four times greater risk of firearm involvement (RR 4.06, CI 1.36-12.16, p=0.01). Open fractures were the most common (n=7, 31.8%), and more frequently involved firearms (RR 4.55, CI 3.27-6.34, p=0.02). Comminuted fractures were most likely to involve firearms (RR 7.72, CI 3.89-15.30, p=0.003). The most frequent management was splinting (n=11, 50%), but nerve repair and foreign body removal were more likely to involve firearms (RR 19.43, CI 2.12-177.91, p<0.001; RR 9.71, CI 1.23-76.60, p=0.009, respectively). Lastly, African American race had 2 times greater risk of firearm injury compared to other races (RR 2.00, CI 1.31-3.08, p=0.007).

CONCLUSIONS: This represents the largest reported cohort in pediatric hand trauma to date, and our findings highlight several risk factors for firearm injuries. African American patients with webspace, nerve, or palm/dorsal hand injuries have the highest risk of firearm injuries. In addition, open and comminuted fractures are more likely to occur by firearm. These findings have important public health and safety implications, aiding in the evaluation of firearm injuries for early referral to hand trauma surgeons.

The Impact of the COVID-19 Pandemic on Case Volume and Wait Times of Elective Hand Procedures

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PURPOSE: The purpose of this study was to compare the number of elective hand surgeries performed during the pandemic to a corresponding pre-pandemic time-period and to quantify the impact to the surgical backlog in hand surgery.

METHODS: Patient health records for individuals who underwent surgical management of

carpal tunnel syndrome (CTS), Dupuytren's disease (DD) or stenosing tenosynovitis (time-periods: March 2018 to July 2019 [pre-pandemic] and March 2020 to July 2021 [pandemic]) were retrieved from two academic institutions. The primary outcome was number of surgeries performed in each time-period. Secondary outcomes included wait-times for each surgery type during the pandemic compared to the corresponding pre-pandemic time-period. Wait-time was defined as the time-period between the surgeon's decision to treat surgically and the time of surgery (Wait 2). Cumulative percentage tables were generated to determine the proportion of patients that fell above a pre-determined cut-off of 182 days (a government-set target wait-time). A univariate comparison of wait-times and variables determined a priori (age; gender; socioeconomic status; geographic location; and comorbidities) was completed.

RESULTS: The search retrieved 906 patient records (586 carpal tunnel release (CTR) cases, 153 fasciotomy/subtotal palmar fasciectomy cases and 167 pulley release/tendon release cases). Fifty-four patient records were pulled in duplicate. Patient records that exceeded more than one year were omitted as per care guidelines (n = 137). Therefore, 715 cases were included (447 CTR cases, 135 fasciotomy/subtotal palmar fasciectomy cases and 133 pulley release/tendon release cases). Two-hundred-and-sixty-four elective hand procedures were performed during the COVID-19 time-period, compared to 451 in the pre-pandemic time-period (n= 187, 41.5%). The number of surgeries for CTS reduced the most, with 291 surgeries during the pre-pandemic time-period compared to 156 performed during the pandemic (n=135, 46.4%). In regard to wait-times, 84.1% of CTR patients underwent surgery before the target wait-time cut-off in the pre-pandemic period compared to 78.1% of patients during the pandemic period. For fasciotomy/ subtotal palmar fasciectomy, 75.0% of pre-pandemic patients underwent surgery within the target time, compared to 81.1% of patients in the pandemic period. For pulley release/ tendon release, 92.9% of patients underwent surgery before the cut-off pre-pandemic, compared to 83.0% of patients in the pandemic period. No association or variation in wait-times was found in regard to the aforementioned variables.

CONCLUSIONS: During the pandemic, a decreased total number of elective hand surgeries were performed when compared to the corresponding pre-pandemic period, contributing to a surgical backlog. Fewer hand surgery cases achieved target wait-times during the pandemic period. To mitigate surgical case backlog, potential solutions have been proposed and should be evaluated further.1,2

REFERENCES:

1. Ghoshal S, Rigney G, Cheng D, et al. Institutional Surgical Response and Associated Volume Trends Throughout the COVID-19 Pandemic and Postvaccination Recovery Period. JAMA Network Open. 2022;5(8):e2227443-e2227443. doi:10.1001/JAMANETWORKOPEN.2022.27443

2. McKinsey & Company. Cutting through the COVID-19 surgical backlog. Published October 8, 2020. Accessed February 17, 2022. https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/cutting-through-the-covid-19-surgical-backlog

Price Transparency in Hand Surgery: Investigation of Compliance and Price Variation among Top US Hospitals

Abstract Presenter
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INTRODUCTION: With the aim of helping patients make informed health care decisions and decreasing overall healthcare expenditures, the Centers for Medicare and Medicaid Services (CMS) established a price transparency law in 2021 requiring hospitals to publish standardized and accessible price data. We investigated compliance rates and price variation in common hand surgery procedures among prominent US hospitals.

METHODS: We performed a multi-institutional economic evaluation study. The top 20 U.S hospitals were identified using 2021-2022 US News list of "Best Hospitals". Common operative hand procedures were grouped into 13 categories: incision and drainage, debridement, biopsy, De Quervain treatment, ganglion cyst treatment, synovectomy, tendon repair, Dupuytren's repair, reconstruction, tendon repair, neuroplasty, carpal tunnel release and cubital tunnel release. Price data, including payer-specific negotiated charge, discounted cash price, de-identified minimum and maximum negotiated charges, location of the procedure, and billing code, was collected for each category at each hospital system using current procedural terminology codes. Compliance rates and price variation were analyzed using descriptive statistics.

RESULTS: 18 of the 20 hospitals evaluated provided publicly accessible price data. Nine hospitals (50%) provided all pricing information required by the CMS price transparency law for hand surgery procedures. Of the six CMS requirements, hospitals were most compliant with publishing billing codes (18/18, 100%) and procedure campus location (16/18, 100%). Hospitals were least complaint in publishing discounted cash price (13/18, 72%), de-identified minimum (13/18, 73%) and maximum charges (14/18, 78%). Prices for tendon sheath incision for De Quervains treatment demonstrated the greatest variation per average total gross charges between hospitals. Least price variation per average total gross was found for hand debridement procedures. Average gross total charge did not correlate with hospital rank.

CONCLUSIONS: Despite CMS legislation, there continues to be significant variation in price transparency as well as the cost of common hand surgery procedures, regardless of hospital reputation. Lack of transparency places patients at a disadvantage, particularly when seeking a physician and hospital system for elective surgeries.

Assessing the Effectiveness of Lymphovenous Bypass for Upper Extremity Lymphedema Using Indocyanine Green Lymphography Staging

Abstract Presenter
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INTRODUCTION: Lymphovenous bypass (LVB) is a microsurgical procedure to restore lymphatic drainage in patients with lymphedema. We sought to determine if the change in limb volume after LVA differed between indocyanine green lymphography (ICG) stage groups in patients with upper extremity lymphedema.

METHODS: Adult patients that underwent upper extremity LVB were included. The mean percentage change in volume difference was calculated as follows: % Change = [(postoperative difference) – (preoperative difference)/(preoperative difference)] * 100, where postoperative difference is the absolute difference between the affected and unaffected limbs' volume at a specific endpoint and the preoperative difference is the absolute difference between the affected and unaffected limbs' volume preoperatively. The endpoints were 2 weeks, 2 months, and 6 months after the surgery. Patients were categorized based on the mean ICG (preoperative and postoperative 0 to 5 staging). After evaluating the endpoints for normality using Shapiro-Wilk tests, differences per endpoint among ICG stage groups were evaluated using Kruskal-Wallis tests. The limb volume change is expressed as a percentage. Data is presented as mean (standard deviation).

RESULTS: 70 patients were identified for this study ('stage 1' = 2, 'stage 2' = 18, 'stage 3' = 21, 'stage 4' = 28, 'stage 5' = 1). Kruskal-Wallis's test was used to assess for significant differences in endpoint values among the ICG stage categories. The test, which compares median values, was statistically significant after two weeks (p-value = 0.04833 for week 2). The mean percentage change in volume difference among ICG stage categories at 2 weeks was as follows: ('stage 1' -296 (NA), 'stage 2' -112 (106), 'stage 3' -24.0 (81.3), 'stage 4' -44.6 (21.3), 'stage 5' NA. The remaining endpoints, on the other hand, had no statistical significance (2 = 2.6853, df = 2, p-value = 0.2611 for month 2; 2 = 3.0826, df = 2, p-value = 0.2141 for month 6; 2 = 2.7886, df = 2, p-value = 0.248 for year 1). Despite this, after month 2 of follow-up, there were significant differences in the mean volume change between the ICG staging categories.

CONCLUSION: The results of the Kruskal-Wallis test suggest that there is a significant difference in the mean percentage change in volume between ICG staging categories after two weeks of follow-up. However, there were no significant differences in the mean volume change between ICG staging categories after month 2, month 6, or year 1 of follow-up. These results suggest that the ICG staging system is a useful tool for predicting patient outcomes after two weeks of follow-up, but further research is needed to determine its predictive power beyond this point.

Novel Frost-Bite Proof Cooling Device to Combat Chemotherapy Induced Peripheral Neuropathy: A Proof of Concept Study

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BACKGROUND: The prevalence of chemotherapy-induced peripheral neuropathy (CIPN) is as high as 68% in the first month after treatment with targeted anticancer drugs. A study of 1,725 patients treated with microtubule inhibitors suggested that cryotherapy with frozen gloves at -20 to -30°C was effective in preventing CIPN but these temperatures can result in frostbite, leading to a worldwide recall of cooling equipment. Since then, the effectiveness and safety of cooling temperatures for CIPN prevention remain unknown. Previous reports of post-exercise muscle cooling therapy, on safe cooling with phase change material (PCM) at 15°C for 6 hours have demonstrated an adequate safety profile without frostbite. Based on this evidence, we developed the Cool Water Electric Circulation Seat (CECS), which maintains a sustained temperature of 15 degrees Celsius.Recently, video-capillaroscopy (VC) has been improved to enable observation of blood flow in microcirculation with a high resolution of 1.2 megapixels at 620x magnification. In this study, as a preliminary experiment, cooling the hand and finger with the CECS was performed, and blood flow in the superficial skin layer was evaluated using video-capillaroscopy.

METHODS: A total of 21 healthy Japanese adult volunteer left hands were continuously covered by CECS and cooled at 15°C for 2.5 hours, which is the standard time for the administration of Taxanes (anti-cancer drugs) . The blood flow status of the dorsal hand and the nail capillary of the ring finger before and after cooling was captured using video-capillaroscopy (GOKO Bscan-ZD). Data was recorded three minutes before and after cooling. We measured still images of VC using ImageJ software. The area of capillaries was obtained by dividing the blood vessel area (Pixels) by the area of the entire visual field. We defined the blood vessel area reduction rate (%) as the percentage of reduction in the blood vessel area after cooling. The red

blood cell movement was evaluated as 0 points for unobservable, 1 point for slow movement, and 2 points for fast movement.

RESULTS: The average age was 40.2±12.5 years. The superficial temperature of the finger before treatment was 36.129±0.299℃ and dropped to 24.043±1.735℃ after cooling (p<.001). In the finger, the area before cooling was 13±2.6 % and was significantly reduced after cooling to 3.73±1.2 % (Mean difference 8.7, 95%CI 7.85 - 10.3; p<.001). The superficial temperature of the hand before treatment was 36.29±0.245℃and dropped to 23.219±0.961℃ after cooling (p<.001). On the hand, the area before cooling was 11.2±2.88 % and was significantly reduced after cooling to 3.848±1.621 % (Mean difference 13.071, 95%CI 12.57-13.57, p<.001). Before cooling the movement of RBC was categorized as slow (52.4%) or fast (47.6%). After cooling, RBC movement was classified as slow (23.8%) or no movement (76.2%) (p<.001). Temporary redness and pain were reported in 38.1% and 28.6% of the cases 30 minutes after cooling, and these were completely recovered after 1day, respectively.

CONCLUSION: The CECS has the potential to provide adequate and safe cooling for maximum prevention of CIPN and to allow cooling therapy to continue without risk of frostbite.

Novosorb Bio-Degradable Temporizing Matrix is a Cost-Effective Option for Reconstruction of Complex Upper Extremity Wounds

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PURPOSE: Treating traumatic wounds with exposed tendon and/or bone is often costly to both patients and the healthcare system, requiring rigorous wound care, lengthy hospital stays, and multiple surgical procedures including use of dermal matrices, secondary skin grafting, and possible flap reconstruction. Here, we aim to compare the costs associated with using Novosorb Bio-degradable Temporizing Matrix (BTM) in reconstruction of complex upper extremity wounds with wounds reconstructed with Integra CCS Bilayer. We hypothesize that BTM is a cost-effective option for reconstruction of complex upper extremity wounds

METHODS: A retrospective, IRB-approved chart review was performed for all patients with isolated upper extremity trauma who underwent reconstruction of complex upper extremity soft tissue defects with either BTM or Integra between January 2017 and May 2022. Patients with poly-trauma or admitted for other medical reasons were excluded from analysis. Demographic data, comorbidities, wound etiology, wound size, secondary surgery and complications were recorded. Cost of procedures were determined using Centers for Medicare & Medicaid Services (CMS) Physician Fee Schedule.

RESULTS: 27 patients were identified: 18 (66.7%) BTM and 9 (33.3%) Integra. Age, sex, medical comorbidities, wound size, and duration of hospital stay were similar between the groups. Average template size was 101.8 cm2 for BTM and 64.7 cm2 for Integra (p = 0.19). Skin grafting was required in 8 patients (44.4%) in the BTM group compared to 5 patients (55.6%) in the Integra group, p=0.013. Time to skin graft was 43.4 days in BTM group and 21.4 days in Integra group, p=0.002. 6 patients (33.3%) in BTM group experienced complications compared to 5 patients (55.6%) in Integra group, p=0.002. Mean number of secondary procedures required after template placement was 0.67 in BTM group compared to 1.56 in Integra group, p=0.049. Overall, there was no differences in successful wound closure between the two groups, BTM 94.4% vs Integra 77.8%, p=0.48. Less patients in BTM group experienced complications, BTM 33.3% vs Integra 55.6%, p=0.0018. There were no differences in time to wound closure BTM 86.1 vs Integra 58.3 days, p=0.09.

At our institution, 100 cm2 of BTM cost $850 and $3150 for Integra. The average cost of skin grafting is $958.78. When factoring in cost of product, skin grafting (in indicated), and cost of secondary surgeries (including debridement and secondary flaps), the average cost of wound reconstruction with BTM was $1361.92 compared to the average cost of Integra $3185.71 p=0.049.

CONCLUSION: We have found that Novosorb BTM is effective in management of complex upper extremity. When compared to wounds reconstructed with Integra, those with Novosorb BTM had lower complication rates. Though there was no statistical significance in successful wound closure, likely due to the small sample size, BTM cohort had 94.4% successful wound closure compared to 77.8% with Integra. Given the difference in product cost of $2300, decreased need for secondary skin grafting and revision procedures, wounds reconstructed with Novosorb BTM have significantly lower cost when compared to Integra.

A comparison of trauma bay and operating room washouts of gunshot wounds of the upper extremity

Abstract Presenter
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INTRODUCTION: Gunshot wounds (GSW) of the upper extremity (UE) create significant morbidity in the United States. Washout in the trauma bay or operating room (OR) are often employed as initial management of these injuries, but this practice can be time and resource intensive and may not necessarily improve outcomes. Thus we sought to examine the impact of washout on civilian UE GSW complications at an urban level 1 trauma center.

METHODS: All adult patients with UE GSWs from 2015-2020 with at least 6-months post-

injury follow-up in the University of Pennsylvania Trauma registry were studied for demographics, injury pattern, trauma bay treatment, operative details, and post-operative outcomes. Inclusion criteria was adults ≥ 18 years old and patients with GSW to the upper extremity. Exclusion criteria was children < 18 years old or patients with simultaneous non-ballistic trauma. Patients were grouped according to location of washout. Fisher's exact and ANOVA tests were used for statistical analysis.

RESULTS: Of the 360 patients included in the study, 120 (33.3%) received neither trauma bay nor OR washout, 105 (29.2%) received only trauma bay washout, 84 (23.3%) received only OR washout, and 51 (14.2%) received both trauma bay and OR washout. All patients received antibiotics. There was no difference in patient age or race across groups, but patients who did not go to the OR had fewer fractures (20.4% vs. 85.2%, $p<0.001$) and lower rates of compartment syndrome (0% vs 4.4%, $p=0.006$), unplanned reoperation (0.9% vs. 5.9%, $p=0.013$) and unplanned readmission (0.4% vs. 11.9%, $p<0.001$) compared to those who went to the OR. Patients who received trauma bay washout had fewer GSWs (3.8 vs. 2.3, $p<0.001$) compared to patients with neither trauma bay nor OR washout. There was no significant difference in injury type (including soft tissue, fracture, peripheral nerve, and tendinous injuries), number of unplanned reoperations, unplanned readmissions, sepsis, DVT/PE, SSTI/DSTI, or 30-day mortality. Amongst those who went to the OR, patients who received a trauma bay washout prior to the OR had no significant difference in time to OR, injury type or post-operative complications compared to patients with only OR washout.

CONCLUSION: Most of our UE GSW patients had washouts, although OR washout patients had significantly more complications compared to those who had no washout or only trauma bay washout. However, this more likely reflects differences in injury type and increased severity of injuries that necessitated operative attention rather than time or location of the washout. These findings suggest certain UE GSW injuries can be successfully treated and washed out in the trauma bay, and that operative washout patients more likely have fractures and more extensive injuries. Further prospective research may help delineate the role of the initial washout and its impact on definitive treatment and clinical outcomes.

Migraine & Peripheral Nerve

Pulling the Trigger: The importance of early exploration in ballistic peripheral nerve injury

Abstract Presenter
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PURPOSE: Gun violence has increased 25% over five years.1 While current teaching has traditionally advocated for a "watch and wait" approach to ballistic nerve injuries, many patients

treated with this paradigm fail to recover distal function and subsequently require tendon and nerve transfers.2,3 Herein, we describe our experience with early exploration in ballistic peripheral nerve injuries.

METHODS: A retrospective review was performed for ballistic peripheral nerve injuries since February 2022. Data collection included demographic data, number of gunshot wounds (GSW's), concomitant vascular/orthopedic injury, and peripheral nerve outcomes. Early exploration was defined as exploration within the primary hospitalization. Primary outcome was nerve transection at initial exploration.

RESULTS: Fourteen patients met inclusion criteria. All patients were male with an average age of 29±8.3 years with an average number of 3.6±2.6 GSW's. Of these, 42.9% (N= 6) of patients had a concomitant vascular injury, and 50% (n=7) demonstrated a concomitant fracture. Ten patients (71.4%) underwent early exploration with a mean of 16 days from injury to exploration. Among these, 70% (N=7) demonstrated nerve transection injury requiring reconstruction. Four of these ten patients had injury to a named vessel, three patients had ballistic tracking through a constrained nerve entrapment point, and two patients demonstrated retained bullet fragments on radiography. Four patients had delayed reconstruction necessitating tendon transfers. Time to exploration in these delayed patients was 258 days with lack of demonstrable neural recovery.

CONCLUSIONS: With an understanding of the temporal window in which to reinnervate muscle, early exploration of ballistic peripheral nerve injuries allows for early detection of transected nerves and their prompt reconstruction. The "watch and wait" approach can cost these patients critical time in the reinnervation window. Certain criteria are highly suspicious for nerve transection in ballistic trauma. Patients with transection injury to a named vessel, ballistic tracking through a constrained neural entrapment point, and patients with evidence of projectile fragmentation have a high probability of neural transection injury requiring reconstruction.

REFERENCES:

1. Gramlich J. What the data says about gun deaths in the US Pew Research Center. February 3, 2022.
2. Mathieu L, Goncalves M, Murison JC, Pfister G, Oberlin C, Belkheyar Z. Ballistic peripheral nerve injuries: basic concepts, controversies, and proposal for a management strategy. European Journal of Trauma and Emergency Surgery. 2022;48(5):3529-39.
3. Hollerman JJ, Fackler M, Coldwell D, Ben-Menachem Y. Gunshot wounds: 1. Bullets, ballistics, and mechanisms of injury. AJR American journal of roentgenology. 1990;155(4):685-90.

Current Regenerative Peripheral Nerve Interface and Targeted Muscle Innervation literature. A Bibliometric Analysis

Abstract Presenter
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PURPOSE: Each year, around 150,000 nontraumatic lower-extremity amputations are performed in the USA. These surgeries are associated with high patient morbidity and decreased quality of life. Recent efforts to improve patient outcomes after amputation prompted the integration of the novel techniques Targeted Muscle Innervation (TMR) and Regenerative Peripheral Nerve Interface (RPNI) into conventional amputation surgery. TMR and RPNI become one of the hot topics in Plastic Surgery. In this study, we analyzed the publication and authorship trends of TMR/RPNI bibliometrically.

MATERIALS AND METHODS: A systematic search of the PubMed/Medline database was conducted, which identified 1030 articles (868 TMR and 162 RPNI). The Journal Citation Reports - Web of Science Group – Clarivate tool, gender API, and Researchgate were utilized to determine the journal Impact Factors, author genders, and the number of citations, respectively.

RESULTS: One hundred seventy-four articles were included in the final analysis. As TMR was introduced to the field a decade earlier (2004 vs 2014), more than 2/3rd of the articles was on TMR. These articles were published in various journals, mainly with a medium Impact Factor (IF). The journals with the highest IFs were Lancet (202.7) for the TMR; Annals of Surgery (13.78) for the RPNI studies. The articles with the highest citations had 838 (TMR) and 98 (RPNI) citations. Gender disparity was observed in the first (TMR 68.8%; RPNI 75%) and senior authorship (86.1%; RPNI 76.9%).

CONCLUSION: TMR/RPNI is a relatively novel area of plastic surgery characterized by promising results and constant evolution. TMR/RPNI research has been published in a wide variety of both medical and surgical journals. A substantial number of articles on TMR/RPNI had >100 citations.
The first few years of the TMR/RPNI research are characterized by publications exclusively by the original group describing the technique, including those in journals with the two highest impact factors. The introduction of the RPNI overlapped with the start of the second TMR period, in which the first publications by the other USA and international institutions were noted. This study also highlights the low number of impactful publications originating from international institutions and the discrepancy between the national and international adoption rates of TMR and RPNI techniques.

Postoperative pain course and factors associated with successful pain mitigation following primary and secondary Targeted Muscle Reinnervation in amputees

Abstract Presenter
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PURPOSE: Targeted Muscle Reinnervation (TMR) is an effective modality in the surgical management of neuropathic pain for amputees. TMR can be performed within 14 days of the amputation (primary TMR) for prevention of neuropathic pain, or secondarily (> 14 days post-op) for treatment of neuropathic pain (1-3). Patients may experience significant pain relief, and cases of remission or complete absence of pain have been reported. However, it is not known when pain relief is achieved and which patients benefit the most from this technique.

METHODS: We examined the charts of 218 patients who underwent TMR at the Massachusetts General Hospital between 2017 and 2023. Demographic, epidemiological, and surgery-related data was collected and analyzed. Longitudinal data of pain scores collected with a 0-10 numerical pain scale were used to assess the postoperative pain course and factors associated with effective pain remission and prevention. Locally weighted scatterplot smoothing (LOWESS) curves were utilized to visualize postoperative pain courses.

RESULTS: A total of 100 patients were included in the final analysis. Compared to Secondary TMR patients, primary TMR Patients (n = 47) reported lower pain scores, pain intensity, and pain interference up to 12 months post-op, with a statistically significant difference in pain levels at 3 and 6 months ($p<0.05$). Sustainable pain remission/prevention (pain level of 3/10 or lower for >3 months up until the last follow-up) was achieved for 52.3% of primary and 18.9% of secondary TMR patients. For primary TMR patients, 19.1% reported complete pain disappearance (NRS = 0 for more than 3 months until the last follow-up). This occurred in 1.9% of secondary TMR patients. Primary TMR patients have significantly higher odds (OR=4.89; 95% CI 1.84-13.37. p=0. 0003) of achieving sustained mild pain, than secondary TMR patients. Effective pain prevention in primary TMR patients was correlated with an absent history of psychiatric comorbidities and depression. In secondary TMR patients, higher BMI, distal amputation levels, lower preoperative pain interference scores, and absence of psychiatric diseases were significantly associated with sustainable pain remission.

CONCLUSIONS: Patients undergoing primary TMR report lower pain scores overall and demonstrate a higher percentage of patients achieving optimal outcomes. Psychiatric comorbidities appear to be a risk factor for worse outcomes in both groups and we associate further epidemiological characteristics to an increased likelihood of successful outcomes in secondary TMR patients.

REFERENCES:
1. Kuiken TA, Barlow AK, Hargrove LJ, Dumanian GA. Targeted muscle reinnervation for the upper and lower extremity. Tech Orthop. 2017;32(2):109-116.
2. Dumanian GA, Potter BK, Mioton LM, et al. Targeted Muscle Reinnervation Treats Neuroma and Phantom Pain in Major Limb Amputees: A Randomized Clinical Trial. Ann Surg.

2019;270(2):238-246.
3. O'Brien AL, Jordan SW, West JM, Mioton LM, Dumanian GA, Valerio IL. Targeted Muscle Reinnervation at the Time of Upper-Extremity Amputation for the Treatment of Pain Severity and Symptoms. J Hand Surg Am. 2021;46(1):72.e1-72.e10.

Correlation of Heterotopic Ossification with Neuroma Distribution and Pain in Below-Knee Amputees undergoing Neuroma Excision and Targeted Muscle Reinnervation

Abstract Presenter
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HYPOTHESIS: The relationship between nerve regeneration and osseous growth has been described previously(1-3). During treatment of surgical neuroma in below-knee amputees, we have noticed that heterotopic ossification (HO) depicted on preoperative X-ray appears to correlate with the location of symptomatic neuromas in both the peroneal (fibula) and tibial (tibia) nerve distributions.

METHODS: A retrospective review of amputees enrolled in a prospective repository between 2018 and 2023, treated with neuroma excision and Targeted Muscle Reinnervation (TMR) for neuropathic pain, was performed. Patients were included if a pre-operative X-ray of the stump was obtained and a pre-operative pain score within three months was reported. X-rays were assessed for the presence of heterotopic ossification (HO), location, and severity. HO was classified as the presence or absence of HO on the distal fibula and tibia. The presence of tibial and/or peroneal neuroma was collected by chart review. Pre-operative pain scores on a 0-10 Numeric Rating Scale (NRS) were included.

RESULTS: Sixty-two limbs of 59 amputees were included in this study, with 24 (38.8%) female patients and 38 (61.2%) having HO on X-ray. The median X-ray-to-surgery interval was 3.0 (IQR 2.0-5.0) months, and the median pain score-to-surgery interval was 0 (IQR 0-0.7) months. The overall presence of HO, distal fibular HO, and distal tibial HO correlated with higher pain, compared to the absence of HO on X-ray (all $P< 0.01$) (Figure 1A). Identifying peroneal neuroma with distal fibular HO showed significantly higher pain than those without HO (6.7 ± 2.0 vs. 5.0 ± 2.6, $P= 0.03$); this was also the case for presence of tibial neuroma with distal tibial HO (6.6 ± 1.8 vs. 3.8 ± 3.1, $P< 0.01$) (Figure 1B). The presence of distal fibular HO correlated with presence of a peroneal neuroma ($X2= 9.1$, $df= 1$, $N=62$, $P< 0.01$), and shows significantly higher odds of having a symptomatic peroneal neuroma (OR, 9.1; 95% CI [1.9-44.7], $P< 0.01$). However, the presence of distal tibial HO did not correlate with the presence of a tibial neuroma ($X2= 3.9$, $df= 1$, $N=62$, $P= 0.09$) (Figure 2).

CONCLUSION: In below-knee amputees undergoing neuroma excision and TMR, identifying HO on X-ray correlates with higher preoperative pain. Identifying distal fibular HO on pre-operative X-rays indicates presence of a symptomatic peroneal neuroma, while no correlation between symptomatic tibial neuroma and the presence of tibial HO was shown. These findings may assist in intraoperative decision-making on which nerves to address in neuroma surgery and inform the biology of neuroma formation and development.

REFERENCES:

1. Lee S, Hwang C, Marini S, et al. NGF-TrkA signaling dictates neural ingrowth and aberrant osteochondral differentiation after soft tissue trauma. Nat Commun. 2021;12(1).
2. Minarelli J, Davis EL, Dickerson A, et al. Characterization of neuromas in peripheral nerves and their effects on heterotopic bone formation. Mol Pain. 2019;15.
3. Qin Q, Gomez-Salazar M, Cherief M, et al. Neuron-to-vessel signaling is a required feature of aberrant stem cell commitment after soft tissue trauma. Bone Res. 2022;10(1).

Validating a Murine Model of Muscle Loss in Chronic Nerve Compression (CNC)

Abstract Presenter
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PURPOSE: Chronic compression neuropathies are characterized by demyelination, impaired nerve conduction speed (NCS), and muscle loss. Previous studies have established a murine model of CNC; however they did not investigate changes to the muscle.1 We aim to validate a mouse model of muscle loss in CNC, and to determine the mechanism and timing of muscle and nerve related changes.

METHODS: CNC was induced by placing a silastic tube around the sciatic nerve with the contralateral limb as control. At 6, 8, 12, and 16 weeks, NCS was assessed, and the sciatic nerve, tibialis anterior (TA), and extensor digitorum longus (EDL) were harvested bilaterally. Muscle weight and fiber size, and nerve myelin thickness and axon diameter were measured. RT-PCR of TA and EDL muscle tissue was also performed. Genes assayed included atrogenes Foxo-3, atrogin-1, and MuRF1, markers of myogenesis, myoD and myogenin (MyoG), fatty-acid synthase (FAS), type-I collagen (Col1a1), and inflammatory markers TNF-alpha and IL-1beta.

RESULTS: We observed a progressive decline in NCS that peaked at 16 weeks with a 23% decline compared to control. At 16 weeks, we also observed a 31.7% increase in g-ratio

indicating demyelination and 37.7% decline in axon density suggesting axon loss.

At 6 weeks, we observed a maximum 18.5% decline in TA+EDL muscle weight. Muscle fiber cross-sectional area was reduced 15.3% in the non-oxidative TA composed of large type IIB fibers and elevated 9.0% in the EDL composed of smaller type IIA, IIB, and IIX fibers at 16 weeks. In addition, at 16 weeks, atrogene expression was increased 1.4–1.7x implying ongoing atrophy. MyoD and MyoG expression was reduced 0.5x, FAS expression was increased 1.5x, Col1a1 expression was increased 1.5x, and inflammatory marker expression was increased >2x. All findings were significant at $p<0.05$.

CONCLUSIONS:
The murine model of CNC demonstrates progressive muscle loss that correlates with slower NCS, demyelination, and reduced axon density. Gene expression of markers of atrophy, fatty acid synthesis, inflammation, and fibrosis were elevated, while markers of myogenesis were reduced. Ongoing studies will further define muscle changes with time including fatty replacement, atrophy, and fibrosis. Together, these findings validate a murine model of muscle loss in CNC.

CITATIONS:
1. Gupta R, Nassiri N, Hazel A, Bathen M, Mozaffar T. Chronic nerve compression alters schwann cell myelin architecture in a murine model. Muscle Nerve. 2012;45(2):231-241. doi:10.1002/mus.22276

CGRP Antagonists And CGRP Monoclonal Antibodies As Treatment For Neuropathic Pain–A Systematic Review And Meta-Analysis Of Animal Studies.

Abstract Presenter
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PURPOSE: Neuropathic pain is characterized by intricate interactions between peripheral and central nervous system mechanisms, including peripheral sensitization, central sensitization, and neuroinflammation. Calcitonin gene-related peptide (CGRP) plays a crucial role in these processes and has been found to be upregulated in neuropathic pain in both animal models and patients. With the established safety profile and regulatory approval of CGRP therapeutics for

indications such as migraine, cluster headaches, and trigeminal neuralgia, we have a favorable opportunity to leverage these agents for a novel indication–neuropathic pain. However, despite the potential, there is currently no consensus on the effectiveness of CGRP therapeutics for neuropathic pain in animal studies. This systematic review and meta-analysis aim to comprehensively evaluate the existing data and consolidate evidence on the effectiveness of CGRP antagonists and monoclonal antibodies as a potential treatment for neuropathic pain.

METHODS: The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive search was conducted in four electronic bibliographic databases (MEDLINE, EMBASE, Web of Science, and Scopus) to identify English-language animal studies published from 1980-2022 that evaluated the effectiveness of CGRP antagonists or monoclonal antibodies in treating neuropathic pain. Out of 3705 articles initially identified, 2001 duplicates were removed, and 1704 articles were screened based on their titles and abstracts. After full-text assessment of 172 articles, 23 studies were included in the final meta-analysis. Statistical analysis was performed using R software version 4.2.2. The MBESS package in R was employed to transform withdrawal thresholds measured in grams for mechanical allodynia and in seconds for thermal hypersensitivity into standardized mean differences (SMD). The meta package (version 4.9-6) with the metagen function was used to combine the studies into a pooled estimate of SMD. We performed separate meta-analyses for mechanical allodynia and thermal hypersensitivity outcomes, using random-effects inverse variance meta-analysis methods and assessed between-study heterogeneity using the I2 index.

RESULTS: The overall SMD for mechanical allodynia in the 11 studies was -5.30 (95% CI [-6.65, -3.96]), indicating a significant reduction in mechanical allodynia with CGRP therapeutics compared to controls. For thermal hypersensitivity, the overall SMD was -2.28 (95% CI [-6.65, -3.96]), indicating a significant reduction in thermal hypersensitivity after CGRP therapeutic administration. Both outcomes exhibited high heterogeneity, with I2 values of 84.5% and 89.1%, respectively that may be attributed to differences in study design, type of animal, and model of neuropathic pain used.

CONCLUSION: These results indicate a statistically significant effect in favor of CGRP therapeutics as a potential treatment for neuropathic pain. However, the significant heterogeneity among the studies should be taken into consideration when interpreting the overall effect and further evaluation is needed to explore sources of heterogeneity. Nonetheless, given the established safety profile and regulatory approval of CGRP therapeutics for other indications, the results of this study provide an impetus for the development of clinical trials to evaluate the effectiveness of CGRP antagonists and monoclonal antibodies for neuropathic pain.

The Effect of Local Exosomes, Stem Cells and Tacrolimus on Neurite Extension

Abstract Presenter
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BACKGROUND: Reconstruction of nerve injuries using nerve allograft still results in inferior regeneration and motor outcomes to the nerve autograft. Nerve regeneration can be enhanced by modulating the local microenvironment of the nerve reconstruction site. The aim of this study was to investigate the combined effect of local delivery of Purified Exosome Product (PEP), mesenchymal stem cells (MSCs) and Tacrolimus (FK506) alone and combined on nerve regeneration.

METHODS: A three-dimensional in vitro compartmented cell culture system was used to evaluate regenerating neurites from a rat neonatal dorsal root ganglion into the adjacent nerve. Decellularized allografts were augmented with local application of (i) MSCs, (ii) PEP (5%), (iii) FK506 (100 ng/mL), (iv) combined PEP and FK506, and (v) combined MSC and FK506 (N=9/group). Outcomes were compared to untreated autografts and allografts. After 48 hours, constructs were stained against Neurofilament-160 to measure neurite extension as a measure of nerve regeneration, and CD90-DAPI to confirm stem cell characterization.

RESULTS: Stem cell viability was confirmed in all MSC-treated grafts using CD90-DAPI staining. Treatment with PEP, PEP and FK506, and MSCs and FK506 significantly improved outcomes of untreated allografts ($p<0.0001$, $p<0.0001$, $p<0.001$) and were found comparable to the untreated autograft ($p>0.99$, $p>0.99$, 0.99). Combined treatments of PEP and FK506 and MSCs and FK506 were found comparable ($p>0.99$). Combined MSCs and FK506 treatment was found superior to MSCs alone ($p<0.02$).

CONCLUSION: PEP treatment alone, PEP combined with FK506 and MSCs combined with FK506 resulted in a significant neurite extension, and was found comparable to the current gold standard, the autograft. These results suggest that the neuroregenerative effect of PEP is similar to MSCs. PEP could overcome the limitations of harvesting, culturing and seeding of stem cells, making this more translatable to clinical care. In vivo animal models are needed to further investigate the effect of PEP alone and combined with FK506 in nerve regeneration.

Acute Flaccid Myelitis: A Treatment Algorithm Designed from Surgeon and Caregiver Experience

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PURPOSE: Acute flaccid myelitis (AFM) is a polio-like illness largely affecting children that leads to weakness or paralysis of one or more limbs. To date, AFM has affected an estimated 701 patients in the United States. AFM is rare, but the effects are life-altering. Nerve surgeons can offer interventions in the form of nerve transfers or decompressions largely dependent on the time and symptoms at which a patient presents. To overcome gaps in referral patterns, the AFM community has created a social media network to exchange resources and experiences among patients and families. The overarching goal of this study was to understand the gaps in care as perceived by caregiver experience and to collate our substantial clinical experience to establish a management framework for healthcare providers and families affected by AFM.

MATERIALS AND METHODS: A retrospective chart review was conducted of patients who presented to the senior author's peripheral nerve clinic with the diagnosis of AFM made between 2014 to 2020. Demographic data and outcomes were reviewed. To understand the influence of social media on patient and family experience, an anonymous survey was distributed via Qualtrics to the "AFM Facebook group" from April through June 2022. The survey consisted of 17 questions.

RESULTS: Thirty-one patients diagnosed with AFM were identified (average age of 5.6 years ± SD). Among this cohort, 9.7% presented to nerve clinic within 6 months, 48.4% presented between 6-12 months, and 41.9% presented after 12 months from diagnosis. Twenty-three patients underwent surgical intervention to improve function and/or pain. Intervention included nerve transfers and/or nerve decompressions at an average time from onset to nerve surgery of 11.7 ± 4.5 months (average ± SD). Based on our clinical experience, a treatment algorithm was developed to provide guidelines for multidisciplinary care (Figure 1).

Our distributed survey yielded 91 responses. Sixty percent of respondents found the social media platform via an internet search and 74% did so within the six months from AFM diagnosis. Social media was found to aid in the parents' medical decision making (73%), lead to a self-referral (59%) and to an intervention for 51 patients (56%). Family members quit working to become the primary caregiver in 45% of cases. More than half of patients traveled out of state for the medical care, including rehabilitation
(40%).

CONCLUSIONS: AFM is a rare illness with a natural history that can have life-altering long-term effects on patients and caregivers alike. Social media provides a platform for those affected to find support, gather information, and advocate to improve their child's medical care. As healthcare providers, it is imperative that we combine our clinical experience caring for AFM patients with the information provided by AFM families to improve care for new patients. Our proposed treatment algorithm seeks to provide the necessary guidelines to treat AFM patients in a timely fashion in order to improve outcomes.

Proteomic analysis of vessels in migraine surgery.

Abstract Presenter
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Although there is increasing evidence of migraine headaches having extracranial origins, the exact mechanisms behind the pathogenesis of surgically treated migraines continue to be poorly investigated and described. Specific alterations in the vasculature at the neurovascular bundles of the temporal and occipital trigger sites have been described. In this study we investigated the proteomic characteristics of superficial temporal and occipital arteries in the auriculotemporal and great occipital trigger points of migraine patients to determine their possible role in migraine etiopathogenesis. Forty biopsies were collected intraoperatively during migraine surgery. Samples were dissociated with Liberase TL enzyme and then were lysed, reduced and alkylated with LYSE buffer, digested, and processed by iST protocol (doi. org/ 10. 1038/ nmeth. 2834). Digested samples were analysed by a nano-UHPLC-MS/MS system using an Ultimate 3000 RSLC coupled to an Orbitrap Fusion Tribrid mass spectrometer. Protein identification was obtained using the MaxQuant software searched against the Uniprot reference human proteome database. We identified 2253 total proteins. 46 proteins were significantly modulated between healthy and pathological artery. From the GO enrichment analysis we found that the up-regulated proteins in the pathological artery were enriched in pathways related to immune functions such as negative regulation of lymphocyte-mediated immunity and leukocyte-mediated immunity, while the up-regulated proteins in the healthy arteries were enriched in pathways such as extracellular structure organization and collagen fibril organization. These data corroborated the role of vascular anomalies in migraine pathogenesis. The reflections of these results in surgical practice have still to be investigated.

Late Intercostal To Musculocutaneous Nerve Transfer To Restore Elbow Flexion In A 2 Year Brachial Plexus Injury

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Late Intercostal To Musculocutaneous Nerve Transfer To Restore Elbow Flexion In A 2 Year Brachial Plexus Injury

A 28 year old police officer was involved in a high velocity accident on March 2020, while driving his motorcycle at a speed of 60 km/h without wearing helmet or any protective motorcycle clothing, suffered a collision against waste containers, producing a severe cranioencephalic trauma , subarachnoid hemorrhage, Grade III liver laceration, right femur fracture and right brachial plexus palsy.

After 2 years of evolution, he presented in our center with paretic right upper extremity. At physical examination, right upper extremity with hypoplasia in comparison with its contralateral, presenting adduction of the shoulder and little elbow flexion, Trapezium motor function with a BMRC grade M5, Rhomboid M4, Supraspinatus M3, Infraspinatus M3, Biceps M2, deltoid M1, pectoralis major M1, rest of the muscles M0.

Electrodiagnostic studies revealed right brachial panplexopathy with axonal preganglionic alteration, severe axonal injury of the inferior trunk and medial cord without reinnervation data with null voluntary contractile activity, severe axonal injury of the superior trunk with few reinnervation data on biceps brachii and supraspinatus.

According to clinical findings and electromyographic studies, on June 2022 we performed surgical exploration of the musculocutaneous nerve; under transoperative nerve monitoring, revealing muscular activity on the right musculocutaneous nerve, due to the findings, we decided to realize nerve transfers of the 4th, 5th and 6th right intercostal nerves to the right musculocutaneous nerve, achieving a free tension coaptation.

On the sixth month review, the patient showed an important improvement in elbow flexion, achieving flexion of more than 90°, with functional motor improvement in the biceps brachii with a BMRC grade M4

It is said that elbow flexion is the most important function to recover in patients with brachial plexus injury, in which, nerve transfers from the intercostal nerves to the musculocutaneous nerve, represents a viable therapeutic option with good results. Nevertheless, it is important to take into account that after 12 to 18 months from injury, muscular denervation makes nerve transfers a non-viable option

With that on mind, in this patient despite of a 2-year brachial plexus injury, nerve transfers to recover elbow flexion, were realized with success, achieving good results. This result makes nerve transfers a viable option in patients with 2 or more year brachial panplexopathy injuries presenting with few reinnervation data in electrodiagnostic studies.

Expanding Our Role in Headache Management: A Systematic Review and Algorithmic Approach to Surgical Management of Postcraniotomy Headache

Abstract Presenter
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PURPOSE: The International Classification of Headache Disorders (ICHD) defines chronic postcraniotomy headache (PCH) as a "secondary headache persisting for longer than three months following a craniotomy." 1 Chronic PCH is unfortunately common and debilitating, with an incidence as high as 64%.2 However, the literature on this topic is sparse without clear management algorithms. 2–5 Possible etiologies of PCH include nerve injury and/or entrapment, hardware, dural adhesions, or musculoskeletal injury. The purpose of this study is to present the results of both a systematic review of the literature and a single-center case series for patients surgically managed for chronic PCH, both of which informed the development of a novel treatment algorithm that may be applied to this patient population

METHODS: Using PRISMA guidelines, we performed a systematic review of the literature, identifying articles describing the surgical management of PCH. Searches used a combination of the terms "neurosurgery," "craniotomy," "headache," and "pain." A retrospective chart review was performed to identify patients who met the criteria for surgical PCH treatment at a single institution between January 2013 to July 2021. A patient's history and physical exam determined the etiology and management, and pain severity scores were the primary outcomes measured.

RESULTS: Nineteen papers encompassing 131 patients described surgical management techniques for PCH. Analysis of improvement of pain after intervention in the literature demonstrated that 83 patients (63%) had complete resolution of pain, 23 patients (18%) had significant improvement, and 25 patients (19%) had no improvement ($X2 = 52.1$, $p < 0.001$). At our institution, 19 patients underwent surgical management for PCH. Headache duration ranged from 3.6 months to 12.1 years, with a mean duration of 3.4 ± 3.1 years. A significant reduction in pain scores from 7.57 to 2.16 ($p < 0.001$) was demonstrated, and eighty-four percent of patients achieved complete or significant pain reduction. The average duration of follow-up was 1.4 ± 1.18 years.

CONCLUSIONS: Through a literature review and our own case series, we demonstrate that surgical management of PCH can achieve remarkable results with significant improvement in pain. Plastic surgeons, with their expanding role in treating migraine and headaches, are well-suited to manage these patients. We present an algorithmic approach to simplify the management of this common and debilitating condition.

REFERENCES:
1. The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629-808. doi:10.1177/0333102413485658
2. Rocha-Filho PAS, Gherpelli JLD, de Siqueira JTT, Rabello GD. Post-craniotomy headache: Characteristics, behaviour and effect on quality of life in patients operated for treatment of supratentorial intracranial aneurysms. Cephalalgia. 2008;28(1):41-48. doi:10.1111/j.1468-2982.2007.01465.x
3. Schaller B, Baumann A. Headache after removal of vestibular schwannoma via the retrosigmoid approach: A long-term follow-up-study. Otolaryngology - Head and Neck Surgery. 2003;128(3):387-395. doi:10.1067/mhn.2003.104
4. Schessel DA, Nedzelski JM, Rowed D, Feghali JG. Pain after Surgery for Acoustic Neuroma. Otolaryngology–Head and Neck Surgery. 1992;107(3):424-429. doi:10.1177/019459989210700314
5. Rocha-Filho PAS. Post-Craniotomy Headache: A Clinical View With a Focus on the Persistent Form. Headache: The Journal of Head and Face Pain. 2015;55(5):733-738. doi:10.1111/HEAD.12563

Treatment delay in nerve decompression surgery

Abstract Presenter
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PURPOSE: When patients with chronic headaches have failed medical management and all the criteria for nerve compression are present, surgical trigger point deactivation is warranted. Currently, trigger point deactivation surgery is not routinely considered as part of the management algorithm of chronic headaches. Therefore, the aim of this study is to evaluate the time between onset of chronic headache and trigger point deactivation surgery and to report post-operative outcomes, to examine whether current treatment algorithms need to be adjusted.

METHODS: Eight -hundred and ninety-three patients that filled out screening forms for pericranial trigger point deactivation surgery between September 2012 and November 2022 were prospectively enrolled. Information regarding demographics, onset of symptoms and headache characteristics was collected. Patients who were diagnosed with refractory chronic headaches by a neurologist and had all their records at either Massachusetts General Hospital or Weill Cornell Medicine were included. Among the patients that underwent trigger point deactivation surgery,

the treatment outcome was evaluated by pain frequency (pain days per month), -intensity (scale of 0-10), and duration (in hours) preoperatively and at 12 months post-operatively.

RESULTS: Five-hundred and thirteen patients met the inclusion criteria. Patients were predominantly female (79%) and the average age was 44 (±14) years. The average age of symptom onset was 23 (±15) years and patients had been experiencing headache symptoms for 19 years (7.2-32) at the time of screening.
Preoperatively, the median number of headache days was 30 days per month (20-30), the median pain duration was 20 (8.5-24) hours and the median pain intensity during the headaches was 9.0 (8.0-10.0). Screening for surgery was performed by WGA or LG and includes a) confirmation of failure of conservative management b) history and exam findings consistent with nerve compression headache c) pain drawing positive for nerve pain d) ultrasound positive for nerve compression e) pain relief with local anesthetic block. After screening, 190 (37%) patients were considered good candidates for surgery and underwent trigger point deactivation surgery. The average time between onset of symptoms and trigger point deactivation surgery was 19 years (8.1-33). The average time of follow-up was 9.1 (±4.2) months. One-hundred and fifty-eight (83%) patients underwent occipital nerve decompression, 25 (13%) patients underwent frontal (supraorbital and/or supratrochlear nerve) decompression and 16 (8.4%) patients underwent temporal (auriculotemporal and/or zygomaticotemporal nerve) avulsion. Among the patients that underwent surgery, the median number of headache days per month decreased from 30 (22-30) preoperatively to 7.5 (0-30) (75%) ($p<0.001$) post-operatively, the median pain intensity decreased from 9.0 (8.0-10.0) preoperatively to 4.3 (0-7.0) (52%) ($p<0.001$) post-operatively and the median pain duration in hours decreased from 23 (10-24) preoperatively to 4.0 (0-14) (83%) ($p<0.001$) post-operatively.

CONCLUSION: The results of this study show that patients experience symptoms of nerve compression headache for an average of 19 years prior to undergoing trigger point deactivation surgery. Trigger point deactivation surgery significantly improves pain frequency, duration and pain and should be considered earlier in the treatment course of patients with chronic headache who have failed conservative management.

Intraoperative Anatomy and Postoperative Sensation of Targeted Nipple Areola Complex Reinnervation in Gender-affirming Double Incision Mastectomy with Free Nipple Grafting

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BACKGROUND: Gender-affirming mastectomy is the most frequently performed procedure in patients transitioning from a woman to man. However, in the standard surgical approach, intercostal nerves (INC) are transected which may result in loss of sensation. Targeted nipple areola complex (NAC) reinnervation (TNR) in gender-affirming double incision mastectomy with free nipple grafts (FNG) aims to improve postoperative sensation. The TNR technique involves preservation of the lateral ICN, and coaptation of the nerves to the NAC. A comprehensive understanding of the relevant ICN anatomy is important to optimize outcomes.

METHODS: 26 consecutive patients who underwent TNR were prospectively enrolled. Data included demographics, mastectomy weight, intraoperative anatomy of ICN branches, and axon and fascicle counts. Sensation was evaluated using monofilaments preoperatively, and postoperatively at one, three, and twelve months.

RESULTS: 52 mastectomies were performed. Per mastectomy, a median of 2 ICN branches (1-5) were used for TNR. A learning curve was associated with nerve branch dissection and coaptation. In the first third of mastectomies performed, an allograft with a median length of 3.5 cm (1.5-4.0) was required in 100% of patients, in the second third in 88.2% and in the last third in 52.9%.
Median fascicle count was one (1-1) in the 3rd, two (1-7) in the 4th, two (1-6) in the 5th, and two (1-8) in the 6th ICN. Mean axon density was 6163.1 (±1478.5) axons/mm2 in the 4th, 4221.1 (±1493.7) axons/mm2 in the 5th, 5804.8 (±2365.2) axons/mm2 in the 6th ($p=0.08$).

Patients with BMIs ≥30 kg/m2 had significantly worse preoperative sensation at the NAC ($p<0.01$) and breast skin ($p<0.05$). Mastectomy weight ≥800g was also significantly associated with worse sensation at the NAC ($p<0.0001$) and breast skin ($p<0.05$). There were no associations between number of branches found or axon and fascicle counts and preoperative sensation.

NAC sensation was significantly worse than preoperative values at 1 month ($p<0.01$), comparable at 3 months, ($p>0.05$) and significantly better at 12 months ($p<0.01$).
Chest skin sensation was comparable to preoperative sensation at 1 and 3 months postoperatively ($p>0.05$), and significantly better at 12 months ($p<0.05$).
There were no associations between number of branches used for TNR or number of branches that could directly reach the NAC, fascicle and axon counts and postoperative sensation.

CONCLUSION: TNR for gender-affirming double incision mastectomy with FNG allows for restoration of sensation within 3 months postoperatively. There is a learning curve associated with direct coaptation of nerves to the NAC versus use of an allograft. The 4th and 5th were most often used and most often reached the NAC directly. Axon counts were not statistically significantly different.

Caregiver distress: Does it exist in the peripheral nerve injury patient population?

Abstract Presenter
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BACKGROUND: In the United States, 2.3% of individuals who suffer trauma to their extremities are diagnosed with peripheral nerve injuries (PNI). PNIs often result in devastating loss of motor function, sensory disturbance, and pain which can significantly impact a patient's quality of life. Caregiver burden is well described in several disease states including cancer, dementia, and heart disease, but this burden has not yet been evaluated in the setting of PNIs. The aim of this study was to determine if caregiver distress exists in the setting of PNIs and evaluate how it affects caregiver's lives.

METHODS: This single institute, cross-sectional descriptive study identified patients who presented for treatment of PNIs at our peripheral nerve clinic between October 2022 to March 2023. Patients with concomitant chronic diseases or injuries that may impact caregiver burden (i.e., cancer, dementia, amputation) were excluded. Patient injury and demographic information was collected from their electronic medical records. Caregivers provided general demographic information through a provided questionnaire. Patients completed a series of validated surveys to measure pain (Visual Analog Scale, 0-10 Likert scale), distress (Distress Thermometer, 0-10 scale), and anxiety/depression (Patient Health Questionnaire-4). Caregivers were identified and completed the Distress Thermometer and Patient Health Questionnaire-4. Furthermore, socio-economic data including employment, income, and education were collected from both patients and their caregivers. Preliminary data analysis was completed by descriptive analysis and univariate regression analysis.

RESULTS: Seventy-eight patients (50% female) with an average age of 45 (range: 18-77) were included. Most patients presented with an upper extremity injury (56%) compared to a lower extremity injury (42%). Forty-five (58%) patients had been experiencing PNI symptoms for less than two years, and 42 (54%) had not had a surgical intervention to address their nerve injury. Twenty-nine patients (37%) reported an employment status change because of their PNI. Patients reported an average pain score of 5.31 (median: 6) and a moderate distress score of 4.42 (median: 5). Thirty-seven patients (47%) screened positive for anxiety or depression. Caregivers (n=64) were predominantly female (70%) and most often a spouse (63%) or parent (25%). Caregivers reported mild distress scores of 3.97 (median: 4) and 17 caregivers (27%) screened positive for anxiety and depression. More severe symptoms of anxiety and depression in patients was significantly associated with these same symptoms in their caregivers ($p<0.0005$).

CONCLUSION: Patients with PNIs experience detrimental pain and loss of function that impacts their quality of life. This study demonstrated the impact of these nerve injuries on employment status and mental health, leading to anxiety and depression in 47% of patients. Moreover, we identified that caregiver distress exists in the setting of PNIs and leads to anxiety and depression in 27% of caregivers. The severity of anxiety and depression in patients was significantly associated with similar symptoms in their caregivers, highlighting the need for interventions to alleviate this burden.

The Superficial Inferior Epigastric Artery Fascia Flap in Rabbits to enhance nerve regeneration

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BACKGROUND: Vascularized flaps wrapped around a nerve graft are thought to enhance outcomes after nerve reconstruction. The purpose of this study was to describe the surgical technique and report long-term survivability for the Superficial Inferior Epigastric Artery Fascia (SIEF) flap in rabbits in a peroneal nerve defect model to add vascularization and enhance nerve regeneration.

METHODS: Thirty-six New Zealand Rabbits underwent the technique to determine feasibility and long-term survivability. After a 18-cm paramedian abdominal incision, on the ipsilateral side of the nerve reconstruction, the 18x10-cm flap was exposed. After identification of the SIE vessels, the flap was dissected distally, starting on the medial side. The flap was raised towards the proximal branch of the SIE vessels and tunneled through a subcutaneous inguinal tunnel towards the previously exposed peroneal nerve reconstruction site without torsion of the pedicle. After a 30-mm peroneal nerve reconstruction, the SIEF flap was wrapped around the nerves, covering both anastomoses. Without tension and compression on the pedicled flap and reconstructed nerve, the flap was loosely secured. The viability of the SIEF flap was evaluated after survival of 16 and 24 weeks using the milking patency test, color of the flap and active bleeding at the edges of the flap.

RESULTS: All SIEF flaps remained viable and had patent vessels after survival of 16 and 24 weeks. No flap related complications were observed.

CONCLUSION: A pedicled adipofascial flap model in the rabbit to provide a vascular bed for peroneal nerve reconstruction is detailed with long-term survivability evaluation of the flap. This flap was relatively uncomplicated to harvest, with consistent anatomy, and was suitable for revascularization procedures in the lower abdomen, genital area and thigh in the rabbit, suggesting potential translation to larger animal models.

Time is Neurons: Neuron Retention in Immediate and Delayed TMR versus RPNI

Abstract Presenter
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PURPOSE: Targeted muscle reinnervation (TMR) and regenerative peripheral nerve interfaces (RPNI) are surgical procedures that re-route nerves during or following limb amputation to provide motor input for bioprostheses. An unforeseen benefit to these procedures is prevention and relief of neuropathic pain in amputees, but this mechanism is not completely understood. Relative retention of sensory neurons following nerve injury has been correlated to analgesia.1 We hypothesize that these interventions differentially support sensory neuron regeneration. This study used retrograde labeling to compare the difference in regenerating motor and sensory nerve counts when TMR and RPR were applied at different time intervals following nerve injury in a rodent.

METHODS: Rats underwent transection of the common peroneal and tibial nerves at the sciatic trifurcation. The sural nerve was maintained to prevent autotomy. Rats were divided into 5 cohorts: injury alone, injury + immediate TMR (iTMR), injury + immediate RPNI (iRPNI), injury + TMR 3 weeks later (TMR-3), or injury + RPNI 3 weeks later (RPNI-3). For TMR, the common peroneal and tibial nerves were coapted to semimembranosus and biceps femoris motor branches, respectively. For RPNI, extensor digitorum longus and hemi-soleus muscle grafts were taken from donor animals and coapted to the common peroneal and tibial nerves, respectively (motor branches to semimembranosus and biceps femoris were transected to allow comparability to the RPNI cohorts). 8 weeks after injury or intervention, the operated nerve was retrograde labeled with 4% Fluorogold dye distal to the intervention coaptation performed on the common peroneal nerve. After 1 week, spinal cords and the L5 dorsal root ganglia were harvested and frozen. Samples were cut, imaged, and sensory and motor neurons were counted (n=5-7).

RESULTS: Sensory neurons: iRPNI and iTMR interventions preserved 53-87% of the baseline population, respectively, and were not significantly different from historical data. RPNI-3s retained a significantly more than TMR-3; RPNI-3 showed far greater retention compared to TMR-3; RPNI-3s retained significantly more than iRPNI ($p<0.05$). Counts were not significantly different between iTMR and TMR-3.

Motor neurons: iTMR preserved 107% +/- 40% of the baseline population, while iRPNI

preserved significantly fewer, 34.2% +/- 14.6% ($p<0.05$). RPNI-3 retained significantly more than iRPNI ($p<0.05$). Counts were not significantly different between TMR-3 and RPNI-3 or iTMR and TMR-3,

CONCLUSION: With no significant change in sensory or motor neuron counts between iTMR and TMR-3, it may inferred that the efficacy of TMR as either an analgesic procedure or as bioinput for prostheses does not differ when performed immediately versus 3 weeks out from nerve injury. On the other hand, with RPNI-3 retaining a significantly greater number of sensory and motor neurons compared to iRPNI, there are likely significant differences in pain and motor outcomes when RPNI is delayed compared to immediate application. Correlation to prosthetic use and pain outcomes are next steps in applying these findings clinically.

REFERENCE

1. Leibovich H, Buzaglo N, Tsuriel S, Peretz, L, Caspi, Y, Katz, B, et al. Abnormal Reinnervation of Denervated Areas Following Nerve Injury Facilitates Neuropathic Pain. Cells. 2020;9(4):1007. 2020 Apr 18. doi:10.3390/cells9041007

DEVELOPMENT OF A NOVEL PATIENT-REPORTED OUTCOME MEASURE FOR HEADACHE DISORDERS: THE HEADACHE-Q

Abstract Presenter
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PURPOSE: Headache disorders (HD), characterized by recurrent headache, are among the most common disorders of the nervous system. Subsequently, a variety of medical interventions are available for HDs. Substantial evidence exists on the effectiveness of the HD treatments; however, little attention has been paid to the measurement of outcomes of HD treatments from the patient perspective. Patient-reported outcome (PRO) is any report of the status of a patient's health condition that comes directly from the patient. PRO measures (PROMs) are surveys or instruments that measure PROs. A recent systematic review concluded that no single comprehensive, rigorously developed, validated HD-specific PROM currently exists. This study fills this gap by developing a HD-specific PROM, called the HEADACHE-Q.

METHODS: We use a multi-step, mixed methods approach to develop PROMs that is

compliant with the internationally established guidelines for PROM development. This abstract describes the first step which includes the use of qualitative methods to develop and demonstrate content validity of the PROM. The qualitative health services research approach of interpretive description was used to conduct in-depth, semi-structured interviews with English-speaking adults with HD at the outpatient clinics of the Division of Plastic and Reconstructive Surgery and the Department of Neurology at two hospitals in Boston, Massachusetts. Purposive, maximal variation sampling technique was used to ensure representation of diverse age groups, race/ethnicities, HD diagnosis and treatments. A semi-structured interview guide was used. During the interviews, the participants were asked to describe the impact of HD and the treatments on their Health Related Quality of Life (HRQL). The data were analyzed using line-by-line coding and constant comparison was used to develop an item pool and a preliminary conceptual framework consisting of top-level and sub-domains.

RESULTS: 21 interviews (76% females; 48 ± 8 years) were conducted that resulted in an item pool and a preliminary conceptual framework with two top-level domains of HRQL and experience of care. All patients had undergone pharmacologic treatment including CGRP antagonist treatment (80%). Patients further received treatment with injectables (76%), device-based treatment (24%) and surgical intervention (62%). All participants described the experience of HD in terms of pain (type, frequency, duration, aggravating and relieving factors, and coping strategies). In terms of impact of HD, most participants described the impact on psychological function (anxiety, worry, frustration, depression), cognitive function (brain fog, memory loss), day-to-day function (selfcare, sleep, chores, taking care of dependents), work (taking time off work, changing professions, accommodations at work), and social life (isolation, giving up hobbies). Participants also described varying levels of HD relief with treatment(s). Some participants found it challenging to seek appropriate and timely care due to lack of access to clinicians experienced with HDs.

CONCLUSION: The preliminary conceptual framework and the item pool will be used to develop the drafts of HEADACHE-Q scales such that the scales are unidimensional and independently functioning. Patient and expert feedback will be sought to demonstrate content validity of the scales. Following this, we will conduct an international, multi-center study to establish psychometric properties of the HEADACHE-Q using Rasch measurement theory.

The Use of Nerve Transfer for Functional Restoration in Spinal Cord Injury: A Systematic Review of Clinical, Animal, and Anatomical Feasibility Studies

Abstract Presenter
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BACKGROUND: Nerve transfers have been proposed solutions for urinary, bowel, and genital dysfunction after spinal cord injury (SCI). However, there remains a need to characterize nerve candidates and other treatment variables for SCI. The objective of this systematic review was to characterize nerve transfer strategies and outcomes for the restoration of bladder, bowel, genital, and lower extremity function after SCI.

METHODS: PubMed, Cochrane, Medline, and Embase libraries were queried according to the PRISMA guidelines for articles that presented outcomes after SCI in humans, animals, and cadavers treated with nerve transfer.
Results: Thirty-one studies with 471 subjects were included. Thirteen studies were anatomical feasibility, 11 were animal, and 7 were clinical studies. The sacral(n=218) and pudendal(n=100) nerves were injured the most. There were 490 nerve transfers, with genitofemoral(n=113) and femoral(n=88) nerves transferred the most. Satisfactory bladder void control was regained in 75% of sacral, 100% of intercostal, and 88% of lumbar nerve transfer patients. Spontaneous void of bowel was regained in 78% of lumbar nerve transfer patients. Two patients with lumbosacral plexus nerve root injuries had improved knee extension from grade 0 to 2 and 3 out of 5 after obturator nerve transfer.

CONCLUSION: This review demonstrates feasibility of transferring genitofemoral, femoral, sacral, and ilioinguinal nerves for the restoration of bladder, bowel, genital, and lower extremity function. While these studies suggest potential nerve transfer options, only 7 seven studies examined the outcomes in humans. Both the feasibility and applicability of nerve transfer after SCI must be explored further in clinical research.

Nerve Stimulator Implant or Surgical Decompression for the Management of Occipital Neuralgia: A systematic review and meta-analysis

Abstract Presenter
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BACKGROUND: Occipital neuralgia (ON) is characterized by severe pain originating from an occipital nerve. For patients that fail conservative and minimally invasive therapy, there are several surgical approaches to manage ON. Currently, there is little support in the literature for one surgery over another, and predictors of patient response are not standardized. We conducted

a systematic review and meta-analysis to discuss the efficacy of two commonly used surgical interventions - subcutaneous nerve stimulator implantation and surgical decompression.

METHODS: PubMed, Ovid(Medline) and Web-of-Science were searched following PRISMA guidelines to include studies describing nerve stimulation or surgical decompression in the management of occipital neuralgia. A total of 158 references were screened for relevance. Only studies that published discrete patient information were included. Demographic data and outcomes were assessed. Chi-square tests and analysis of variance were used to identify any significant differences ($p<0.05$) between the two procedures.

RESULTS: Overall, 22 studies met inclusion criteria with a sample size of 74 patients. Of these, 13 underwent surgical nerve decompression (SD) and 61 had peripheral nerve stimulator implantation (NS). Patient ages ranged between 21-86 and symptom duration ranged between 6-132 months. Statistical significant differences between the two procedures were seen in patient age (SD: 38.9, NS: 49.9, $p = 0.01$), symptom duration (SD: 25 months, NS: 57 months, $p = 0.021$), 10-point pre-op pain score (SD: 7.2, NS: 8.3, $p = 0.0497$) and pre-op opioid use (SD: 0%, NS: 38%, $p = 0.019$). None of the differences in outcome variables such as change in pain score, complications or failures were statistically significant between the two treatment groups.

CONCLUSION: We sought to compare treatment outcomes and patient demographics for the treatment of ON by surgical decompression vs nerve stimulation and found that while there were statistically significant differences between age and patient symptom history (duration, pain, opioid use) at presentation, the difference in outcomes between the two procedures was not statistically significant. Our study was limited by the inclusion of only studies that published discrete patient information in which metrics we collected were sparsely reported and unstandardized. A larger scale meta-analysis that included studies with pooled rates would provide higher statistical power and better discernment of difference in efficacy between the two treatments.

Assessing the Association between Obesity and Trigger Point Specific Outcomes following Headache Surgery

Abstract Presenter
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BACKGROUND: Trigger point deactivation surgery is both safe and effective in the treatment of properly selected patients suffering from migraine, with 68.3-100% experiencing symptom improvement post-operatively. However, it is still unknown why certain patients do not respond.

Obesity has been shown to be associated with worsened migraine symptomatology and a decreased response to select pharmacotherapies. The purpose of this study was to determine whether obesity may also be associated with an attenuated response to surgery.

METHODS: A retrospective chart review was conducted to identify patients who had undergone trigger point deactivation surgery for migraine treatment. Patients were split into obese and non-obese cohorts. Obesity was defined as a body mass index (BMI) of 30 or higher. Outcomes and follow-up periods were determined with respect to individual operations. Staged surgeries, usually no less than 3 months apart, occurred for patients with multiple trigger sites diagnosed at frontal, temporal, and occipital trigger sites such that these could be performed as outpatients and without multiple position changes. If post-operative pain developed at a new trigger site that was not previously addressed during the index surgery, this new pain was defined as a secondary trigger site after meeting appropriate diagnostic criteria. Outcomes included post-operative change in migraine attack frequency, intensity, duration, and the migraine headache index (MHI). Differences in demographics, operative characteristics, and operative outcomes were compared between obesity charts using descriptive and inferential statistics. A mixed-effects logistic regression analysis was used to determine the relationship of obesity with a >90% improvement in migraine outcomes post-operatively, while adjusting for patients who had multiple surgeries.

RESULTS: Of the 79 operations included, 45 involved obese patients and 34 involved non-obese patients (mean BMI 37.9 ± 7.4 SD versus 24.7 ± 3.3 SD, respectfully, p <.001). Median follow-up was 16 months (9-32, interquartile range) for operations performed on obese patients and 12 months (8-21) for the non-obese cohort. The obese cohort was found to undergo a higher proportion of surgeries to address secondary trigger sites (13.3% vs. 2.9%) and staged surgeries (13.3% vs. 5.9%). No significant associations were found between obesity and a >90% improvement in any post-operative migraine outcome (MHI: Odds Ratio 0.9 [0.2-3.6, 95% confidence interval], frequency: 1.7 [0.5-6.1], intensity: 1.6 [0.5-5.3], duration: 1.4 [0.4-4.9]).

CONCLUSIONS: This retrospective study demonstrated no difference in outcomes between obese and non-obese cohorts following trigger point deactivation surgery for the treatment of migraine. Furthermore, tracking outcomes with respect to individual operations for patients undergoing multiple surgeries allows for a more nuanced and complete accounting of surgical efficacy.

The Link Between Obesity and Migraine Headache: Does This Exist?

Abstract Presenter
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BACKGROUND: Migraine headaches and obesity are both prevalent disorders, resulting in a high socioeconomic burden. To better understand the relationship between obesity and migraine, the aim of this study was to investigate the association between migraine symptomatology, metabolic syndrome and estrogen-associated variables.

MATERIALS AND METHODS: A retrospective analysis of adult patients with refractory migraine seen by our senior author was performed. Patient demographics and migraine characteristics, including migraine attack intensity, duration, and number of headaches per month, were collected from medical records. Migraine headache index (MHI) was calculated by multiplying frequency, intensity and duration of headaches. Weight and height were used to calculate body mass index (BMI) and these BMI groups were categorized per Center for Disease Control (CDC) classifications. Univariate linear regression models were used to evaluate associations between migraine characteristics and obesity.

RESULTS: A total of 224 patients that presented to migraine clinic were identified. For one patient, baseline migraine characteristics were not available, thus this patient was excluded. Patients (n=223) were predominantly female (78%) with a mean age of 44 years (range of 15-86 years) at presentation. Patients with a BMI higher than 40 (class III obesity) had higher MHI scores (p=0.01) and experienced a higher number of migraine attacks per month (p=0.007), compared to patients with a healthy BMI, respectively. Migraine attack frequency was found to be significantly higher in post-menopausal women compared to pre-menopausal women (p=0.02). No other significant associations were found.

CONCLUSIONS: This study found that severe obesity (CDC Class III) is associated with an increased MHI score and migraine attack frequency. Post-menopausal patients are also found to have increased migraine attack frequency, which is explained by the estrogen-withdrawal hypothesis. These findings provide new insights into the association between obesity and migraine headaches and future studies are needed to evaluate the outcomes of individuals with obesity after trigger point deactivation surgery.

MyChart Care Companion as a Rescue for Substantially Low TMR Penetrance

Abstract Presenter
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PURPOSE: Targeted Muscle Reinnervation (TMR) has been demonstrated to decrease post-amputation pain, and recent reports suggest a benefit to earlier intervention. However, access to TMR can be variable based on patient, practice, and institutional factors. Therefore, to improve

access to TMR, we aimed to understand recent practice patterns better to identify barriers to implementing TMR as a component of amputation care.

METHODS: A single-center retrospective study was conducted using CPT codes. First, patients treated at OSUWMC over the last eight years (2014-2021) and underwent above-(27590) or below-knee amputation were identified. Subsequently, the subset of the patients who underwent the TMR (64905, 64784, 64874, 64787, 20926, 24905) was determined. In addition, patient demographics, surgical details, and affiliated departments of the primary surgeons were recorded.

RESULTS: One thousand six hundred sixty-eight records were identified. Most amputation surgeries (59%) were performed by vascular surgery and orthopedic surgery (34%) departments. Other departments performed the remaining 7% of the amputations.
While 17.3% of orthopedic surgery amputees underwent TMR, this number was only 0.7% for vascular surgery patients. During this period, the penetrance of TMR for orthopedic surgery patients rose from 11% to 57%. However, this observation was not true for vascular surgery patients (penetrance, 0-2%).
To improve interdepartmental communication and TMR availability, we started using MyChart Care Companion to identify adult patients scheduled for above or below-knee amputation at OSUWMC. Upon referral, these patients will receive weekly surveys (VAS and PROMIS behavior, intensity, interference) for three months, starting from one week preoperatively through MyChart. While patients with mild pain levels (VAS<3) will be referred to nonsurgical treatments, patients with VAS scores >7 and between 4-6 will be offered TMR at postoperative week 6 and month 3, respectively.

CONCLUSIONS: Only a minority of amputees treated at OSUWMC have undergone TMR as part of their amputation care, and rates of TMR adoption have varied widely between surgical departments. Therefore, novel department- and institution-specific strategies are required to improve patient access to TMR.
MyChart Care Companion will enable us to identify the proportion of patients developing postamputation residual and phantom limb pain and associated risk factors. Furthermore, close follow-up and early surgery will minimize patient suffering as well as avoid patient morbidity from unnecessary nerve surgery.

Systematic Review of Psychosocial Factors of Nerve Injury, Repair, and Recovery

Abstract Presenter
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PURPOSE: Peripheral nerve injuries (PNIs) are debilitating injuries that often result from traumatic (penetrating injury, crush, stretch, ischemia) and non-traumatic (overuse) mechanisms. Direct consequences of PNIs include motor and sensory deficits as well as neuropathic pain. While various treatment options exist, psychosocial factors, such as depression, posttraumatic stress disorder, and emotional support, have recently been identified to affect prognosis of nerve injury and recovery.(1) Limited data has been published, yet the literature lacks a comprehensive review assessing the impact of both pre-injury psychological conditions and symptoms related to the event on motor, sensory, pain, and psychological outcomes following PNI. The following systematic review was performed to evaluate the effects of psychosocial factors on both pre- and post-injury treatment and recovery trajectory in patients who have sustained PNIs.

METHODS: Using the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines, we conducted a systematic literature search using the following databases: Pubmed/Medline, EMBASE, and Cochrane. Our search was conducted on articles published from January 1985 through December 2022. There were 36,190 records identified which were examined. After removal of 3,829 duplicates, then exclusion of 32,066 articles by the Rayyan system for relevance, 295 articles were assessed for eligibility by two independent reviewers. The final review found that 111 articles met inclusion criteria for our synthesis of the literature.

RESULTS: PNIs have been associated with increased levels of depression, anxiety, personality disorders, and post-traumatic stress disorder. While many studies detailed the degree of negative impact of PNI on patients' psychological well-being, the literature also indicates that negative psychological symptoms can impair functional recovery and exacerbate pain.(2) In some cases, psychosocial factors exert a stronger influence on perceived general health than physical function and/or injury severity.(1)

An emerging body of evidence indicates that pre-existing psychological conditions influence final strength, range of motion, sensation, and pain outcomes of PNI, as well as post-injury progression to psychological dysfunction, including depressive symptoms, anxiety, pain catastrophizing, and post-traumatic stress disorder (PTSD).(3) Pre-treatment counseling including education on the diagnosis and extent of injury, expectations for recovery, and adaptive coping strategies have been shown to mitigate the impact of negative psychosocial factors on all of the aforementioned physical and psychological outcomes following treatment of acute, chronic, and overuse PNIs.(2,4)

Despite limited evidence in some injury patterns, the majority of data on PNIs points to a need for psychological considerations in the diagnostic and treatment algorithms. In complex regional pain syndrome (CRPS), however, there are mixed findings regarding the value of pre-existing psychological symptoms in predicting onset of CRPS.(5) Psychosocial factors should still be considered in these patients as psychological interventions have been shown to improve CRPS symptoms.(5)

CONCLUSIONS: The results of our review indicate that psychosocial factors have a significant impact on outcomes in a variety of peripheral nerve injury patterns. This review will serve as a

valuable resource for surgeons to improve diagnostic and treatment algorithms and may ultimately lead to improved outcomes in this patient population.

REFERENCES:

1. Miller C, Peek AL, Power D, Heneghan NR. Psychological consequences of traumatic upper limb peripheral nerve injury: A systematic review. Hand Therapy. 2017/03/01 2017;22(1):35-45. doi:10.1177/1758998316679387
2. Edwards RR, Klick B, Buenaver L, et al. Symptoms of distress as prospective predictors of pain-related sciatica treatment outcomes. Pain. 2007/07 2007;130(1-2):47-55. doi:10.1016/j.pain.2006.10.026
3. Large J, Naumann DN, Fellows J, Connor C, Ahmed Z. Clinical outcomes following major trauma for patients with a diagnosis of depression: a large UK database analysis. Trauma Surg Acute Care Open. 2021/12/14 2021;6(1):e000819. doi:10.1136/tsaco-2021-000819
4. Delehanty RD, Trachsel L. Effects of short-term group treatment on rehabilitation outcome of adults with amputations. Int J Rehab Health. 1995/04/01 1995;1(2):61-73. doi:10.1007/BF02213887
5. Brinkers M, Rumpelt P, Lux A, Kretzschmar M, Pfau G. Psychiatric Disorders in Complex Regional Pain Syndrome (CRPS): The Role of the Consultation-Liaison Psychiatrist. Pain Res Manag. 2018 2018;

Plastic Surgery Topics

Close

Comparing the Long-Term Surgical and Patient-Reported Outcomes of Skin-preserving Versus Delayed Microvascular Breast Reconstruction

Abstract Presenter
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BACKGROUND: To minimize the risk of complications, skin-preserving breast reconstruction is preferred in patients undergoing post-mastectomy radiotherapy (PMRT). However, the long-term surgical complications and patient-reported outcomes associated with this technique are not well understood, particularly when compared to delayed reconstruction. In this study, we compared the long-term surgical and patient-reported outcomes of skin-preserving and delayed microvascular breast reconstruction, stratified by PMRT.

METHODS: A retrospective cohort study was conducted to examine consecutive patients who underwent a mastectomy and microvascular breast reconstruction between January 2016 and

April 2022. The primary outcome was post-operative flap-related complications. Secondary outcomes were tissue expander (TE) complications and patient-reported outcomes.

RESULTS: A total of 1002 reconstructions (330 skin-preserving; 672 delayed) in 812 consecutive patients met the inclusion criteria, with a mean follow-up of 24.2±19.3 months. PMRT was required in 564 reconstructions (56.3%). Skin-preserving reconstruction procedures were less likely to have been performed in patients who had PMRT (39.1% compared with 64.7%, $p < 0.001$). Delayed reconstruction procedures, compared with skin-preserving reconstruction procedures, had a significantly longer median (IQR) interval from PMRT end to breast reconstruction (10 [7.0-15.0] compared with 8 [5.0-11.0] months, $p < 0.001$), and from mastectomy to reconstruction (15.0 [9.0-30.0] compared with 8 [3.0-16.0] months, $p < 0.001$). In the PMRT group, skin-preserving reconstruction was independently associated with a significantly shorter hospital stay (β -1.15, $p<0.001$) and operative time (β -97.0, $p<0.001$) and had lower odds of 30-day readmission (OR 0.29, $p=0.005$) and infection (OR 0.33, $p=0.023$) when compared to delayed reconstruction. In the non-PMRT group, skin-preserving reconstruction was independently associated with a shorter hospital stay (β -0.32, $p=0.045$) and had lower odds of 30-day readmission (odds ratio [OR] 0.44, $p=0.042$), seroma (OR 0.42, $p=0.036$), and hematoma (OR 0.24, $p=0.011$) when compared to delayed reconstruction. TE complications occurred in 48 of the 330 skin-preserving reconstruction procedures (14.5%), with significantly higher rates in the PMRT group (19.4% compared with 11.4%, $p = 0.046$). Skin-preserving reconstruction had a 10.6% TE loss rate and did not demonstrate any significant difference from delayed reconstruction in patient-reported satisfaction with breasts (β -3.7, 95% CI -15.7 to 8.2, $p = 543$), and psychosocial (β -7.3, 95% CI -18.5 to 4.0, $p = 0.203$), or sexual (β 0.5, 241 95% CI -12.9 to 13.9, $p = 0.942$) well-being.

CONCLUSION: The findings of this study suggest that skin-preserving breast reconstruction is a safe option for patients, irrespective of whether they require PMRT. This technique is associated with an acceptable TE loss rate and has a lower risk of surgical complications compared to delayed reconstruction. Additionally, patient-reported satisfaction and quality-of-life outcomes are comparable between the two groups.

Discord Between Mastectomy and Breast Reconstruction Rates: A National Analysis

Abstract Presenter
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PURPOSE: Previous studies demonstrate a significant discrepancy in number of patients undergoing reconstruction following mastectomy when stratified by racial demographics. These

studies are mainly limited to patient populations up until 2014 and concluded that African American women were less likely to undergo reconstruction following mastectomy. To the best of our knowledge, this is the first study that examines racial discrepancies in patients undergoing mastectomy and reconstruction on a national level with a more recent patient population.

METHODS: Using the Nationwide Inpatient Sample (NIS), adult female encounters were queried from 2012–2019. International Classification of Disease, ninth and tenth edition, Clinical Modification (ICD-9-CM and ICD-10-CM) procedure codes were used to identify those who underwent mastectomy and any simultaneous or subsequent autologous or implant-based breast reconstructions. Demographics and comorbidities were recorded. Discharge weights were used to extrapolate national estimates. Schapiro-Wilk, chi squared, Kruskall-Wallis, and multivariable logistic regression tests were used for statistical analysis.

RESULTS: 350,830 encounters (mean age 56.8 ± 13.9 years) met criteria having undergone mastectomy between 2012 and 2019. Of these, 182,650 (52.5%) underwent implant-based or autologous breast reconstruction. Minority women were less likely than White women to undergo reconstruction following mastectomy (OR 0.584 for Black women; OR 0.732 for Hispanic women; OR 0.564 for Asian or Pacific Islander women; OR 0.373 for Native American women; $p<0.001$), even after adjusting for hospital region and insurance type. Women who were enrolled in Medicare or Medicaid (OR 0.305, $p<0.001$) or who did not have insurance (OR 0.280; $p<0.001$) were much less likely to undergo reconstruction than those covered by private insurance. Women were more likely to undergo reconstruction in the Northeast than in the Midwest (OR 0.696), South (OR 0.773), or West (0.658)($p<0.001$). Those who underwent reconstruction were significantly younger (mean age 51.4 ± 10.8) than those who did not (mean age 62.8 ± 14.4) ($p<0.001$). Women with diabetes diagnoses were less likely to undergo reconstruction (OR 0.889; $p<0.001$), whereas women with a history of breast radiation were more likely to undergo reconstruction (OR 1.418; $p<0.001$).

CONCLUSION: Minority women who undergo mastectomy continue to receive reconstruction at a significantly lower rate than their White counterparts, a trend that has propagated over time. Additional work is needed to address the underlying reasons as to why this gap in postmastectomy care exists.

Interrogating T Cell/Silicone Shell Interactions in an Engineered Organotypic Model of the Breast Microenvironment

Abstract Presenter
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PURPOSE: Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL) is a T-cell derived lymphoma linked to textured breast prosthetic devices. Despite this association with textured implants, the etiopathogenesis of BIA-ALCL remains unknown. Prior investigations have involved two-dimensional cell culture models with an inherent lack of fidelity to the in vivo condition. We have engineered a biomimetic platform composed of patient-derived breast tissue components within a collagen-based hydrogel that simulates the three-dimensional breast microenvironment to investigate the interactions between silicone implant textures and patient-derived primary T-cells.

METHODS: Allergan textured (BIOCELL®) and smooth breast implant shells were shaped to line the sides of wells in 96-well plates, with the outer shell surface exposed to patient-derived breast tissue components. Primary T-cells were isolated and activated with anti-CD3+/CD28+ beads. Corresponding patient-donated mammary tissue was digested to isolate adipocytes, stromal vascular fraction, and epithelial ductal organoids. These cell populations were suspended in 0.3% type I collagen, forming the biomimetic platform, along with either naïve or activated T-cells (200,000 cells/mL) and cultured with and without implant shell linings in low serum feeding media (0.5% human serum). Additional experimental groups included naive and activated T-cells cultured in constructs of 0.3% type I collagen only. In parallel, naïve and activated T-cells were cultured two-dimensionally with and without implant shell lining, in both low (0.5% human serum) and full serum (10% human serum) media. Confocal imaging was performed over ten days and cell counts were quantified using ImageJ and MetaMorph software.

RESULTS: No marked stimulation of either naïve or activated T-cells was noticed in either two- or three-dimensional conditions. In two-dimensional culture, naïve T-cells and activated T-cells, in both low and high serum, showed significant declines in cell number over 10 days across all groups including textured implant, smooth implant, and no implant comparisons ($p<0.0001$). Full serum groups declined more rapidly than low serum groups. Among our samples from three separate patients, exposure to textured shells, in both low and full serum conditions, was associated with the greatest decline in T-cell number while cells not exposed to implant shells declined the least. In three-dimensional biomimetic constructs, activated T-cells, unlike naïve T cells, demonstrated a slight increase in cell count upon exposure to either a textured or smooth implant. In contrast, among collagen-only platforms, both activated and naïve T-cells decreased in cell count. The relative rates of decline between the remaining groups widely varied between different patient samples.

CONCLUSIONS: When cultured either in 2D or in an organotypic tissue engineered 3D platform, T cells do not appear to be stimulated by exposure to various silicone implant shells in short term culture. The lack of proliferation seen upon exposure to silicone implant shells may indicate that the silicone itself is insufficient to induce pathologic transformation and hints at the existence of a co-factor playing a significant role in the pathogenesis of ALCL.

Optimizing Design Parameters of P4HB 3D-printed Scaffolds for Long-lasting Reconstructed Nipples

Abstract Presenter
Xue Dong

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PURPOSE: Surgically creating nipples is a crucial step in breast reconstruction. However, autologous tissue techniques are limited due to scar contracture and significant loss of neo-nipple projection. The use of biodegradable polymers Poly-4-Hydroxybutyrate (P4HB), with a long track record of clinical use as a surgical mesh (Phasix), has been previously proved to promote fast tissue ingrowth as 3D-printed nipple scaffolds with cartilage filled as interior support, in parallel with a stable projection maintenance of the reconstructed nipple. Herein we aimed to determine and optimize the design parameters of the 3D-printed P4HB cylindrical scaffold to facilitate neotissue formation in order to better mimic the biomechanical properties of the native nipple while maintaining long-term projection.

METHODS: P4HB nipple scaffolds were 3D-printed (diameter: 1.0cm, height: 1.0cm) with different internal 3D conformations of P4HB filaments (infill density, filament diameter, external shell present/no shell) and implanted subcutaneously in rats using a CV flap technique. Cook Biodesign® Nipple Cylinder (G1), previously-studied P4HB scaffolds with the internal latticework (G2), P4HB scaffolds (only external shell present/empty, G3), manually-rolled Phasix mesh scaffolds (G4) and mechanically-thermoformed Phasix mesh scaffolds (G9) were implanted for comparison. The infill density of G5/G6, G7 and G8 is 20, 25 and 30%. The filament diameter of G6 is 0.15mm, and 0.2mm for the other 3D groups.

RESULTS: Nipple reconstructions with internal 3D-printed P4HB latticework and Phasix mesh were well maintained in diameter over 6 months (~100%). Similarly, the projection reservation was significant improved over the first 3 months among those groups (>90%) and only slightly decreased in G4 and G6 after 6 months (80% and 86% respectively). In contrast, the Cook Biodesign® nipple (G1) lost 25%, 54% and 60% projection at 1, 3 and 6 months ($p<0.05$), due to the insufficient internal support to resist skin contraction because of rapid absorption of the SIS (small intestine submucosa) substrate. After 6 months, nearly 100% of the interior space of 3D-printed scaffolds was filled by tissue ingrowth and the inflammatory tissue seen at 1 month was replaced by mostly healthy fibrovascular tissue with adipocytes generated on the outermost layer between filaments. The starting stiffnesses were different between 3D-printed groups (ranging from 1.21 to 9.54MPa), all declined over time which were approaching that of native nipples

(0.27MPa) by 6 months (ranging from 0.73 to 2.94MPa), as the P4HB polymers gradually degraded and were replaced by tissue ingrowth.

CONCLUSIONS: Engineered neo-nipples with P4HB 3D-printed scaffolds demonstrated notable diameter and projection maintenance over 6 months, with no significant differences observed between different design parameters. As the P4HB filaments degrade over time and the scaffold loses structural integrity, the adipose fibrovascular tissue formed within provides the structure which allows the engineered nipple to maintain proper shape, volume and biomechanical qualities that approaches that of native nipples. Long-term observation out to 1 year is ongoing to verify the translatability of this novel 3D-P4HB nipple scaffold.

Novel imaging techniques of acellular dermal matrices for reconstruction

Abstract Presenter
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PURPOSE: Acellular dermal matrices (ADM), or decellularized products derived from human or animal cadaver dermis, are used as structural support in surgical reconstructive procedures, such as breast reconstruction and abdominal wall reconstruction. The extracellular matrix remains after sample processing, and the structural proteins elastin and collagen influence the biomechanical properties of the product, including material stretch and tensile strength. Previous studies have focused on staining different proteins by using special stains. This approach requires processing of multiple slides per sample to assess for separate protein components, and it is both costly and inefficient. The purpose of our study was to assess the potential of novel fluorescence-based imaging technology for rapid measurement of different structural proteins.

METHODS: As a control, we first sought to assess optimal ADM processing to visualize collagen with a standard H&E stain and elastin with a Verhoeff Van Gieson special stain. Then, we applied DUal-mode Emission and Transmission (DUET) technology to the H&E slide, with a goal of utilizing the spectral differences in H&E fluorescence to generate a virtual histochemical image highlighting collagen content. As a comparison, we had previous virtual histochemical images of skin, which combined H&E brightfield and an overlay of collagen and elastin using DUET. Next, we applied the novel technology Fluorescence Imitating Brightfield Imaging (FIBI), which is a slide-free method that images non-sectioned tissue immediately, to demonstrate if we could visualize the extracellular matrix ultrastructure of ADM.

RESULTS: Our controls in identification of collagen by H&E and elastin by Verhoeff Van Gieson confirmed presence of these proteins in our ADM sample. Further, we found that we were able to successfully visualize ADM structure with DUET and FIBI. By combining brightfield and fluorescence imaging and a spectral phasor approach, we created a virtual histochemical image of collagen. Referencing our skin sample, an overlay of brightfield H&E with DUET-generated visuals allows for identification of elastin and collagen by spectral difference. Further, we developed a workflow for processing ADM samples and immediately imaging non-sectioned tissue by FIBI.

CONCLUSION: These proof-of-concept studies inform a more efficient approach to characterization of skin and ADM samples. Our findings offer an important tool for future investigation into the properties of ADM as related to protein content. Future assessments include complementing protein content measurements by DUET technology with biomechanical testing of the same samples. In addition, these imaging technologies are promising in data acquisition for the application of machine learning and other AI approaches. Clinically, future studies should assess the use of measuring individual patient elastin and collagen content in skin to inform selection of an ADM sample with ideal protein content and properties that will lead to optimal and personalized outcomes for patients.

Gene Therapy-mediated Angiogenesis of Transplanted Fat

Abstract Presenter
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PURPOSE: Autologous fat transfer is an increasingly common aesthetic and reconstructive technique used for facial rejuvenation, breast or buttock contouring and augmentation, and improving the form and function of atrophic conditions like scleroderma, scar contractures and radiation. The long-term results are often disappointing because of variable and often significant loss of up to 70% or more of the graft. Other complications associated with this procedure are fat necrosis/nodule formation and the development of oil cysts. A major cause of graft loss and its associated complications is inadequate vascularization of the fat following transplantation. Thus far attempts to incorporate various growth factors to augment graft take have not been successful likely because of inadequate bioavailability over the initial 24-72 hours after transplant. Thus, we propose to solve this challenge by genetically modifying harvested fat prior to transplantation

with an adenovirus gene transfer vector coding for all 3 major isoforms of vascular endothelial growth factor (capable of inducing expression for 1-2 weeks), to improve angiogenesis and promote engraftment of transplanted fat.

METHODS: Fat was harvested using standard liposuction techniques from several patient donors and concentrated by Telfa rolling to remove extra lipid and fluid. Ad5VEGF-All6A+ is a E1⁻E3⁻ serotype 5 adenovirus (Ad) vector coding for a novel genomic hybrid coding for all 3 major isoforms of human vascular endothelial growth factor (VEGF 121, 165 and 189). The vector was produced and stored at - 70C. At the time of vector delivery, the vector was thawed, diluted, and administrated to the harvested autologous fat at different concentrations (109, 1010 and 1011 pfu). The expression of VEGF was assessed in triplicate by quantitative PCR (RNA) and by ELISA (protein) using cell lysate and media supernatant following a 24-hour incubation. Untouched fat, PBS treated, and Ad-null (1011 pfu) administration served as controls.

RESULTS: The highest RNA expression of VEGFA, measured by qPCR, was achieved by the 109pfu dose of Ad5VEGF-All6A+. Absolute mRNA VEGFA copy numbers were 6.70E+06 (±3.65E+05), 4.21E+06 (2.97 E+05) and 2.59E+06 (3.19 E+05), respectively for each increasing dose. VEGFA protein data exhibited a dose dependent response for each of the increasing Ad5VEGF-All6A+ doses. VEGFA ELISA data measured in protein cell lysates and media supernatant showed an increasing amount of VEGFA produced.

CONCLUSIONS: We have demonstrated the administration of Ad5VEGF-All6A+ to human lipoaspirate significantly increases VEGF expression. Importantly, the expression induced with this vector lasts between 1-2 weeks, which is crucial to maintain the angiogenic response necessary to rescue ischemic transplanted fat. This strategy has significant potential to significantly improve the vascularization of transplanted fat. Ongoing studies include in vivo animal fat grafting experiments to determine long term fat graft retention.

Risk Factors for Hardware Removal Following Orthognathic Surgery - A National Database Analysis

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PURPOSE: Orthognathic surgery typically relies on rigid fixation for stabilization of bony structures using titanium hardware. Though hardware is usually intended to be implanted

permanently, removal of hardware (ROH) is sometimes indicated for a variety of reasons including pain, screw loosening, plate fracture, plate palpability, infection, and wound dehiscence. We sought to identify risk factors for hardware removal following orthognathic surgery using a national database.

MATERIALS AND METHODS: Using the IBM® MarketScan® Research Databases, patients were queried from 2007–2021. Current Procedural Terminology (CPT) and International Classification of Disease, ninth (ICD-9) and tenth (ICD-10) edition diagnosis codes were used to identify those who underwent an index Le Fort osteotomy and bilateral sagittal split osteotomy operation. Patient demographics, comorbidities (using the Elixhauser index), procedural factors, perioperative antibiotic fills (within seven days prior to seven days following the index procedure), and complications resulting in ROH were accessed. Chi-squared, Schapiro-Wilk, Kruskall-Wallis, and multivariable logistic regression tests were used for statistical analysis.

RESULTS: 4,740 patients met inclusion criteria. The mean age at the time of surgery was 25 yrs, and 57% were female. ROH occurred in 6.8% of patients. Mean time to hardware removal was 361.3 ± 546.8 days (range 3-4,389). In a multivariate logistic regression, increased odds of ROH were associated with patient age >46 years (OR 1.63[1.08-2.46],p=0.02), hypertension (OR 1.61[1.07-2.42],p=0.03), and sleep apnea (OR 1.69[1.21-2.36],p=0.002)). In the same model, postoperative oral antibiotic prophylaxis was not associated with ROH (p = 0.840).

CONCLUSION: Patient-specific factors including older age, history of hypertension, and history of sleep apnea are associated with increased rates of hardware removal following orthognathic surgery. Patients who fall into these categories should be counseled on the increased possibility of requiring a second operation for ROH prior to having orthognathic surgery to ensure their expectations align with the evidence.

Wireless implantable myoelectric sensors (IMES) enable multifunctional and simultaneous prosthetic hand control through minimal access ultrasound guided surgery.

Abstract Presenter
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Restoring meaningful hand function in transradial amputees remains a significant challenge, despite voluntary control of remnant muscles persisting years after injury. Existing systems

cannot reliably provide smooth myoelectric prosthetic hand control due to the technological limitations in discerning multiple electromyography (EMG) signals using surface sensors. Sweat and prosthetic interface movements also negatively affect surface sensors making existing control unreliable.[1] By contrast, wireless implantable myoelectric sensors (IMES) directly record individual muscle contractions from both superficial and deep muscles, thereby facilitating intuitive, simultaneous and multifunctional control of hand prostheses.[2] We report on the first clinical trial participant using a new IMES system implanted via ultrasound guided technique – a 46-year-old male, 16 years after traumatic left transradial amputation, who is a former surface myoelectric user.

In February 2023, during general anaesthetic day case surgery at Glasgow Royal Infirmary in Scotland, eleven IMES were implanted into residual forearm muscles, under intraoperative ultrasound guidance through two short (3-5cm) incisions. Volitional control of target muscles was confirmed by pre-operative ultrasound. Sensor placement was confirmed using intraoperative C-arm X-ray and all sensors passed a wireless communication test. Mild neuropathic pain was experienced post-operatively which resolved with a short course of gabapentin, and no other complications were observed. A multi-articulated, powered hand prosthesis (including wrist rotation) was fitted, and training began 4 weeks after surgery.

On Day 1 of training, all IMES provided EMG signals enabling the participant to simultaneously and intuitively control an initial setup of 3 degrees of freedom (DOF): hand open/close, wrist rotation (pronation/supination) and thumb rotation. The system had capacity for a further 2 degrees of freedom in the study participant but were not utilised in the initial setup. A number of outcome measures were administered during this initial training to assess isolated and combined functions of the IMES system, in comparison to a standard surface sensor controlled multi-articulating myoelectric hand (without wrist movement) used at baseline. Complex function was assessed using the Assessment of Capacity for Myoelectric Control (ACMC), which showed an improvement from 58.2/100 using the baseline device to 93.0 at Day 3 of training with the IMES system. Repeat measures will be administered after training and during home use of the device over a period of 24 weeks.

Initial outcome data presented here builds on previous studies, [3,4] and shows that IMES implantation using a minimally invasive, ultrasound guided technique is feasible. Results indicate that the new version of the IMES system has the potential to offer amputees smooth and intuitive prosthetic hand control, with increased degrees of freedom, soon after minimally invasive, day case, surgical implantation.

REFERENCES:

1. Roche AD, Lakey B, Mendez I, Vujaklija I, Farina D, Aszmann OC. Clinical Perspectives in Upper Limb Prostheses: An Update. Curr Surg Reports. 2019;7(3):5. doi:10.1007/s40137-019-0227-z
2. Weir RF ff, Troyk PR, DeMichele GA, Kerns DA, Schorsch JF, Maas H. Implantable myoelectric sensors (IMESs) for intramuscular electromyogram recording. IEEE Trans Biomed Eng. 2009;56(1):159-171. doi:10.1109/TBME.2008.2005942
3. Pasquina PF, Evangelista M, Carvalho AJ, et al. First-in-man demonstration of a fully implanted myoelectric sensors system to control an advanced electromechanical prosthetic hand.

J Neurosci Methods. 2015;244:85-93. doi:10.1016/j.jneumeth.2014.07.016
4. Salminger S, Sturma A, Hofer C, et al. Long-term implant of intramuscular sensors and nerve transfers for wireless control of robotic arms in above-elbow amputees. Sci Robot. 2019;4(32). doi:10.1126/scirobotics.aaw6306

Efficacy of Liposomal Bupivacaine (Exparel) for Post-Operative Analgesia in Plastic Surgery: A Systematic Review

Abstract Presenter
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BACKGROUND: This systematic review aimed to identify new evidence from randomized controlled trials on the post-operative applications of liposomal bupivacaine (Exparel) in patients undergoing plastic surgery. It was hoped that recent data would provide clarity not only on a patient's subjective assessment for pain control; but rather on hard endpoints such as reduction in opioid use, post-operative complications, as well as length of stay and healthcare costs. Methods: An extensive literature search was performed using PubMed, MEDLINE, Embase and Google Scholar to identify studies published between November 2015 and July 2021, investigating the efficacy of Exparel for postoperative pain management in patients undergoing plastic surgery procedures. Data on opioid use, patient satisfaction, patient outcomes, hospital costs and length of stay were collected.

RESULTS: A total of 22 studies were selected out of 5651 identified in our initial search. The data for a total of 2505 patients are included in this review across various plastic surgery procedures (including abdominal reconstruction, breast reconstruction, hand, skin and oromaxilofacial surgery). Exparel was shown to be safe and led to a reduction in post-operative opioid requirements compared to controls in 65.6% of studies (14 out of 22). Looking at pain scores, only 9 (40.9%) demonstrated statistically significant improvement in post-operative pain levels. while 9 articles (40.9%) demonstrated only a trend towards improvement but no significant difference in patient pain scores. Length of stay was significantly shorter for patients treated with Exparel in only 6 (27%) studies compared to 8 (36%) which did not show any significant difference.

CONCLUSION: Exparel is a long-acting non-opioid analgesic that has become increasingly popular for post-operative pain control. Overall, the data from this review demonstrate that it is effective at reducing opioid requirements post-operatively, although effects on pain scores, treatment costs, and length of stay remains controversial. Nonetheless, it remains a part of many Enhanced Recovery After Surgery (ERAS) protocols. Further studies are required to fully

characterize the use of Exparel for specific indications and to develop standardized pain management protocols for plastic surgery.

IGF-1 Nanoparticles in a Nanofiber Hydrogel-based Drug Delivery System as a Therapeutic for Peripheral Nerve Injury in Non-Human Primates

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INTRODUCTION: Insulin-like growth factor 1 (IGF-1) reduces the deleterious effects of chronic denervation on both Schwann cells and muscle, while also enhancing axonal regeneration. IGF-1 is a small protein and has a short half-life which makes clinical utility as a therapeutic for peripheral nerve injury challenging. Previously, we encapsulated IGF-1 within biodegradable nanoparticles (NP) which were then placed in an injectable nanofiber fiber hydrogel composite (NHC) carrier. The NP-NHC provided sustained, local delivery of IGF-1 at therapeutic levels for over 6 weeks. This resulted in an improvement of at least 30% in functional recovery compared to untreated controls in both a chronic denervation rodent model and a small preclinical, non-human primate (NHP) pilot study. This study aimed to evaluate the efficacy of the IGF-1 NP-NHC in a larger study using our novel NHP peripheral nerve injury model.

METHODS: The IGF-1 NP-NHC was investigated in the upper limb of 6 adult male rhesus macaques. The median nerve was transected and immediately repaired in the mid-brachium of the dominant arm. Experimental NHPs were administered IGF-1 and control NHPs were administered 0.9% sodium chloride (n=3 per group). IGF-1 and sodium chloride injections were administered, every 6 weeks, along the median nerve, distal to the repair site, and into median nerve innervated muscle. Biopsies of flexor carpi radialis were sampled at 2 week intervals and the concentration of IGF-1 was measured using enzyme linked immunosorbent assay (ELISA) to quantify release kinetics of the NP-NHC. Motor function is being serially assessed serially using stimulated grip strength testing (SGST), to measure maximal tetanic contraction of forearm

flexors, with recovery compared to baseline grip strength.

RESULTS: The IGF-1 NP-NHC provided sustained, first-order release of IGF-1 for 6 weeks. The NHC also minimized local inflammation through increased anti-inflammatory cytokine expression (IL-10 and TGF- β). When compared to baseline SGST, experimental NHPs, on average, demonstrated an increased return to baseline SGST than control NHPs; 44.7% vs 29.1%, 36 weeks after nerve repair. Functional assessment using behavioral tasks to evaluate actions of the hand provided by the median nerve in addition to toxicological assessment of the NP-NHC are ongoing.

CONCLUSION: The NP-NHC provides sustained, linear release of IGF-1 for 6 weeks in NHPs which is similar to that observed in our rodent chronic denervation model. Currently serial SGST has demonstrated a greater increase in functional recovery in the IGF-1 treated NHPs. The NPs and NHC are both able to be produced through scalable and Current Good Manufacturing Practices (CGMP)-compliant processes. Consequently, this definitive pre-clinical study of the IGF-1 NP-NHC in NHPs has the potential to lead into early phase clinical trials.

Improving the retention and predictability of low volume autologous fat grafting: A comparative analysis in facial feminization patients

Abstract Presenter
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PURPOSE: The use of autologous fat grafting as a technique for augmenting soft tissue is well established. However, outcomes have been unpredictable due to variability in fat retention rates. This issue is of particular importance in facial fat grafting where only small volumes of fat are used. The Viality lipoaspirate wash system (Sientra, Inc. Santa Barbara, CA) uses proprietary technology to stabilize and concentrate lipoaspirate but data has not yet been reported in low volume cases. This study aimed to determine if the Viality technology could be applied to low volume fat grafting procedures and produce retention rates superior to traditional techniques for lipoaspirate preparation.

METHODS: Medical charts were reviewed to determine the cohort of patients who underwent autologous fat grafting for facial feminization between September 2021 and February 2023. All patients had previously obtained preoperative and postoperative three-dimensional facial imaging. Patients were grouped based on the method of lipoaspirate preparation (Viality system versus traditional techniques). Three-dimensional imaging analysis software was used to calculate the change in facial volume that occurred between the preoperative and postoperative images. This volume was compared to the actual volume injected intraoperatively. The

differences between these values were used to calculate the percent retention. The average percent retention between the Viality system and the traditional lipoaspirate preparation technique was compared over a range of postoperative time points.

RESULTS: During the defined time period, five facial fat grafting procedures occurred using the Viality system and five occurred using the traditional technique for lipoaspirate preparation. The average volume of processed lipoaspirate injected at the time of surgery was 24.59mL (S.D. 11.01mL). For the cases which used the Viality system, the average volume retention at follow-up was 87.95% (S.D. 6.54%). This was found to be a statistically significant increase in the retention rate compared to the fat grafting which occurred without the use of the Viality system (avg retention 43.48%, S.D. 14.90%) ($p<0.01$). The average time to follow-up was similar between the two groups (avg 22.7 days, range 14-36 days).

CONCLUSIONS: For patients undergoing low volume fat grafting, the Viality technology may result in superior fat retention rates and a higher level of outcome predictability compared to traditional lipoaspirate preparation techniques. As facial fat grafting, particularly for the purpose of facial feminization, continues to expand, finding techniques for optimizing outcomes in low volume fat grafting will be of increasing importance.

Can artificial intelligence guided image assessment be as accurate as laser doppler perfusion scanning in predicting depth of burn injury?

Abstract Presenter
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PURPOSE: Appropriate identification of burn depth and size is paramount. Despite the development of assessment aids [e.g., laser doppler imaging (LDI)], clinical assessments remain the gold standard, which assesses partial thickness burn depth with ~67% accuracy. We sought to develop an image-based artificial intelligence (AI) system that predicts burn severity and margins for use in acute burn triage.

METHOD: A convoluted neural network (CNN) was trained on 1855 mobile-device-captured burn images of different burn depths. The CNN was used to develop a novel Boundary-Attention Mapping (BAM) algorithm, using elements of saliency mapping, which was utilized to recognize the boundaries of burns. For validation, 144 patient charts that included clinical assessments, burn location, total body surface area, LDI-assessments, were retrieved for a retrospective study

at the University of Alberta. The clinical images underwent CNN-BAM assessments and were directly compared with the LDI assessment.

RESULTS: The CNN-BAM system can highlight burns from surrounding tissue with high confidence. The CNN can classify four levels of burn severity with an accuracy of 80%. Results comparing the CNN-BAM outputs to clinical and LDI assessments have shown a high degree of correlation (approximately 85%) between the CNN burn severity predictions to those extrapolated from LDI healing potential. When compared to pre-LDI clinical assessment, the accuracy of the CNN-BAM outcomes has been equivalent or superior in most cases. A high degree of correlation has been demonstrated between the LDI scans and BAM maps created by the system when identifying the overall burn injury margins.

CONCLUSION: This novel AI algorithm gives approximately equal accuracy in detecting burn depth as an LDI with a more economical and accessible application when embedded in a mobile device.

Highly Porous Foam Scaffolds Imprinted with human iPSCs Regenerate Skeletal Muscle and Improve Function Following Volumetric Muscle Loss

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PURPOSE: Volumetric muscle loss (VML) is a composite loss of skeletal muscle tissue (greater than 20%) that heals with minimal muscle regeneration, substantial fibrosis, and subsequent functional deficits (1,2). Standard treatment, involving free functional muscle transfer and physical therapy, cannot restore full muscle function following VML (3). Tissue engineered scaffolds, 3D structural templates that mimic native extracellular matrix, are promising to enhance functional muscle formation and recovery (4,5). Bioprinted 3D scaffolds, engineered using scaffolding material and stem cells, can replicate skeletal muscle architecture with control over cellular alignment and differentiation.

METHODS: The present study evaluates a highly porous, 3D-bioprinted scaffold containing engineered muscle fibers developed from human induced pluripotent stem cell-derived myogenic precursor cells (hiPSC-MPCs), derived from a serum-free differentiation protocol of a hiPSC cell line, for the treatment of VML in a murine model. Human induced pluripotent stem cells (hiPSCs) exhibit excellent proliferation potential and are capable of being differentiated into

myogenic (precursor) cells and regenerate skeletal muscle. The gelatin scaffold was subjected to high rates of stirring to increase porosity. These muscle tissue implants were then integrated and implanted into a VML injury model, created through a 4-mm punch biopsy to a mouse gastrocnemius muscle.

RESULTS: At four weeks post-VML injury to the gastrocnemius, gross imaging of the muscle showed migration of host cells into the construct and identified newly regenerated muscle tissue in the hiPSC-MPC muscle group compared to the acellular GelMA group. At eight weeks post-VML injury, histological analysis confirmed significant 2.5-fold increase ($p<0.0001$) in de novo muscle regeneration, measured by the number of myofibers identified with centrally located nuclei per high power field, in the hiPSC-MPC group compared to the untreated VML group. At four weeks post-VML injury, the hiPSC-MPC group also showed significantly reduced % area fibrosis (<3.58% area) in gross imaging compared to the acellular GelMA group ($p<0.0001$) and untreated VML group ($p<0.05$). Functional strength assessment of ankle plantarflexion of isolated gastrocnemius demonstrated a significant increase in both in situ twitch ($p<0.033$) and tetanic ($p<0.033$) force in the hiPSC-MPC group compared to the acellular GelMA group and VML untreated group.

CONCLUSIONS: This study pioneers a combination of bioengineering and stem cell technologies to develop a treatment for VML. Taken together, these results demonstrate successful graft-host integration and de novo muscle formation upon in vivo implantation of hiPSC-MPC-derived muscle scaffold in a mouse gastrocnemius model of VML injury. This work is an important step toward the next generation of VML regenerative therapies.

REFERCENES:

1. Corona BT, Rivera JC, Greising SM. Inflammatory and Physiological Consequences of Debridement of Fibrous Tissue after Volumetric Muscle Loss Injury. Clinical and Translational Science. 2018;11(2):208-217. doi:10.1111/cts.12519
2. Corona BT, Rivera JC, Owens JG, Wenke JC, Rathbone CR. Volumetric muscle loss leads to permanent disability following extremity trauma. J Rehabil Res Dev. 2015;52(7):785-92. doi:10.1682/jrrd.2014.07.0165
3. Garg K, Ward CL, Hurtgen BJ, et al. Volumetric muscle loss: persistent functional deficits beyond frank loss of tissue. J Orthop Res. Jan 2015;33(1):40-6. doi:10.1002/jor.22730
4. Panayi AC, Smit L, Hays N, et al. A porous collagen-GAG scaffold promotes muscle regeneration following volumetric muscle loss injury. Wound Repair and Regeneration. 2020;28(1):61-74. doi:10.1111/wrr.12768
5. Porzionato A, Sfriso MM, Pontini A, et al. Decellularized Human Skeletal Muscle as Biologic Scaffold for Reconstructive Surgery. Int J Mol Sci. Jul 1 2015;16(7):14808-31. doi:10.3390/ijms160714808

Three-Dimensional Wraparound Geniomandibular Chin Implant: An Alternative to the Sliding Genioplasty

Abstract Presenter

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PURPOSE: Sliding genioplasty is an operation designed for the treatment of microgenia and its associated functional and aesthetic deformities. Traditional chin implants cannot be considered a reasonable substitute for the sliding genioplasty because they do not fit most of the indications and cannot adequately treat microgenia to the same extent as sliding genioplasty. This report describes a newly engineered chin implant that that compares to and even surpasses many of the the benefits of sliding genioplasty and traditional implants.

MATERIALS AND METHODS: The implant is made of high-density porous polyethylene material (Poriferous, Newnan, Ga). These implants are available in two shapes (square and round) and in three sizes for each shape (3, 5 and 7 mm projections); the maximal projection is at the center of the implant. Each implant has two pieces that can be joined at the middle by a modifiable alignment tab. Additional reduction in size can be made by carving the different portions with a number 20 blade on a solid carving board. The surgeon should use the sizers as templates according to implant size and projection. A small notch is provided for the mental nerve, and the space can be enlarged if necessary. Traditionally surgeons used an interpositional bone graft or hydroxyapatite between the bone segments during a sliding genioplasty to augment the vertical distance of the anterior mandible and chin. This new implant presents a vertical component that wraps around the mandible and augments the vertical distance. Furthermore, on the external surface of the chin, it has a high vertical segment that gradually tapers down; this prevents the formation of a step-off deformity that manifests as a deep mentolabial groove, commonly seen in sliding genioplasty patients or those who get large chin implants. Our implant tapers from 7 mm at its maximal projection to 0.5 mm in its superior border. These two characteristics make it unique compared to other designs.

RESULTS: Over twenty-eight years, 260 patients underwent placement of the three-dimensional wraparound chin implant. Two thirds of the patients underwent placement of the previously described Mandibular Matrix system in conjunction with the three-dimensional wraparound implant. One third of the patients underwent placement of the three-dimensional wraparound implant by itself. The authors observed minimal complications overall: These included two surgical site infections; one patient required explantation of the implants and the other patient of the two underwent washout of the implant site and did well with a six-week course of oral antibiotics. One patient presented the implant very close to the gingivo-buccal sulcus, which required intraoral trimming. One patient complained of long term paresthesias which required trimming of the implant around the mental nerves. There were no other complications observed.

CONCLUSIONS: The three-dimensional chin implant provides various cosmetic advantages. This novel device produces a more gradual profile transition than the osteotomy. This prevents deepening of the mentolabial sulcus, which is accentuated in the sliding genioplasty. Since most of the chins that require sliding genioplasty are retrogenic or microgenic, the wraparound implant

augments the chin and the anterior segment of the mandible in three dimensions, similar to the effect of the sliding technique but without sacrificing height of the lateral segments. The application of this implant requires detachment of the anterior bellies of the digastric muscles. After placement and fixation of the chin implant the the digastric muscles are reattached to the infero-posterior border of the implant with non-absorbable (3-0 nylon) sutures, ultimately improving the cervico-submental angle. This implant allows advancement of the entire soft tissues from the symphysis to the anterior border of the masseter muscles bilaterally. The effect of this is also seen in the area of the jowls. The platysma muscle is separated vertically along with the muscle continuity on the chin itself (mentalis muscle insertion). Overall, this novel implant provides an array of cosmetic benefits, as described above, when compared to sliding genioplasty and traditional implants.

Change In Lower Lip Position After LeFort I Osteotomy In Patients With Bilateral And Unilateral Cleft Lip And Palate.

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BACKGROUND: Accurately predicting soft tissue changes from orthognathic surgery is crucial for pre- and post-surgical treatment planning and managing patient expectations, especially for patients with cleft lip and palate (CLP). Pre-surgically, patients with bilateral CLP (BCLP) characteristically present with a more hypertrophic and everted lower lip than patients with a unilateral CLP (UCLP). However, the change in the position of the lower lip after LeFort I osteotomy has been poorly defined in these groups. The purpose of this study was to compare the change in lower lip position following LeFort I osteotomy in patients with BCLP and UCLP.

MATERIALS & METHODS: The surgical records of 64 patients with CLP (25 bilateral, 39 unilateral) with class III malocclusion who had undergone a single-jaw, one-piece LeFort I osteotomy between 2013 and 2022 at a single institution were retrospectively analyzed. Patients were included if they had a lateral cephalogram or cone-beam computed tomography (CBCT) scan preoperatively and at least 6 months postoperatively. Patients were excluded if they had a genioplasty, post-operative anterior dental restorations, or if they were missing more than 2 incisors. Lateral cephalometric landmarks were digitized and superimposed by a single investigator with excellent intra-investigator reliability. Paired student's t-test, Wilcoxon Signed Ranks Test and Pearson correlation coefficients were used to compare pre- and post-operative changes.

RESULTS: Pre-surgically, there was a significantly greater horizontal upper-to-lower lip discrepancy for the individuals with BCLP compared to those with ULCP (6.7 mm vs 4.4 mm, respectively; $p = 0.0015$). There was no difference in the amount of bony maxillary advancement (BLCP= 7.2 mm, ULCP= 6.4 mm, $p = 0.1353$). This resulted in concomitant advancement of the upper lip, which was greater for individuals with BCLP (BLCP= 6.3 mm, UCLP= 4.6 mm, $p = 0.0133$). Post-surgically, the lower lip point moved similar distances posteriorly in both cohorts (BLCP= 0.9 mm, UCLP= 1.0 mm, $p = 0.7694$). This change in lower lip position correlated strongly with changes in mandibular landmarks. There was also a moderate correlation with changes in the upper lip position and weak to moderate correlations were observed with changes in maxillary position.

CONCLUSION: Pre-surgically, patients with BCLP present with a more protuberant lower lip and a significantly larger horizontal upper-to-lower lip discrepancy. After comparable maxillary advancements between in patients with BLCP and UCLP, the upper lip position was farther advanced in those with BCLP, while both groups exhibited similar improvements to the lower lip position and final lip competence. The change in the lower lip position was most greatly correlated with small changes in the mandible despite no mandibular surgery. However, it was also moderately correlated with changes in the upper lip position, suggesting an important role of lip competence in determining the final resting lower lip position.

Effects of Posterior Vault Distraction Osteogenesis on Ventricular Morphology and Volume

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INTRODUCTION: Patients with cephalocranial disproportion may be treated by posterior vault distraction osteogenesis (PVDO) to expand intracranial volume (ICV). The increase in ICV may reverse or prevent increased intracranial pressure (ICP) and its sequelae. ICV expansion may additionally improve ventricular patency and cerebrospinal fluid (CSF) hydrodynamics. However, the relationship between cranial vault expansion by PVDO and ventricular volume has yet to be quantified. This study aims to conduct pre- and postoperative morphometric and volumetric ventricular analyses to better understand the effects of PVDO on cranial CSF hydrodynamics.

METHODS: All patients who had undergone PVDO at our institution between 2008 and 2022 with appropriate pre- and postoperative cranial computed tomograms (CT) were retrospectively reviewed. Patients with intervals greater than one year between imaging and PVDO were excluded, as were patients who had undergone additional cranial procedures between images. The ventricular system was isolated from pre- and postoperative images for volumetric analysis. All measures were normalized to total cerebral volume to control for inter- and intrapersonal variations in cerebral dimensions. Linear mixed effects models were used to compare normalized pre- and postoperative dimensions.

RESULTS: Eleven patients were included. Mean age at PVDO was 4.51±2.83 years. Three patients had bicoronal synostosis, 2 had multisuture, 5 had pansynostosis, and 1 had unicoronal craniosynostosis. Six patients had a syndromic diagnosis (2 Apert, 1 Crouzon, 1 Muenke, 1 Pfeiffer, 1 Saethre Chotzen). Mean age at pre- and postoperative CT scans were 4.38±2.79 years and 5.01±2.90 years, respectively. Average pre- and postoperative normalized total ventricular volume was 2.36±2.14% and 3.42±2.24% of total cerebral brain volume, respectively. The lateral ventricles were the greatest contributors to total ventricular volume. Pre- and postoperative normalized lateral ventricle volumes were 2.10±1.97% and 3.11±2.14% of total cerebral brain volume, respectively. PVDO was found to significantly increase the normalized volume of the lateral ventricles (β=1.00%, p=0.04), while the expansion in normalized volume of the total ventricular system trended toward significance (β=1.06%, p=0.06). There was no significant change in normalized volume of the third (p=0.33) or fourth ventricles (p=0.82).

CONCLUSION: This study provides evidence that a secondary effect of PVDO is a significant increase in ventricular volume. The maximal relative volume increase is obtained in the lateral ventricles, with total relative ventricular volume trending towards significance, as well. These findings have potential implications in the treatment of conditions associated with aberrant ventricular hydrodynamics, such as hydrocephalus. Future works will be critical in quantifying the effects of PVDO on CSF flow and understanding its use as a potential treatment for ventricular pathology.

Patient Factors Predictive of Longer Operation Times in Patients with Cleft Palate

Abstract Presenter
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Introduction: Orofacial clefting serves as the most common craniofacial congenital anomaly. Surgical repair of cleft palate (CP) typically is performed within the first year of age. There is currently a paucity of data on the impact of patient and demographic characteristics on surgical

repair of CP. The purpose of this study is to analyze the implications and predictiveness of such factors on operation time.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) Pediatric Date File was used to identify patients who underwent CP repair between 2012-2022. Student's t-test were performed to model the association of operation time with the following patient factors: prematurity, overall comorbidities, American Society of Anesthesiologists (ASA) class, congenital cardiac defects (CCD), structural pulmonary abnormalities (PA) and gender.

Results: Upon review, 20,525 patients were identified in the NSQIP database during the study who were determined to have CP requiring surgical intervention. The average operation time reported in the database was 130 ± 67 minutes. Males had significantly greater operative times (131 vs. 129 min, p=.023). Patients with at least one comorbidity had significantly greater operation times (127 v. 106 min, p<.001). Patients with CCD or PA were found to have significantly longer operative times (CCD: 140min v. non-CCD: 129 min, p<.001; PA: 139 min vs. non-PA: 129 min). ASA classes II-IV had significantly greater operative times than ASA class I (131 vs 124 min, p<.001). In contrast, prematurity was not found to significantly impact operation time (p=.931).

Conclusion: This study highlights the factors that put patients at higher risk of a longer and thus conceivably a more complicated intraoperative and postoperative course. These findings will allow physicians to identify patients in whom surgery may be more involved and subsequently counsel patients' families on surgical expectations.

Epigenetics and Surgical Timing Inform Safety and Outcomes of Tongue Reduction for Patients with Beckwith-Wiedemann Syndrome

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BACKGROUND: Macroglossia is a cardinal feature of Beckwith-Wiedemann syndrome (BWS). Optimal timing of tongue reduction is debated due to the spectrum of phenotypic severity across and within epigenetic subtypes. Operative timing is of critical importance due to

its impacts on obstructive sleep apnea, speech progression, craniofacial growth, and dental development. This study leverages a large cohort of molecularly characterized patients with BWS to correlate epigenetic diagnosis with phenotype and treatment outcome.

METHODS: Patients with BWS seen in consultation for macroglossia from 2009-2022 were reviewed for phenotype, molecular diagnosis, tongue reduction status, timing of surgery (early = under 12 months, late = after 12 months), length of hospital stay, perioperative complications, and repeated tongue reductions. The surgical technique used at our institution is an anterior resection with a modified-W shaped pattern. The frequency of tongue reduction was compared across epigenetic subtypes. Phenotypic features including hemihypertrophy, omphalocele, hyperinsulinism, embryonal tumors, macrosomia at birth, facial nevus flammeus, ear creases/pits, organomegaly, and umbilical hernia/diastasis were compared across patients who did and did not undergo tongue reduction. Complications were compared between patients undergoing early and late tongue reduction.

RESULTS: Two hundred thirty-seven patients were included, 95 (40%) of whom underwent tongue reduction (47 early, 48 late). Imprinting control region 2 loss of methylation (IC2 LOM) was the most common epigenotype (61%). Paternal uniparental isodisomy for chromosome 11 (pUPD11) comprised a larger proportion of patients undergoing tongue reduction (18%) than those not undergoing surgery (8%, $p=0.024$) and was associated with need for repeat surgery (OR 4.49, 95% CI 1.06-18.98, $p=0.041$). Certain phenotypic features including omphalocele (OR 4.20, 95% CI 2.11-8.35, $p<0.001$), hyperinsulinism (OR 4.39, 95% CI 2.14-9.03, $p<0.001$), and organomegaly (OR 3.68, 95% CI 1.98-6.86, $p<0.001$) were more frequently observed in patients undergoing tongue reduction. Length of hospitalization among patients admitted for early tongue reduction was 9.5 days (IQR 6.8-12.5) compared to 3.0 days (IQR 2.0-5.0) in the late surgery cohort ($p<0.001$). Duration of postoperative intubation was significantly longer in the early surgery group (5.0 days, IQR 2.8-7.0) compared to the late surgery group (0 days, IQR 0.0-1.0, $p<0.001$). Complications including wound dehiscence, ventilator associated pneumonia, and unplanned extubation were more common in patients undergoing early surgery (20%) than late surgery (4%, OR 5.70, 95% CI 1.14-28.55, $p=0.034$).

CONCLUSIONS: The results support correlations between severity of features such as omphalocele, hyperinsulinism, and organomegaly and severe macroglossia necessitating tongue reduction. Certain genetic subtypes, namely pUPD11, are associated with more frequent tongue reduction and repeated surgery, perhaps due to tongue regrowth. While early operation is indicated for relief of obstructive sleep apnea, this must be weighed against longer hospitalization and intubation as well as increased risk of perioperative complications, most of which are non-surgical. This study highlights how molecular diagnosis advances clinical care in BWS by risk stratifying clinical outcomes in a multidisciplinary care center.

Genetic Subtypes of Apert Syndrome Are Associated with Differences in Airway Morphology and Early Upper Airway Obstruction

Abstract Presenter

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BACKGROUND: Apert syndrome is predominantly caused by two paternally inherited gain-of-function mutations in the FGFR2 gene, Pro253Arg and Ser252Trp. Studies comparing phenotypic features between these two mutations have established differences in syndactyly severity and incidence of cleft palate. Obstructive sleep apnea can be debilitating in a subset of patients with Apert syndrome yet is not well understood. This study aimed to determine whether subtypes of FGFR2 mutation imparts differential effects on airway physiology and morphology.

METHODS: Patients with Apert syndrome and confirmatory molecular testing were reviewed for polysomnography, nasal endoscopy, and computed tomography (CT) imaging. Obstructive apnea hypopnea index (OAHI) and oxygen saturation (SpO2) nadir, nasal airway volumes, choanal cross-sectional area, and midfacial cephalometric dimensions were compared across mutation types. Severity of obstructive sleep apnea (OSA) was classified as none (OAHI < 1) or never tested, mild (OAHI 1-5), moderate (OAHI 5-10), or severe (OAHI > 10). Volumetric and cross-sectional measurements were carried out in Materialise Mimics.

RESULTS: Twenty-four patients (13 Ser252Trp, 11 Pro253Srg) were included. Severe obstructive sleep apnea (OAHI > 10) occurred in 8 (62%) patients with Ser252Trp mutations compared to 1 (9%) patient with Pro253Arg mutations (p=0.009). CT imaging at one year of age demonstrated that nasopharyngeal airway volumes were 5302 ± 1076mm3 in the Ser252Trp group and 6832 ± 1414mm3 in the Pro253Arg group (p=0.041). Cross-sectional area of the choanae was 57.2 ± 19.4mm2 in the Ser252Trp group and 80.4 ± 20.4mm2 in the Pro253Arg group (p=0.057). Thirteen patients (9 Ser252Trp, 4 Pro253Arg) underwent nasal endoscopy between 1 month and 4.5 years of age. Nasal cavity stenosis was noted in 5 patients (4 Ser252Trp and 1 Pro253Arg) and choanal stenosis was noted in 5 patients (4 Ser252Trp mutations and 1 Pro253Arg mutation). In six patients with Ser252Trp mutations the endoscope was unable to be passed into the nasopharynx. Maxillary length (ANS-PNS, p=0.026) and Basion-ANS (p=0.007) were shorter in patients with Ser252Trp mutations. SNA was not significantly different between groups (p=0.541).

CONCLUSIONS: The findings suggest that the Ser252Trp mutation in Apert syndrome is associated with more severe obstructive sleep physiology in early life. Patients with Ser252Trp mutations demonstrated more severe OSA, decreased nasopharyngeal airway volume, and a

trend towards a higher incidence of nasopharyngeal airway stenosis. Because untreated OSA early in life can lead to adverse neurocognitive outcomes, the results of this study should prompt a heightened awareness in this specific subgroup. Heightened clinical awareness of these associations may inform treatment planning and family counseling for patients with Apert syndrome.

Keeping an Eye on Metopic Craniosynostosis: Effects of Severity on Orbital Dysmorphology

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BACKGROUND: The premature fusion of the metopic suture in metopic craniosynostosis (CS) can result in characteristic metopic ridging and trigonocephaly which may subsequently induce changes to normal orbital morphology. However, there is a paucity of data assessing the specific orbital dysmorphology and relationship to metopic severity in these patients. This comparative study seeks to better understand this relationship using age- and sex-matched three-dimensional computed tomography (3DCT).

METHODS: All patients who have undergone surgical correction for metopic CS with available 3DCTs prior to any cranial procedure between 2005 and 2022 at our institution were retrospectively reviewed. Unaffected age- and sex-matched controls were collected from an institutional radiographic database. Metopic severity was assessed via the interfrontal angle (IFA), calculated as the angle between the supraorbital notches centered on the metopic ridge in a single axial plane. Eye dysmorphology was measured via the angle between the supraorbital notches and nasion (SNS), infraorbital foramina and nasion (INI), left and right zygomaticofrontal suture-supraorbital notch-dacryon (ZSD), and angle of the orbital long axes, relative to the midsagittal plane. Measures were compared between groups using Mann Whitney U tests and multivariate linear models. ROC curves assessed the predictive ability of various measures at diagnosing metopic CS via the area under the curve (AUC).

RESULTS: 142 patients (68 metopic, 74 control) were included in the study, of which 61% were male and 39% were female. Mean age at imaging was 0.6±0.6 years. There was no significant difference in gender ($p=0.14$) or age ($p=0.92$) between groups. All orbital measures were significantly different between groups. Compared to controls, metopic SNS, INI, and left

and right ZSDs were significantly smaller ($p<0.001$), while orbital long axis angle was significantly greater ($p=0.02$). Controlling for patient age, interfrontal angle was significantly associated with all orbital measures. The strongest positive relationship was found between IFA and SNS ($\beta=0.80$, $p<0.001$), while a negative relationship was found between IFA and long axis angle ($\beta=-0.23$, $p=0.004$). The AUC of the IFA in predicting a diagnosis of metopic CS was 0.98. The optimum cut-off value was found to be an angle of 145.77° (89.19% specific, 98.53% sensitive). The SNS had the highest AUC of the orbital measures at 0.91, and an angle of 125.32° was found to be the optimum diagnostic cut-off value (78.38% specific, 86.76% sensitive).

CONCLUSION: Metopic CS is associated with specific changes to orbital morphology which correlate with severity of trigonocephaly. Specifically, degree of trigonocephaly is associated with narrowing of individual superior orbital rims and narrowing of interorbital distance, superiorly greater than inferiorly. The SNS angle was found to be highly predictive of metopic CS diagnosis, which may aid in the diagnosis of ambiguous cases.

Patient-Reported Experiences with Orthognathic Surgery in Adolescents and Young Adults

REFERENCES:
Liddle MJ, Baker SR, Smith KG, Thompson AR. Psychosocial Outcomes in Orthognathic Surgery: A Review of the Literature. Cleft Palate Craniofac J. 2015;52(4):458-470. doi:10.1597/14-021

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PURPOSE: Orthognathic surgery shows a positive effect on quality of life as measured in psychosocial, functional, and cosmetic domains.1 Yet some patients may report challenges during recovery, including adjusting to their post-operative appearance. This study aims to detail expectations, preparedness, recovery, and perception of changes in appearance and functioning after orthognathic surgery as reported by adolescent and young adult patients and their parents.

METHOD: Self-report surveys were administered to patient-parent dyads who underwent

orthognathic surgery at a tertiary-care children's hospital between 2020 and 2022. Participants provided information about objective and subjective aspects of pre-operative preparation, post-operative hospital admission, and subsequent recovery and adjustment at home. Following completion of surveys, patients and parents were invited for an interview where more detailed qualitative information was collected. Responses were analyzed for trends across the population, discordance between patients and parents, and associations with patient age, gender, clinical history, and time since surgery.

RESULTS: Of 30 families contacted, 16 families consisting of 11 patients and 13 parents completed the surveys, including 9 complete patient-parent dyads. Nine patients had cleft lip and palate. Surveys were completed at an average of 1.4 years after surgery (range 0.3 – 2.4 years) when patients were an average of 18 years old (range 16 – 21 years). On a measure of facial appearance scored 0 to 5, there was a trend towards increased satisfaction with facial appearance compared to baseline at 4-6 weeks after surgery (mean 2.8 vs. 3.3, p=0.19). However, the greatest improvement in satisfaction was reported between 6 weeks after surgery and the time of survey (mean 3.3 vs. 4.3, p=0.002). Seven (64%) patients reported dissatisfaction with their smile prior to surgery, and 10 (91%) patients reported improved satisfaction with their smile following surgery. Eight (73%) patients rated their pre-operative satisfaction with their ability to chew as neutral, and seven (64%) reported a positive change in their chewing ability following surgery. Ten (91%) patients reported numbness or altered sensation of the lip/chin during recovery, with half reporting mild persistent numbness at the time of survey completion. Time since surgery affected patients' perceptions of their surgical experience, with patients over 1-year post-operative considering the experience to be less traumatic (p=0.023) and less of a barrier (p=0.021) to their daily activities compared those surveyed within a year of surgery. Compared to patient reports, parents perceived their child's experience of surgery as more traumatic (p=0.007). Ten (91%) patients and 7 (58%) parents agreed the surgery was "worth it."

CONCLUSIONS: Adolescents and young adults undergoing orthognathic surgery generally report improved satisfaction with facial appearance, particularly in their smile, following surgery. It may take several months before these benefits are fully realized. Patients may show greater resiliency to the negative aspects of surgery than parents assume, particularly in the long-term. Orthognathic surgery, while challenging, provides young patients with long-term improvements in facial appearance and function.

Permanent Dental Complications of Mandibular Distraction Osteogenesis: Radiographic Assessment and Risk Stratification

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PURPOSE: Mandibular distraction osteogenesis (MDO) shows effective early relief of tongue-based airway obstruction and is commonly indicated in Pierre Robin sequence and genetic syndromes involving micro/retrognathia. However, mandibular osteotomies risk damage to developing tooth buds with potential consequences for dental development. We aim to comprehensively assess long-term dental complications in patients previously undergoing MDO.

METHODS: Panoramic dental radiographs and CT imaging was retrospectively collected for patients previously undergoing MDO, with a minimum post-operative interval of 4 years. Each patient's most recent imaging was evaluated by a pediatric craniofacial orthodontist. Mandibular permanent first and second molars were classified according to degree of damage (normally developed, damaged, absent) and viability for dental restoration (not requiring intervention, restorable, non-restorable). Tooth buds judged too immature for definitive evaluation were excluded. Medical and surgical history, including prior dental extractions, was abstracted from the medical record. Rates of permanent molar damage were compared by age at MDO, secondary mandibular interventions, and syndromic diagnosis. Outcomes were analyzed by each hemimandible undergoing MDO.

RESULTS: Thirty-one patients with a median age of 9 years (range 4 to 19 years) at most recent comprehensive dental imaging were evaluated, yielding 54 permanent first molars and 26 permanent second molars evaluable for long-term damage. Median duration of follow-up was 8 years (range 4 to 14 years). Permanent first molar injury was seen in the majority of subjects (74%), with 22 (55%) injured first molars retaining functionality and the remaining 18 (45%) considered nonfunctional and non-restorable. Patterns of damage interfering with function were more common in syndromic (43%) compared to non-syndromic (21%; p=.014) subjects. MDO prior to age two was associated with more frequent and worse dental damage (p=.001). Patients with multiple prior mandibular operations showed a greater proportion of normally developed permanent first molars (p=.003). Of evaluable permanent second molars, 16 (61%) were classified as nonfunctional and non-restorable, with only one evaluable molar classified as normally developed. No specific risk factors for permanent second molar damage were identified. Of 26 hemimandibles with evaluable permanent second molars, 7 (27%) had adjacent permanent first and permanent second molars classified as damaged and non-functional.

CONCLUSION: MDO is a crucial intervention for many pediatric patients suffering from tongue-based airway obstruction. However, permanent dental injury is commonly seen, particularly in patients undergoing MDO before the age of 2. Nevertheless, injured permanent molars are frequently restorable by an experienced dentist. Accordingly, dental development should be carefully monitored in this patient population in anticipation of permanent molar injury requiring intervention.

Predisposing Factors for Postoperative Complications Following Fronto-Orbital Advancement and Remodeling: A Single Institution Study of 270 Patients

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Fronto-orbital advancement and remodeling (FOA) is a common surgical approach used for craniosynostosis conferring functional and aesthetic benefit. There are few reports examining the postoperative complications outside of the admission setting. This study aimed to establish complication rates and identify risk factors for inferior outcomes in a large population of patients undergoing FOA. All patients who underwent fronto-orbital advancement from 2013-2022 at our institution were retrospectively studied. Perioperative and postoperative data were collected to yield outcomes analyses. Stepwise multivariate logistic regression was performed to identify predictors of postoperative complications. There were 270 patients who underwent FOA. The overall complication rate was 9.3%, most commonly postoperative blood transfusion (5.6%), dehiscence (4.1%), delayed wound healing (3.3%), and infection requiring readmission (2.2%). Tense closure independently predicted dehiscence ($p=0.0052$); however, reinforcing prolene or vicryl superficial sutures did not decrease the risk of dehiscence ($p>0.05$). A greater proportion of malnourished patients experienced postoperative complications compared to patients without malnourishment (17.4% vs 7.6%, $p=0.037$), though there were no significant differences in individual postoperative outcomes. Additionally, malnourishment did not increase the risk of intraoperative blood requirements or postoperative complications ($p>0.05$). Identified risk factors for complications included syndromic status and tense closure, but not malnourishment. These factors may be considered in preoperative planning and when counseling patient families.

Virtual Surgical Planning for Staged Craniopagus Conjoined Twin Separation: Reports from the Cutting Edge

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PURPOSE: Craniopagus twins are the rarest presentation of conjoined twins. Craniopagus separation, particularly in cases of shared cerebral vasculature, is a high-risk and technically challenging undertaking requiring extensive interdisciplinary collaboration. The difficulty of these cases is compounded by their rarity, as few centers have been able to build significant institutional experience with this procedure. Virtual surgical planning (VSP) and computer-aided design and manufacturing (CAD/CAM) have many potential advantages in these complex cases and have been applied in multiple prior successful separations. We aim to synthesize the experiences of centers applying these technologies to craniopagus twin separations and present future directions for their further refinement.

METHODS: Surgical teams publishing on successful staged craniopagus twin separation using VSP were surveyed. Questionnaires evaluated use of three-dimensional models, intraoperative surgical guides, custom hardware, virtual reality, and surgical simulation. Surgeons were additionally invited to share insights gained from their personal experience using VSP and CAD/CAM technologies in these cases and areas in which these technologies could be further developed to improve future patient outcomes.

RESULTS: Four of six eligible surgical teams participated in the survey. All teams used three-dimensional CAD/CAM anatomical models, commonly creating layered models demonstrating the relationship between abnormal cerebral vasculature and crania. All but one respondent described using these models to facilitate communication within the large multidisciplinary teams involved in the care of these patients. Two teams used virtual reality for surgical planning, and all groups used virtual simulations to predict changes achieved throughout staged intervention. This included one center where simulated soft tissue expansion was used to plan optimal placement and volumes of expanders used. Two teams used CAD/CAM guides to translate virtual surgical plans into the operating room. Only one team used patient-specific devices or hardware, a custom external distraction device. Considering future directions, surgeons expressed interest in increased fidelity of virtual reality simulations including vascular flow data, incorporation of augmented reality, and manufacture of patient-specific reconstruction plates or other hardware.

CONCLUSION: VSP and CAD/CAM are critical tools for surgical teams endeavoring to separate craniopagus twins. These technologies aid surgeons in visualizing the unique three-dimensional anatomy of each set of twins, anticipating staged outcomes of these complex procedures, and communicating with a large interdisciplinary team. Web-linked virtual reality conferencing may also facilitate the transfer of knowledge from experienced teams to those with less familiarity, an important step toward increasing the global success rate with these rare and challenging operations. Still, many possible advantages of these technologies have yet to be fully realized, particularly in rendering virtual plans into the physical world through augmented reality or custom-manufactured devices and hardware.

Who is Still Attending Cleft Clinic? Sociodemographic Factors Predict Long-term Attrition Following Palatoplasty

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BACKGROUND: Patients with cleft lip and palate benefit from longitudinal follow-up in a multidisciplinary care setting to coordinate secondary surgeries following cheiloplasty and palatoplasty. Unfortunately, prior work has demonstrated that patients of marginalized demographic backgrounds less frequently undergo secondary operations including cleft rhinoplasty and secondary speech surgery. We hypothesized that differences in the rate of attrition from cleft clinic between demographic groups may explain this under-utilization. This study aimed to investigate whether long-term attrition from cleft clinic varies based on race, insurance status, and income.

METHODS: Patients with cleft palate with or without cleft lip born between 1995 and 2007 who underwent palatoplasty at our institution were included. Diagnosis, race, insurance provider (private, public), and estimated income were recorded. Income was estimated by zip code using publicly available 2021 census tract data from the United States Census Bureau. Each patient was followed until their most recent appointment with a cleft team provider or until 15 years of age, with the entire observation period spanning 1995-2022. Multivariable cox proportional-hazard modeling was used to determine significant predictors of attrition, correcting for presenting diagnosis (cleft palate only, cleft lip and palate, submucosal cleft palate). Attrition was defined as failure to present to cleft clinic beyond 15 years of age.

RESULTS: Six hundred ninety-five patients were included. White patients made up 69.4% (n=482) of the cohort, followed by Asian patients (10.8%, n=75), Black patients (9.8%, n=68), Hispanic patients (5.0%, n=35), and other patients (4.9%, n=34). Age at last follow-up across the entire cohort was 11.7±6.4 years. Patients with cleft lip and palate were followed significantly longer (14.6±5.4 years) than patients with cleft palate only (9.2±6.3 years) or submucosal cleft palate (10.7±5.1 years, $p<0.001$). Black patients (OR 1.44, 95% CI 1.05-1.98, $p=0.022$) and other patients (OR 1.85, 95% CI 1.23-2.79, $p=0.003$) were more likely to experience attrition

compared to white patients. Patients with public insurance were more likely to experience attrition than privately insured patients (OR 1.25, 95% CI 1.02-1.54, p=0.033). Patients in the 3rd (OR 0.71, 95% CI 0.51-0.97, p=0.033) and 4th (OR 0.68, 95% CI 0.50-0.93, p=0.017) estimated income quintiles were less likely to experience attrition compared to patients in the lowest quintile.

CONCLUSIONS: Optimizing outcomes for patients with cleft lip and palate requires continuity of care throughout development. Loss of follow-up in the early teen years may result in failure to deliver indicated surgeries, which may have implications for speech quality, appearance, and psychosocial well-being. Results of this study demonstrate that race, insurance provider, and income each affect the likelihood that a patient will continue returning to cleft clinic. Targeted interventions aimed at retention of vulnerable populations may be beneficial towards the goal of ensuring equitable surgical access.

Practice Management/Surgical Pearls 1

Close

Implementation of a Professional Coaching Program for Plastic Surgery Residents

Abstract Presenter
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INTRODUCTION: In 2021, the University of Pittsburgh Medical Center (UPMC) Department of Plastic Surgery established a professional coaching program available to the Integrated residents within our experimental Competency-Based Training Program. Coaching, which is distinguished from other educational interventions in that it is learner-centered, initiated, and driven, and involves a collaborative relationship between coaching and coached individuals, has been consistently shown to be valuable for clinical skills development. However, while professional coaching is used effectively in other disciplines, it is relatively uncommon in surgery, particularly in the training environment. The purpose of this study is to detail our institutions' experience with plastic surgery resident professional coaching.

METHODS: Since its implementation in 2021, our Department of Plastic Surgery has offered professional coaching services to residents within the PGY-1 through PGY-5 years. This professional coaching program for surgical residents emphasizes problem identification, realistic

and relevant goal setting and development, alternative solutions generation, and targeting of feasible solutions to clinical or professional problems that may arise. To help coachees reach their fullest potential, our program also involves frequent performance reviews which encourages frequent self-reflection using facilitated feedback tailored to the trainee's needs and goals.

RESULTS: Professional coaching offers a structured framework for surgical skills development. Of the fifteen integrated residents in PGY 1-5 at our institution, fourteen (93%) have availed themselves of professional coaching services. The majority (85%) of sessions run 30 minutes long, with other sessions lasting 60 minutes. Ten residents (71%) have participated in multiple coaching sessions to establish longitudinal coaching relationships. Coaching topics range based on the PGY-level of the resident participant, with PGY1 residents focusing on transition to plastic surgery training, PGY2-4 residents focusing on defining their professional path and future training plans, and PGY4-6 residents focusing on transitioning from resident to fellow/attending roles. One-on-one sessions formalize time for resident guided self-reflection. Anecdotally, residents that chose to participate in coaching report that coaching helped them to more clearly understand and create actionable plans to meet long-term professional goals such as fellowship and job attainment.

CONCLUSION: Though just a year-old, UPMC's Department of Plastic Surgery individualized coaching service for residents has shown itself to be a valuable tool for surgical and professional development with limited additional time commitment for busy trainees. We have found this program to be an integral component of our Competency-Based Medical Education model of training. This project details our institution's experience with professional coaching services for residents and offers insights into its value as well as potential barriers to more widespread adoption.

Surgical Techniques Dedicated to Nanotextured Implants to Enhance the Aesthetic Potential of Breast Augmentation and Augmentation Mastopexy as Evaluation of Six-Year Single-Center Experience With 1000 Primary and Secondary Cases

Abstract Presenter
Pawel Szychta MD, Phd, Dsc

BACKGROUND: Motiva Ergonomix is the gel-filled breast implant, designed for more natural breast aesthetics, with the nanotextured shell aimed for decreased fibrosis. Indeed, the spectacular outcomes can be partially attributed to the bioengineered biocompatible surface of these implants. However, the device with the remarkably broadened panel of parameters empowering breast aesthetics has individual characteristics, and thus can require also exclusively dedicated surgical techniques to be implemented in order to minimize the implant-related complications.

OBJECTIVES: The aim of this retrospective study was to summarize and analyze the clinical implications and challenges related to the individualized characteristics of Motiva implants,

together with introducing the full set of corresponding necessary surgical maneuvers required and dedicated to device, which were depicted in diverse primary and secondary clinical scenarios, for the most comprehensive guidelines leading to highlight the absolute aesthetic potential of breast augmentation and augmentation mastopexy with nanotextured devices.

RESULTS: In the study, the exclusive maneuvers were focused on ergonomy in general, which in detail was precisely defined as breast shape adapting to the body position, together with breast pliability perceived as softness in touch and extensive dynamics imitating naturalness. Total scope of exclusive surgical techniques with the resulting technical recommendations was depicted and specifically designed in relation to independently specified, complex breast considerations, including: cleavage, volume distribution, nipple-areola complex position, breast base, IMF shape and position, IMF scar length, softness and dynamics of breast. Very low complication rate was reported in the series.
Conclusions: Induvial patient planning and implementation of the presented variations of surgical techniques, dedicated exclusively to nanotextured ergonomic implants, are essential to maximize potential for enhanced aesthetic profile obtainable with Motiva implants. The clinical recommendations summarized in the study will deliver patients with desired breast appearance in reproducible and repeatable manner with long-term stability and safety.

The Controversy Over Price Transparency: Patients & Providers Disagree

Abstract Presenter
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INTRODUCTION: The No Surprises Act, implemented on January 1, 2022, is a new federal policy that requires all medical providers, including those of self-pay services, such as aesthetic procedures, to provide a good faith estimate to protect patients from receiving surprise charges exceeding the original estimate by more than $400.[1]

PURPOSE: To analyze consumer and provider attitudes towards the No Surprises Act price transparency in healthcare

METHODS: Two distinct surveys were sent to providers of aesthetic services and patients. Plastic surgery, dermatology, and med spa providers received a survey asking whether they made pricing available online, reasoning for this choice, and whether they believed that the No Surprises Act applies to them. It is worth noting that the No Surprises Act applies to all medical providers, regardless of specialty or practice setting.[2]

Patients who had previously used a BuildMyHealth online price estimator received a survey asking about their experience obtaining a price estimate online, the accuracy or the estimate, and how using health insurance influences their desire to know the cost of healthcare services beforehand. Both patients and providers were asked about their knowledge of the No Surprises Act; if they indicated any degree or familiarity with it, they were asked to share their perception of this legislation.

RESULTS: Most surveyed providers do not share the costs of their services online. Despite indicating at least some degree of knowledge regarding the No Surprises Act, many providers believe that the law does not apply to them. Most patients surveyed expressed having a positive experience when receiving estimates or medical services prior to consultation. For most patients, the final cost of service was close to or even less than the estimate. Notably, many providers cited the inaccuracy of price estimator tools as a reason not to incorporate them into their websites. Patients who indicated any Knowledge or the No Surprises Act tended to have a positive perception of the legislation.

CONCLUSION: Although most providers of aesthetic services chose not to make pricing publicly available, the results of this survey suggest that transparency in pricing is a patient satisfier. Thus, providers who offer pricing online may attract more patients. Patients who had a positive experience with the price estimator tool indicated that it was because they felt more informed prior to seeking care. Therefore, the decision to implement price transparency can be mutually beneficial to patients and providers of aesthetic services, and the healthcare field should consider further reform regarding price transparency practices.

REFERENCES:

1. No Surprises: Understand your rights against surprise medical bills | CMS. Accessed October 16, 2022. https://www.cms.gov/newsroom/fact-sheets/no-surprises-understand-your-rights-against-surprise-medical-bills
2. Frequently Asked Questions for Providers About the No Surprises Rules. :11

The Gift of a Fresh Start: Results from A Single-Center Surgical Gift Program

Abstract Presenter
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INTRODUCTION: Surgical mission trips are controversial, and their quantifiable benefits remain unclear.(1) Evidence indicates that long-term models that invest in local infrastructure and training have significant benefits in terms of patient outcomes.(2)

Beginning in 1991 in an outpatient surgical center, the Fresh Start Surgical Gifts Program has provided an avenue for low-income patients to receive surgical care at no direct cost to the patient or their family. In 2009, the program transitioned to Rady Children's Hospital of San Diego (RCHSD). By utilizing pre-existing hospital infrastructure, we were able to further develop our program to offer complex surgical care 6 times per year with a dedicated craniofacial team as well as the necessary multidisciplinary team members (e.g. dental, orthodontic, and speech therapy) to provide these patients with the gold standard of care regardless of their ability to pay. In recent years, our program has expanded to include surgeons from other disciplines, such as hand surgery, otolaryngology, urology, general surgery, and neurosurgery. Our program provides a model for long-term, sustainable surgical care to low-income patients with unmet surgical needs.

METHODS: A retrospective chart review was conducted of patients who were treated via the Fresh Start Program at RCHSD from January 2009 to January 2023. Patient demographics as well as medical history related to their care with Fresh Start, (e.g. medical diagnoses, surgical procedures, and duration of follow-up) were collected. Financial information was collected as the total charge accrued by their care, including housing, transportation, hospital, and surgical costs.

RESULTS: In total, 318 patients were treated in the period described. The average age at enrollment was 13.2 years (SD=12.8), and patients were followed for an average of 2.87 years (SD=2.5). 44% of the patients were from North America, 47% from Central America, 3% from South America, 3% from Africa, and 3% from Eastern Europe, South Asia, East Asia, and the Middle East combined. Of these 318 patients, 247 (78%) patients were treated by plastic surgery. Of those, 81% were treated for craniofacial conditions, 7% for congenital hand conditions, 4% for burn reconstruction, 5% for breast, 3% for other congenital abnormalities, 2% oncologic, and 2% for trauma. The most common pathologies seen were dermatologic conditions of the head and neck (19%), cleft lip and/or palate (18%), and microtia (18%). Patients underwent an average of 3 surgeries (SD = 2.35), with a minimum of 1 surgery and a maximum of 16. The mean total cost per patient was $110,837, with a minimum of $771 and maximum of $1,212,044.

CONCLUSIONS: Our surgical gift model represents a humanitarian, community-focused alternative to surgical mission trips where we are able to provide the gold standard of multidisciplinary care in a safe environment.

REFERENCES

1. Hendriks TCC, Botman M, Rahmee CNS, et al. Impact of short-term reconstructive surgical missions: a systematic review. BMJ Glob Health. 2019;4(2):e001176. Published 2019 Apr 3. doi:10.1136/bmjgh-2018-001176
2. Shrime MG, Sleemi A, Ravilla TD. Charitable platforms in global surgery: a systematic review of their effectiveness, cost-effectiveness, sustainability, and role training. World J Surg. 2015;39(1):10-20. doi:10.1007/s00268-014-2516-0

National Analysis of Out-of-Pocket Costs and Variation for Autologous and Implant Based Reconstruction

Abstract Presenter
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Peter Taub MD

INTRODUCTION: Numerous factors influence a patient's decision to undergo autologous versus implant-based breast reconstruction, including medical, social, and financial considerations.1-3 The present study aims to investigate differences in out of pocket and total spending for patients undergoing autologous and implant-based breast reconstruction.

METHODS: The IBM MarketScan Commercial Database was queried to extract all patient who underwent autologous or implant-based breast reconstruction from 2017 to 2021. Financial variables included gross payments to the provider (facility and/or physician) and out of pocket costs (total of coinsurance, deductible, and copayments). Univariate regressions assessed differences between autologous and implant-based reconstruction procedures. Mixed-effects linear regression was utilized to analyze parametric contributions to total gross and out of pocket costs.

RESULTS: This sample identified 2,151 autologous breast reconstruction and 426 implant-based breast reconstruction episodes. The median total gross payments were greater for autologous reconstruction ($52,325.40 vs. $28,362.23, $p<0.001$). Median out of pocket costs were also higher for autologous reconstruction than implant-based reconstruction ($323.41 vs. $250.00, $p=0.017$), which was most pronounced in the South region. The majority of patients in both groups had employer insurance (72.4% and 74.9%). Regression analysis revealed that autologous reconstruction (versus implant-based) contributes significantly to increasing out of pocket costs ($B = \$413.91$, $p=0.041$) and increasing total costs ($B = \$32,316.38$, $p<0.001$). Type of health plan was significantly associated with increasing total costs ($B = \$11,312.52$, $p<0.001$), but not with out-of-pocket costs.
Conclusion: The US national data demonstrate that autologous breast reconstruction has higher out of pocket costs and higher gross payments than implant-based reconstruction. Most of the variation in out-of-pocket costs were concentrated in the South. More study is needed to determine the extent to which these financial differences affect patient decision making,4 and to what extent regional economic factors affect insurance coverage.5

REFERENCES

1. Ganesh Kumar N, Berlin NL, Hawley ST, Jagsi R, Momoh AO. Financial toxicity in breast reconstruction: a national survey of women who have undergone breast reconstruction after mastectomy. Annals of Surgical Oncology. 2022 Jan;29:535-44.
2. Bailey CM, Asaad M, Boukovalas S, Lin YL, Kothamasu V, Kapur SK, Villa MT, Butler CE, Offodile AC. Understanding the relationship between breast reconstruction subtype and risk of financial toxicity: a single-institution pilot study. Plastic and reconstructive surgery. 2021 May 17;148(1):1e-1e.
3. Li X, Meng M, Zhao J, Zhang X, Yang D, Fang J, Wang J, Han L, Hao Y. Shared decision-making in breast reconstruction for breast cancer patients: A scoping review. Patient preference and adherence. 2021 Dec 10:2763-81.
4. Roy N, Villavisanis DF, Taub PJ. Mitigating financial toxicity in breast cancer from diagnosis to treatment and reconstruction. Clinical Breast Cancer. 2023 Jan 1;23(1):e32-6.
5. Pickle LW, Su Y. Within-state geographic patterns of health insurance coverage and health risk factors in the United States. American Journal of Preventive Medicine. 2002 Feb 1;22(2):75-83.

Nationwide Evaluation of Cost and Insurance coverage for Reduction Mammoplasty in Outpatient setting

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BACKGROUND: Despite proven benefits of reduction mammoplasty, the procedure is often denied by insurance plans even when deemed medically necessary.1,2 In some cases, insurance companies act as gatekeepers for conditions requiring surgery. The present study sought to evaluate nationwide variation of insurance type coverage, as well as out of pocket and total costs for reduction mammoplasty in outpatient setting.

METHODS: The Truven MarketScan Database was analyzed to identify patients who underwent reduction mammaplasty (CPT 19318) in an outpatient setting in 2021. Total and out-of-pocket expenses paid for the surgery including deductible, co-payment, and coinsurance were assessed. Furthermore, analysis was performed to evaluate cost variation between the regions. Univariate parametric analysis was applied to evaluate the variation in financial variables across insurance plan types and regions. All values were reported as median, interquartile range (IQR)

and a value of $p<0.05$ was considered significant.

RESULTS: A total of 8660 patients were identified who underwent outpatient reduction mammaplasty in 2021. The majority of patients were female (n=8552, 99%) with age range 18-34 (n=3350, 39%) residing in South region (n=4354, 50%). Most patients were insured either through preferred provider organization plan (PPO) (n=4212, 49%), health maintenance organization (HMO) (n=1153, 13%) or high deductible health plan (HDHP) (n=1085, 13%). The overall median out-of-pocket cost was $523 (IQR $1548) and total payment cost was $8097 (IQR $8245). Out-of-pocket medians did not vary by region ($p=0.016$) but varied by insurance type ($p<0.001$) with highest cost paid with HDHP plan ($1164, IQR $2196) and lowest with point of service (POS) with capitation ($25, IQR $852). For total cost expenses there was statistical significance for both region and plan type ($p<0.001$). With highest median total costs in Northeast region ($11023, IQR $11324) and POS ($9923, IQR $11536).

CONCLUSION: Majority of patients in present study had PPO coverage, with more flexibility in choosing provider or hospital and not requiring specialist referral. Although out of pocket cost did not vary by region, it did vary by insurance type. Insurance companies are becoming increasingly involved in determining medical necessity of surgical procedures and should be aware of the financial burden placed on patients requiring surgical procedures.

REFERENCES:

1. Kerrigan CL, Collins ED, Kim HM, et al. Reduction mammaplasty: defining medical necessity. Med Decis Making. 2002;22:208-17.
2. Becker H. Breast reduction insurance denials. Plast Reconstr Surg. 2004;114:1687.

Objective Residency Applicant Assessment Using a Linear Rank Model

Abstract Presenter
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PURPOSE: Residency applicant assessment is imperfect, with little objectivity built into the process, which, unfortunately, impacts recruitment diversity.1,2 Linear rank modeling (LRM) is an algorithm that standardizes applicant assessment to model expert judgment. Over the last five years, we have used LRM to assist with screening and ranking integrated plastic surgery (PRS) residency applicants.3 This study's primary objective was to determine if LRM scores are predictive of match success and, secondarily, to compare LRM scores between gender and self-

identified race categories.

METHODS: Data was collected on all applicants who applied to a single institution between the years January 2019 through January 2022. Variables collected include demographics, traditional application metrics, global intuition rank, and match success. LRM scores were calculated for screened and interviewed applicants, and scores were compared by demographic groups. Additionally, LRM scores were compared to global intuition ranks or the consensus subjective rank value given to an applicant by all interviewers. Univariate logistic regression was used to evaluate the association of LRM scores and traditional application metrics with match success.

RESULTS: 617 candidates applied, and 231 candidates were interviewed at a single institution over four application cycles. White (n=133, 57.6%) was the most represented race, followed by Asian (n=58, 25.1%). A total of 37 applicants (16.0%) had a self-identified race underrepresented in medicine. No significant differences in LRM scores were appreciated for interviewed applicant gender or self-identified race groups. A Spearman rank-order correlation comparing the rank lists derived from the LRM scores and global intuition ranks demonstrated a statistically significant, positive relationship for all application cycles except the 2022 match year (0.18, p= 0.22). Using area under the curve modeling, LRM score was the most predictive indicator for match success. With every one-point increase in LRM score, there was an 11% and 8.3% increase in the likelihood of screened and interviewed applicant match success (p <.001). An algorithm was developed to estimate the probability of match success based on LRM score.

CONCLUSIONS: LRM score is the most predictive indicator of match success for PRS applicants and can be used to estimate an applicant's probability of successfully matching into an integrated PRS residency. Furthermore, it provides a holistic evaluation of the applicant that can streamline the application process and improve recruitment diversity. In the future, this model could be applied to assist in the match process for other specialties.

REFERENCES:

1. Mohan AT, Banuelos J, Cespedes-Gomez O, et al. Diversity Matters: A 21-Year Review of Trends in Resident Recruitment into Surgical Specialties. Annals of Surgery Open. 2021;2(4):e100. doi:10.1097/AS9.0000000000000100
2. Mellia JA, Jou C, Rathi S, et al. An In-Depth Analysis of Research Output in Successful Integrated Plastic Surgery Match Applicants and Factors Associated With Matching at Top-Ranked Programs. J Surg Educ. 2021;78(1):282-291. doi:10.1016/J.JSURG.2020.06.026
3. Elmaraghi S, Rao VK, Christie BM. Linear Modeling to Reduce Bias in Plastic Surgery Residency Selection. Plast Reconstr Surg. Published online 2021:538-544. doi:10.1097/PRS.0000000000007684

Malpractice Litigation in Reduction Mammaplasty

Abstract Presenter

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PURPOSE: Reduction mammaplasty (breast reduction) remains a basic plastic surgery procedure within the United States, with the American Society of Plastic Surgery reporting 82,643 cases in 2021. Reduction mammaplasty has the potential to improve a patient's quality of life and achieve more acceptable aesthetic results. Since this procedure comes with risks that range from disfigurement, nerve injury, to death, it is not uncommon for patients to pursue malpractice lawsuits against plastic surgeons following the operation. The aim of this study was to evaluate surgeon training, patient characteristics, and procedure outcomes associated with breast reduction malpractice litigation.

METHODS: Data was collected using the Westlaw legal database by query of breast reduction malpractice cases resulting in jury verdicts and settlements. Cases had to be directly related to injury after a reduction mammoplasty. Cases were reviewed for patient and surgeon demographics, outcomes, monetary awards, and surgeon training.

RESULTS: 114 unique cases were identified. In all cases liability was indicated as medical malpractice in plastic surgery with breast reduction as the primary surgery performed. Plaintiffs were all female (100.0%). Surgeon training was varied and consisted predominantly of general surgery followed by plastic surgery fellowship (90.9%), integrated plastic surgery (3.9%), general surgery followed by oral and maxillofacial surgery (3.9%), and otolaryngology (1.3%). Breast disfigurement and surgical scarring were the most common injuries reported by 68.4% and 18.4% of patients, respectively. The average final monetary award for plaintiff verdicts was $708,815 with a range from $4,375 to $1,000,000. There was a statistically significant difference between breast disfigurement as a primary injury and outcome of plaintiff verdict ($p<0.001$), defendant's number of years in practice and outcome of a plaintiff verdict ($p<0.001$), and cosmetic surgery fellowship and outcome of a plaintiff verdict ($p<0.001$).

CONCLUSION: Breast disfigurement and surgical scarring were found to the most common reasons for successful litigation. Adequate surgical education, training, and experience may reduce the incidence of these negative outcomes resulting in litigation.

Penile Revascularization for Erectile Dysfunction Secondary to Arterial Insufficiency: A Case Series

Abstract Presenter
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BACKGROUND: First described by Michal et al in 1972, relatively little has been published in plastic surgery literature on the approach to and outcomes of penile revascularization for vasculogenic impotence. Such injuries are often secondary to atherosclerosis or locoregional trauma.1 Various techniques have been described which involve restoration of blood flow to the cavernosal body with high success reported. 1-5 Reported risk factors for failure include advanced age, chronic systemic disease and tobacco use and patients may experience glans hypervascularization. 2-4

METHODS: We retrospectively reviewed our experience with penile revascularization anastomosing the deep inferior epigastric artery (DIEA) to the dorsal penile vein (DPV) for arteriogenic erectile dysfunction (AED) at our Level I trauma center.

RESULTS: Two gentleman (Pt1: 38 y.o., Pt2: 32 y.o.) underwent penile revascularization for AED secondary to crush injury at our institution over the past 2 years. Both patients sustained pelvic crush injuries with resultant AED minimally responsive to medical management and underwent microsurgical revascularization of the penis utilizing the DIEA with arterialization of the DPV. They demonstrated significant improvement in erectile dysfunction with ability to achieve sustained erection on minimal pharmacotherapy post operatively. One patient noted ability to achieve penetration. Both patients experienced glans edema requiring additional urologic procedures.

CONCLUSION: We present our experience with penile revascularization using the DIEA to DPV for AED secondary to trauma. Overall we have demonstrated improvement of sexual function with the most common complication being prolonged penile edema. Additional research is warranted to further refine technique and improve outcomes.

REFERENCES:

1. Dicks B, Bastuba M, Goldstein I. Penile revascularization – contemporary update. Asian Journal of Antrology. 2013; 15: 5-9.
2. Babaei A, Safarinejad M, Kolahi A. Penile revascularization for erectile dysfunction: A systemic review and meta-analysis of effectiveness and complications. Urology Journal. 2009; 6(1): 1-7.
3. Kawanishi Y, Kimura K, Nakanishi R, et al. Penile revascularization surgery for arteriogenic erectile dysfunction: the long-term efficacy rate calculated by survival analysis. BJUI. 2004; 94:361-8.
4. Kayigil O, Oulu Em Aldemir M, Onen E. Penile revascularization in vasculogenic erectile dysfunction (ED): long-term follow-up. BJUI. 2011; 109: 109-115.
5. Sharlip I. Penile revascularization in the treatment of impotence. West J Med. 1981; 134:206-11.

Funding a Successful Smile: Predicting the Success of Crowdfunding Campaigns for Cleft Lip and Palate Repair

Abstract Presenter
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INTRODUCTION: Cleft lip and palate repair involves a multidisciplinary approach extending into adolescence and adulthood. Insurance may not cover these treatments completely, driving families toward crowdfunding websites. Previous studies(1) have assessed predictive factors of successful fundraisers in other specialties. However, no studies have examined trends in crowdfunding for cleft lip or palate, nor have any studies identified factors predicting successful campaigns for cleft repair. This study examined common crowdfunding themes for cleft lip and palate repair and their associated costs, and identified factors predicting successful campaigns, in order to identify strategies for helping patients and families finance longitudinal cleft care.

METHODS: A GoFundMe search for "cleft lip and palate" was performed using the "medical" filter. Included campaigns were raised on behalf of one person in the United States with cleft lip, palate, or both. Funds covered the cost of initial surgery, follow-up surgery, or other expenses incurred. Three independent viewers screened the results. Demographic data, donation purpose, and amounts requested were analyzed via SPSS. A student's t-test and a chi-square test analyzed successful (meeting ≥75% of goal) vs. unsuccessful (≤25% of goal) campaigns.

RESULTS: Out of 618 drives identified by the search, 356 met inclusion criteria. All campaigns raised $1,305,170 ($0-$36,049) out of $5,247,376 ($0-$500,000). On average, successful campaigns raised $6469 and requested $5891, while unsuccessful campaigns raised $1570 ($p<0.001$) and requested $25,921 ($p<0.001$). Patients were most commonly white (55.8%), male (53.5%), infants (67.8%), and the children of their benefactors (45.2%). Parents fundraising for primary cleft repair on their children's behalf were the most successful ($p=0.05$), while male adults fundraising for their own dental or orthognathic surgeries were the least successful ($p=0.045$).

DISCUSSION: Crowdfunding is an effective way to cover expenses related to cleft surgery. This is partially attributable to leveraging social networks, as previous studies cite a high prevalence of social isolation among adults with isolated cleft lip and palate, especially males. (2) However, appealing to strangers through cover images eliciting empathy (images of patients in the hospital) or conveying likability (smiling), may appeal to audience emotions. Moreover, sharing specific, descriptive stories that outline hidden costs of care may also motivate audiences

to donate. Providing anticipatory guidance for future cleft care, encouraging parents to reach out to their own social networks, and providing mental health and social work services can help expand social outreach for patients with cleft lip or palate, which may help alleviate the financial burden of facial reconstructive surgeries in adulthood. Additional analysis of crowdfunding campaigns may help patients overcome conspicuous and hidden economic barriers to care.

REFERENCES:

1. Mark E, Sridharan M, Florenzo B, et. al. Crowdsourcing Medical Costs in Dermatology: Cross-sectional Study Analyzing Dermatologic GoFundMe Campaigns. JMIR Dermatol 2022;5(2):e34111. DOI: 10.2196/34111
2. Hunt O, Burden D, Hepper P, Johnston C. The psychosocial effects of cleft lip and palate: a systematic review. Eur J Orthod. 2005 Jun;27(3):274-85. doi: 10.1093/ejo/cji004. PMID: 15947228.

Racial Diversity of Patient Population Represented on United States Plastic Surgeons' Webpages

Abstract Presenter
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INTRODUCTION: Representation of individuals from diverse backgrounds in plastic surgery media is critical for accessibility, inclusivity, and equity. Previous literature has demonstrated a lack of racial diversity on academic plastic surgery center webpages, advertisements for nonsurgical cosmetic products, and plastic surgery social media. However, to our knowledge, no study has yet examined the racial diversity of webpage content from a patient-search perspective. This study seeks to characterize the patient experience of self-representation in the media when seeking care from a plastic surgeon. The objective is to determine if there is a racial discrepancy between the US Census, ASPS surgical statistics, and the media appearance of implied patients depicted on United States plastic surgeons' webpages from a patient-search perspective.

METHODS: A Google search for plastic surgeons in each of the 50 United States was completed. Their webpages were analyzed on the basis of patient diversity as presented on the homepage. The words, "(state) plastic surgeon," were searched. The first 10 relevant websites were collected for each state. In line with methods of previous studies, the patients and implied patients on the homepages were counted and classified into one of six skin categories, designated I to VI. These included ivory, beige, light brown, olive, brown and dark brown, respectively. These correlate to Fitzpatrick Skin Phototypes, however, the Fitzpatrick Scale is a measure of skin's response to UV exposure. Skin tone was used as a guide to objectively determine racial representation in the photographs, with the caveat that skin tone does not absolutely correlate to

racial identity. Categories I-III were further classified as "white" and categories IV-VI were further classified as "nonwhite." This data was then compared to the 2020 ASPS demographics report and the 2020 U.S. Census as a whole and regionally.

RESULTS: 4010 individuals were analyzed from 496 webpages. 91.89% were classified as "white" and 8.11% "nonwhite." Overall, 264 individuals fell into category I, 826 into category II, 2586 into category III, 260 into category IV, 69 into category V, and 5 into category VI. Chi-square analyses determined that there was a statistically significant difference between the racial representation within this sample of U.S. plastic surgeons' websites and that of the 2020 US Census ($p = <0.001$), the 2020 ASPS Cosmetic Summary Data ($p = <0.001$), and the 2020 ASPS Reconstructive Summary Data ($p = <0.001$). There was also a statistically significant difference between the racial representation found in this sample and that of the 2020 US Census when stratified by region ($p = <0.001$).

CONCLUSIONS: This patient perspective-driven study highlights that the racial representation on plastic surgeons' webpages is significantly different from the racial demographics of the patients they serve. Our findings point towards a lack of racial diversity in plastic surgery media. Further analyses are needed to identify the influence of these representational disparities on patient care and clinical outcomes. Future studies may also examine how best to study and objectively measure racial diversity and disparities in patient-oriented media.

Patient Opinions on Telemedicine Visits in Cleft/Craniofacial Multidisciplinary Team Clinic

Abstract Presenter
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BACKGROUND & PURPOSE: In the COVID-era, telemedicine has played an increasing role in patient care and many centers have begun to adopt hybrid telemedicine/in-person models for multidisciplinary cleft and craniofacial clinic. It remains unclear how telemedicine may be used to decrease attrition rates in cleft and craniofacial care, where continued follow-up through skeletal maturity is especially important. We surveyed families attending cleft and craniofacial multidisciplinary team clinic to understand barriers to attendance, perceived helpfulness of providers, and desire for telemedicine visits.

METHODS/DESCRIPTION: Families attending team clinic between July 2022 - January 2023 were surveyed. We asked about the helpfulness of the overall visit and of individual providers, whether telemedicine would be as informative as an in-person visit, assessed barriers to attendance, distance traveled, and the likelihood of returning if telemedicine were available. We separately analyzed provider-specific responses among families seeking cleft vs. craniosynostosis care.

RESULTS: The survey received 179 responses. Respondents hailed from 6 states and median transit length was 1-2 hours. 56% of families believed the team clinic visit would or might be equally informative via telemedicine. 94% of families stated that they were somewhat or extremely likely to attend their next visit in-person. Child's age was associated with likelihood of attending next visit, with 21% of families of children 12 or older saying they were unlikely or unsure whether they would attend their next visit ($p=0.05$). 52% of families would be more likely to attend their next visit if telemedicine were available. The most frequently identified specialties which families thought would be equally or more informative via telemedicine were psychology, which 83% of families thought would be at least equally informative, and speech pathology, which 67% thought would be at least equally informative via telemedicine. Barriers to attendance included trouble taking time off work (14%) and transportation difficulty (14%), with cost named as a barrier only in 4% of responses. Patients who named transportation as a barrier to attendance were more likely to attend their next visit if a telemedicine option were available ($p=0.02$). Having attended a prior telemedicine visit was not associated with either perceived helpfulness of telemedicine, or likelihood of attending subsequent visits if telemedicine were offered ($p\geq0.65$). The majority of families seeking cleft care chose plastic surgery (36%) or speech pathology (29%) as their most helpful provider. Those seeking craniosynostosis care most commonly chose plastic surgery (44%) or psychology (21%) as their most helpful provider. Responses about most-helpful provider were significantly associated with likelihood of return if telemedicine visits were available in the cleft subgroup ($p=0.01$). Those who named plastic surgery most helpful were more likely to be interested in a telemedicine option than those who chose speech pathology ($p=0.04$).

CONCLUSION: Perceived informative value of telemedicine visits is mixed, however offering telemedicine options may encourage better attendance at multidisciplinary team clinic, especially for families with transportation barriers. Preferences for telemedicine may in part be driven by which providers will be seen during each visit.

The Impact of Patient Education on Patient Satisfaction and Clinical Efficiency: A Review of the Literature

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PURPOSE: Educational materials provide patients with an understanding of treatments performed, ease patient anxiety, and prevent excess postoperative clinic visits and phone calls.1 The purpose of this literature review is to identify the most effective methods of patient education in plastic surgery outside of ensuring reading level of 6th grade or below as this has been thoroughly discussed in the past.2

METHODS: A comprehensive PubMed search was performed for peer-reviewed articles containing "patient education" and "plastic surgery" published from 2017-2023. The search returned 292 results of which 9 were included in the final analysis. 260 were eliminated by title, 12 by abstract, and 11 by full-text review. Inclusion criteria included the impact of patient education on patient reported impressions or number of clinical encounters as the primary outcomes. Studies were excluded if they were not specific to plastic surgery or if the primary outcomes evaluated impact of intervention on informed consent or readability.

RESULTS: The level of evidence for included studies was II for two, III for six and V for one. The educational materials discussed included direct explanation by the surgeon, procedure-specific training guides, 3D anatomical models, the internet, and pamphlets.3,4 Patients who received pamphlets in addition to verbal education demonstrated a 21% improvement in comprehension in comparison to those who received verbal education alone.3 Patients found reeducation through multiple visits, educational smartphone applications, pamphlets and classes improved their understanding of their diagnosis and treatment plan.2,3,5 Some of these educational techniques improved clinical efficiency. For example, classes to discuss breast reconstruction decreased the duration of new patient visits by 40% and the use of educational smartphone applications reduced calls to the surgeon or emergency room by 20%.1,5

CONCLUSION: Excluding discussion of grade level readability in patient documents, the best practices for plastic surgery patient education have not yet been reviewed in depth. Although surgeons are often patients' ideal point of contact for education, implementation of the above adjuncts has the potential to improve patient understanding and clinical efficiency.

REFERENCES:

1. Henn, D., & Momeni, A. (2020). A standardized patient education class as a vehicle to improving shared decision-making and increasing access to breast reconstruction. Journal of Plastic, Reconstructive & Aesthetic Surgery, 73(8), 1534-1539.
2. Powell, L. E., Andersen, E. S., & Pozez, A. L. (2021). Assessing readability of patient education materials on breast reconstruction by major US academic hospitals as compared with nonacademic sites. Annals of Plastic Surgery, 86(6), 610-614.
3. Pestana, I. A. (2020). Patient-guided breast reconstruction education. Cureus, 12 (7), e9070.
4. Krane, N. A., Smith, J. B., Fassas, S., Kriet, J. D., Humphrey, C., Sykes, K. J., & Lu, G. N. (2021). Educational Materials Improve Patient Comprehension in Forehead Flap Surgery. Facial Plastic Surgery & Aesthetic Medicine, 23(6), 489-490.

5. Noel, W., Bosc, R., Jabbour, S., Kechichian, E., Hersant, B., & Meningaud, J. P. (2017). Smartphone-based patient education in plastic surgery. Annals of plastic surgery, 79(6), 529-531.

Close

Going Beyond the h-index: A New Framework for Evaluating the Academic Performance of Plastic Surgeons

Abstract Presenter
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PURPOSE: Bibliometrics is the field in which statistical analyses are used to quantify the impact of published data within a specific field. In plastic surgery academia, research output is heavily used as a metric of accreditation, from assessing residency applicants to evaluating faculty for promotion. Currently, the application of bibliometrics in plastic surgery remains relatively new and is heavily dependent on the use of the h index as a benchmark metric for academic productivity. The h-index is defined as an author's h papers with at least h citations. While the h-index is simple and intuitive, it also has nonnegligible limitations; it disfavors junior researchers, favors publication quantity, and discounts highly cited works as they are only counted towards the h-index once. Given the importance of bibliometrics within plastic surgery, there is a paramount need to adopt additional metrics to measure research productivity. The authors sought to validate the use of time-independent bibliometrics to complement the h-index in measuring citation impact and use these metrics to generate research profiles and rank for academic plastic surgeons and their departments.

METHODS: The gender and academic roles of plastic surgeons at integrated residency programs were recorded. Author publications were retrieved from Scopus. Bibliometrics software was used to calculate the following metrics: h-index; e-index, which accounts for the excess citations "missed" by the h-index; and the g-index, which prioritizes an author's most cited works. Time-corrected versions of these indices (m-quotient, ec- and gc-index) were used to correct for years since the first publication. Departmental ranks were determined using the cumulative sum of faculty time-corrected indices. Two-sided tests were used to examine gender differences in bibliometrics. Kruskal-Wallis tests assessed for bibliometric differences between academic roles (i.e., professor, chairs, and associate and assistant professors). Kendall tau correlation coefficients (t) were used to assess for congruency between calculated research rankings and Doximity rankings. P-values ≤ 0.05 were deemed significant.

RESULTS: A total of 850 academic plastic surgeons across 81 departments were identified. Men had statistically greater h-indices than women (median 13.0 [IQR: 7.0–21.0] vs. 6.0 [3.0–

13.0]; p<0.001); a similar pattern was observed for e- and g-indices. Professors had the highest median h- (21.0 [14.0–31.0]), e- (28.65 [18.37–41.49]), and g-indices (38.0 [24.0–54.5]) across all academic roles. When correcting for time, there were no significant differences in m-quotient and ec-index between genders. Departmental chairs had significantly higher indices than all other roles after correcting for time, and this difference was less pronounced compared to uncorrected indices. Compared to Doximity rankings, the calculated research ranks were low-to-moderately correlated (t = 0.495 [95% CI: 0.345–0.646; p<0.001]).

CONCLUSIONS: This comprehensive study represents the largest publication analysis and comparison of academic plastic surgeons and their programs. The use of time-corrected indices indicates that there are no statistical differences in publication quality between men and women. Furthermore, the absolute differences in citation impact between academic roles are less pronounced when correcting for time. The use of h-index is a valid citation metric but should be complemented by analyses that encompass an author's greater impact.

Patient Attitudes Towards Plastic Surgeon Social Media Use

Abstract Presenter
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BACKGROUND: In Plastic Surgery, social media is widely used for patient outreach, disseminating research findings, and providing education regarding plastic surgery procedures. Over 80% of plastic surgeons have social media accounts, with 67% utilizing these media platforms for posting patient photos.[1] Despite the prevalence of social media use among plastic surgeons, patient attitudes toward image medium preference and level of patient identifiability remains unknown. This investigation aims to assess patient attitudes toward the type of media used for dissemination as well as how identifiable patients are within photos.

METHODS: Participants were eligible for the study if they were over the age of 18 and previously had an elective aesthetic procedure. Participants were recruited via email using the marketing research company Dynata in 2022 and given a web-based Likert-type ad-hoc survey evaluating their comfort with hypothetical scenarios regarding the use of their images (Face/Neck, Breast/Chest, and Abdomen) in various advertising mediums (website, social media, and magazine/television) and how identifiable they were within those images. Descriptive statistics and bivariate analysis was performed.

RESULTS: A total of 271 participants were eligible respondents. 83 participants completed the study and successfully met the inclusion criteria for analysis (successfully answered 2 attention questions). The response rate was 30.6%. Approximately 49% of participants were age 65 and

older, 95% identified as women and 53% underwent face and neck aesthetic procedures. Patients were more comfortable with de-identified photos than identified photos across all three modalities (website: 27% de-identified vs 22% identified; p=0.002, social media:23% de-identified vs 19%; identified; p<0.001 and magazine or television ads 26% de-identified vs 16% identified; p<0.001). Patients were more comfortable with their surgeon disseminating de-identified photos via websites than social media, magazine, or television ads (26% versus 23% and 25%; p<0.001).

CONCLUSION: Patients who underwent elective aesthetic surgery were significantly more comfortable with surgeons sharing de-identified rather than identifiable clinical photographs. Compared with social media, magazines, or television, patients were more comfortable with their photos being posted on a website. While market forces determine what forms of social media are most effective, understanding patient attitudes and comfort with the use of their clinical images is imperative for maintaining a respectful surgeon-patient relationship.

REFERENCE:

1. Landeen KC, Smetak MR, Keah NM, Davis SJ, Shastri K, Patel P, Stephan SJ, Yang SF. Professional social media in Facial Plastic and Reconstructive Surgery: Usage, Resources, and Barriers. Ann Otol Rhinol Laryngol. 2022 Nov 3:34894221133746. doi: 10.1177/00034894221133746. Epub ahead of print. PMID: 36330593.

A Review of Private Insurance Policies: Coverage of Fat Grafting for Breast and Head & Neck Reconstruction

Abstract Presenter
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INTRODUCTION: The Women's Health and Cancer Rights Act of 1998 codified access to reconstructive surgery to breast cancer patients. Correspondingly, fat grafting when used for oncologic breast reconstruction is routinely covered by insurance providers. However, we suspect that fat grafting applications for other reconstructive goals, particularly to the face, , is not as widely covered or reimbursed.

METHODS: Policies of private medical insurance companies were examined for information regarding coverage or reimbursement of fat grafting after breast or head and neck reconstruction. Keywords including "fat grafting," "lipofilling," "facial fat graft," "reconstructive surgery," "cosmetic surgery," "breast reconstruction," and "facial reconstruction" were used on each company's website.

RESULTS: The 25 largest private insurance companies based on dollars collected in premiums were included in this study. Eight companies deemed fat grafting for breast reconstruction to be medically necessary, 12 regard it to be experimental, 1 considers it to be cosmetic and 1 leaves the necessity of fat grafting to the discretion of the surgeon. For facial reconstruction, only 3 companies report fat grafting for facial reconstruction as medically necessary, 11 deem it as experimental, 5 consider it cosmetic, and 3 rely on the discretion of the surgeon. Eleven companies report covering fat grafting for breast reconstruction while only 5 private companies include coverage for facial fat grafting.

CONCLUSIONS:
While fat grafting is widely used for reconstruction of the breast and face, there exists significant variability in insurance coverage for this procedure among the largest insurers in the United States. Moving forward, we aim to compare policies from commercial insurance companies with state-level Medicare and Medicaid guidelines regarding fat grafting.

Pediatric Cranial Intraosseous Lipoma: Literature Review and Craniofacial Treatment Approach

Abstract Presenter
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PURPOSE: Craniofacial Intraosseous Lipomas (CIOLs) account for about 4% of all intraosseous lipoma diagnoses. Fewer than 50 cases of pediatric CIOLs (PCIOLs) have been reported in literature to date and thus, there is no effective diagnostic approach and standardized treatment for this patient population. This study aims to formulate a multidisciplinary approach to the diagnosis and treatment of PCIOL and review the potential reconstructive options.

METHODS: We conducted a literature review on diagnostics and current surgical techniques for PCIOL.

RESULTS: The proposed diagnostic procedure includes MRI, CT and CT venogram to delineate the sinus anatomy in relation to the mass, and an initial biopsy. The multidisciplinary treatment team should include a pediatric craniofacial surgeon, pediatric neurosurgeon, and medical oncology. Virtual surgical planning (VSP) is an indispensable to plan the resection of the mass and the reconstruction. Reconstructive options include autologous bone grafts or an alloplast (Medpor or PEEK implants). The unpredictable bone resorption as well as large cranial defects that may require reconstruction are critical limitations for autologous cranioplasties. Medpor provides adequate cerebral neuroprotection, allows for vascular tissue ingrowth and incorporation, and is easy to modify intraoperatively. These features render it to be a useful reconstructive option for patients with PCIOL.

CONCLUSION: This influences the diagnosis and surgical treatment of PCIOL to emphasize a multidisciplinary approach that takes advantage of VSP and tailored implant options.

Non-Surgical Aesthetic Treatment Conversion to Surgery: Implications for Patient Selection and Practice Modeling

Abstract Presenter
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INTRODUCTION: Over the past two decades, non-surgical treatments for facial aging with botulinum toxin and dermal fillers have become a mainstay in plastic surgical practices.1,2 Two practice models exist, one in which the plastic surgeon provides both the non-surgical and surgical treatments and the other in which an advanced practice provider (APP) performs the non-surgical treatments. This study aims to provide objective data regarding the model in which APPs perform the non-surgical treatments and determine the model's effectiveness by assessing the conversion rate of non-surgical to surgical procedures.

METHODS: A retrospective chart review was conducted on patients treated with either botulinum toxin or dermal fillers at our division between 2015 and 2021. Patients who had cosmetic surgery at our division before non-surgical treatments were excluded. Patient demographics, number of botulinum toxin and filler visits, age at the first botulinum toxin and filler visit, prior cosmetic surgeries, and cosmetic surgeries at UF were recorded. Collected data was compared between patients with and without prior cosmetic surgery, and between patients undergoing cosmetic surgery at UF and those who did not. Statistical tests included Fisher's exact tests and chi-square tests.

RESULTS: Of the 737 patients included, 39 underwent surgical treatment, with an overall conversion rate of 5.3%. Patients with a history of cosmetic surgery had a higher conversion rate than those without prior cosmetic surgery (12.5% vs. 4.1%, $p<0.01$). Patients undergoing surgical treatment were more likely to have had prior cosmetic surgery ($p<0.01$), received fillers ($p<0.01$) and were older at the time of the first filler visit ($p<0.01$). Overall, patients underwent a total of 49 facial cosmetic surgeries and 33 body cosmetic surgeries, for an average of 2 surgical procedures per patient. The most common surgical procedures were facelifts and body liposuction.

CONCLUSIONS: These findings demonstrate that patients who are older, have had cosmetic surgery in the past, and are treated with fillers are more likely to have surgical procedures, indicating a potential provider focus on treatment counseling and optimization of outcomes. Although most surgeries were performed on the face, the two most common procedures were facelifts and body liposuction. These findings also indicate that non-surgical aesthetic treatments remain a mainstay in the plastic surgery practice. Further studies should compare the two practice models to provide objective data that could support either model as being preferred.

REFERENCES:

1. Aesthetic Plastic Surgery National Databank Statistics 2020–2021. (2022). Aesthetic Surgery Journal, 42 (1 SUPPL.), 1–18.
2. Richards, B. G., Schleicher, W. F., D'Souza, G. F., Isakov, R., & Zins, J. E. (2017). The Role of Injectables in Aesthetic Surgery: Financial Implications. Aesthetic Surgery Journal, 37(9), 1039–1043.

Defining the Incidence of Impostor Syndrome in Academic Plastic Surgery: A Multi-Institutional Survey Study

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BACKGROUND: Impostor syndrome occurs when high-achieving individuals have persistent self-doubt despite objective measures of competence and success, and has been associated with professional burnout and attenuated career advancement in medical specialties. This study aimed to define the incidence and severity of impostor syndrome in academic plastic surgery.

METHODS: A cross-sectional survey containing the Clance Impostor Phenomenon Scale (0-100; higher scores indicating greater severity of impostor syndrome) was distributed to residents and faculty from 12 academic plastic surgery institutions across the United States. Generalized linear regression was used to assess demographic and academic predictors of impostor scores.

RESULTS: From a total of 136 resident and faculty respondents (response rate, 37.5%), the mean impostor score was 64 (SD 14), indicating frequent impostor syndrome characteristics. On univariate analysis, mean impostor scores varied by gender (Female: 67.3 vs. Male: 62.0; p=0.03) and academic position (Residents: 66.5 vs. Attendings: 61.6; p=0.03), but did not vary by race/ethnicity, post-graduate year of training among residents, or academic rank, years in practice, or fellowship training among faculty (all p>0.05), Figures 1, 2. Among faculty, the highest impostor scores were seen among those 0-5 years in practice or 11-15 years in practice and were higher among Assistant Professors or full Professors compared to Associate Professors, though these differences were not statistically significant (all p>0.05), Figure 3. After multivariate adjustment, female gender was the only factor associated with higher impostor scores among plastic surgery residents and faculty (Estimate 2.3; 95% Confidence Interval 0.03-4.6; p=0.049).

CONCLUSION: The prevalence of impostor syndrome may be high among residents and faculty in academic plastic surgery. Impostor characteristics appear to be tied more to intrinsic characteristics, including gender, rather than years in residency or practice. Further research is needed to understand the influence of impostor characteristics on career advancement in plastic surgery.

Perspectives on evidence-based exercise and nutrition training: The next step in training plastic surgery residents

Abstract Presenter
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BACKGROUND: The importance of healthy lifestyle choices is well understood for long-term success in plastic surgery procedures, for example, body contouring procedures.[1] While studies emphasize this importance, there is a lack of literature examining the fundamental knowledge base of medical practitioners at different levels of their training who are encouraging these

healthy lifestyle choices. This study aimed to evaluate a top 25 NIH-funded school's medical students' self-reported assessment of their nutrition and exercise knowledge base and preparedness for counseling patients on the topics.

METHODS: A short survey was constructed to assess participants' confidence in counseling patients on specific evidence-based nutrition and exercise practices, views on preclinical training, and background knowledge regarding common nutrition and exercise misconceptions. The online survey was distributed to a top 25 NIH-funded medical school classes of 2022-2025. Responses from 119 medical students were collected.

RESULTS: Out of 119 respondents, 49 (43.8%), 35 (31.3%), 24 (21.4%), and 4 (3.6%) were from the class of 2025, 2024, 2023, and 2022 respectively, with 2024-2022 completing or have completed clerkships. Among respondents, 83 (70.3%) students felt either poorly prepared or unprepared to answer questions regarding nutrition and weight loss and exercise specifics as treatment. Only three students (2.5%) felt very prepared to counsel patients on these modalities, and 92% (110) demonstrated the presence of at least one common misconception regarding nutrition and/or exercise. There was no difference in preparedness or misconceptions when comparing clinical vs. preclinical students on Fisher exact test (p=.1346).

CONCLUSIONS: This survey examined medical students' beliefs regarding their training in evidence-based nutrition and exercise topics. We found them ill-equipped in these topics, revealing the need to reevaluate the current curriculum in medical schools and plastic residency programs, especially with the growing demand for cosmetic plastic surgery procedures and the increasing prevalence of obesity.[2,3] To ensure the best post-operative and long-term outcomes for plastic surgery patients, we must ensure practitioners are adequately prepared to, at minimum, briefly counsel patients on the foundations of nutrition and fitness topics.

REFERENCES:

1. Rohrich RJ, Broughton G 2nd, Horton B, et al. The key to long-term success in liposuction: a guide for plastic surgeons and patients. Plast Reconstr Surg. 2004;114(7):1945-1953. doi:10.1097/01.prs.0000143002.01231.3d
2. Aesthetic Plastic Surgery National Databank Statistics 2020–2021, Aesthetic Surgery Journal, Volume 42, Issue Supplement_1, July 2022, Pages 1–18, https://doi.org/10.1093/asj/sjac116
3. Bryan Stierman, M.D., M.P.H., Joseph Afful, M.S., Margaret D. Carroll, M.S.P.H, et al. (2020). National Health and Nutrition Examination Survey 2017–March 2020 Prepandemic Data Files Development of Files and Prevalence Estimates for Selected Health Outcomes. National Health Statistics Reports. http://dx.doi.org/10.15620/cdc:106273

Differences in Exposure to Plastic and Reconstructive Surgery During Medical School by Sex and Race/Ethnicity

Abstract Presenter
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PURPOSE: Increasing the gender and racial diversity of the medical workforce is an important driving force for improving healthcare quality and access in underserved communities.[1] While improvements have been made, such diversity still lags at the physician level in plastic surgery.[2] This could be due in part to relatively less exposure to the field during medical school for underrepresented minority (URM) and female students. We hypothesized that there are fewer opportunities for plastic and reconstructive surgery exposure during medical school for URM and female students than their White/Asian and male counterparts, respectively.

METHODS: Allopathic medical schools in the US were assessed for presence of an ACGME-accredited integrated plastic surgery residency, ACGME-accredited fellowship (hand and/or craniofacial), and plastics advisory infrastructure (plastic surgery interest group and/or ASPS regional ambassador affiliation). The demographic proportions for each exposure type were calculated by aggregating AAMC medical student race/ethnicity and gender enrollment data stratified by allopathic medical schools for the 2021-2022 academic year and cross-referencing with presence of each exposure type.[3]

RESULTS: URM students made up a lower percentage of medical students in schools with a plastic surgery residency (20.07%) than those enrolled in medical schools without one (24.56%). This trend persisted when broken down by URM subgroups. In contrast, White and Asian students made up higher percentages of medical students in schools with a plastic surgery residency (56.52% and 27.57%, respectively) than in those without (53.88% and 25.73%, respectively). Women made up a higher percentage of medical students in schools with a plastic surgery residency (53.02%) than in those without (52.28%). URM students made up a lower percentage of medical students in schools with an ACGME-accredited plastics fellowship (21.63%) than in those without (21.97%). URM students also constituted a lower percentage of medical students in schools with a plastics advisory infrastructure (21.14%) than in those without (23.42%).

CONCLUSIONS: URM medical students are less likely to have exposure opportunities to plastic surgery contrary to their Asian, White, and female counterparts who made up a higher proportion of students enrolled in medical schools with an integrated plastic surgery residency than in those without. Our findings indicate that better distribution of specialty-specific resources and mentorship opportunities may help bridge racial gaps in plastic surgeon demographics, while other barriers may exist in the educational pipeline that hinder female surgeon representation in the field.

REFERENCES

1. Moy E, Bartman BA. Physician race and care of minority and medically indigent patients. JAMA. 1995;273(19):1515-1520.
2. Lane M, Sears ED, Waljee JF. Confronting Leaky Pipelines: Diversity in Plastic Surgery. Curr Surg Rep. 2022;10:63-69.
3. 2022 FACTS: Enrollment, Graduates, and MD-PhD Data. Association of American Medical

Colleges. (n.d.). Accessed January 10, 2023. https://www.aamc.org/data-reports/students-residents/interactive-data/2021-facts-enrollment-graduates-and-md-phd-data

A Critical Assessment of Gender Diversity within Plastic Surgery

Abstract Presenter
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PURPOSE: Prior research into female representation in leadership positions, has not comprehensively analyzed gender diversity within residency class as well as faculty by academic title, including society and journal board within the past 5 years. This study sought to examine gender distributions within plastic surgery leadership positions in journal editorial boards, society boards and within academic faculty.

METHODS: A cross-sectional study was performed to evaluate gender in plastic surgery among academic faculty, journal editorial boards, and professional societies' leadership positions. Our sample included 1918 subjects across 879 plastic surgery journal editorial board members, 872 plastic surgery academic faculty members, and 167 plastic surgery association board members. The following journals were studied: Plastic and Reconstructive Surgery, Annals of Plastic Surgery, Aesthetic Surgery Journal, Journal of Reconstructive Microsurgery, Journal of Craniofacial Surgery, Journal of Reconstructive Microsurgery, and The Cleft Palate-Craniofacial Journal. Similarly, the names and gender of board members were obtained for the following societies: American Society of Plastic Surgeons, American Association of Plastic Surgeons, The Plastic Surgery Foundation, American Society for Aesthetic Plastic Surgery, American Society of Maxillofacial Surgeons, American Cleft Palate Craniofacial Association, American Society for Reconstructive Microsurgery, American Association for Hand Surgery, and the American Board of Plastic Surgery. The name, gender, position, and year of graduation from residency for all faculty members were obtained.

RESULTS: A total of 872 plastic surgery academic faculty were reviewed from 86 plastic surgery programs, 23.7% were male. Among the 180 faculty members from the Midwest region, 26.1% were female. A total of 307 faculty members were identified from the Northeast region, of whom 20.9% were female The Northwest region had a total of 17 faculty members; 35.3% were female. In the South, 210 faculty members were identified and included 23.8% females. In the Southwest, 11.1% were females Finally, for the West, 140 faculty members were identified and included 24.3% females. Faculty members were further subdivided by academic rank. A

significant difference was found between the number of male and female faculty members at all academic positions. Of 245 full professors, 7.8% were female. There were 226 associate professors queried with 22.1% identified as female. 401 assistant professors were identified with 33.4% identified as female. Years in practice after completing terminal training were analyzed across the academic faculty. Among faculty with less than 10 years since completion of terminal training, 34.9 % were female. For faculty with 10 to 20 years post-terminal training, 23.5% were female. For those with 20 to 30 years of experience, 13.6% were female. For faculty with over 30 years since graduation, 7.6% were female. There was a significant difference between the number of male and female members across all six journals with over 80% being male. Among the analyzed editorial boards, only 27% were female.

CONCLUSION: Our results show that representation of women in plastic surgery trails behind recently reported numbers for other specialties. Difficulty finding mentors, family responsibilities, and institutional biases have been cited as barriers to women reaching faculty and leadership roles in plastic surgery.

REFERENCES:

1. Linscheid LJ, Holliday EB, Ahmed A, et al. Women in academic surgery over the last four decades. Plos One. Dec 16 2020;15(12)doi:ARTN e0243308 10.1371/journal.pone.0243308
2. Danko D, Cheng, Losken A. Gender Diversity in Plastic Surgery: Is the Pipeline Leaky or Plugged? Plastic and Reconstructive Surgery. Jun 2021;147(6):1480-1485. doi:10.1097/Prs.0000000000008002
3. Abelson JS, Chartrand G, Moo TA, Moore M, Yeo H. The climb to break the glass ceiling in surgery: trends in women progressing from medical school to surgical training and academic leadership from 1994 to 2015. Am J Surg. Oct 2016;212(4):566-+. doi:10.1016/j.amjsurg.2016.06.012
4. Oseni TO, Kelly BN, Pei K, et al. Diversity efforts in surgery: Are we there yet? Am J Surg. Jul 2022;224(1 Pt B):259-263. doi:10.1016/j.amjsurg.2022.01.014
5. Brisbin AK, Chen W, Goldschmidt E, Smith BT, Bourne DA. Gender Diversity in Hand Surgery Leadership. Hand (N Y). Mar 10 2022:15589447211038679. doi:10.1177/15589447211038679

Meet the Team: Comparison of the Characteristics and Trends of Practicing Plastic Surgeons and General Surgeons in the United States

Abstract Presenter
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PURPOSE: Characterize and identify gaps in the plastic surgery workforce.

BACKGROUND: Studies demonstrate a lack of diversity in plastic surgery.1,2 Despite policy shifts to reverse inequalities, there has been no significant change in integrated plastic surgery applicants demographics between 2010-2014 and 2015-2020.3 These disparities are pronounced in academic plastic surgery, with less Black and Hispanic representation compared to the U.S. population.4 This trend is also seen in fellowships, demonstrating female racial/ethnic minorities' disproportionate underrepresentation.5

METHODS AND MATERIALS: Surgeon demographics were extracted from the Centers for Medicare and Medicaid Services(CMS) open database. Urban/rural classification and academic affiliation were crosslinked from the Inpatient Prospective System database. Sole proprietorship status was cross-linked from the NPI Registry. Data was analyzed using STATA/BE 17.

RESULTS: We analyzed 15,352 general and plastic surgeons in the US. Plastic surgeons were less likely to be females($P<0.05$) and more likely to be sole proprietors($P<0.05$) and affiliated with a teaching hospital($P<0.05$) than general surgeons. There was no difference in rural-practicing surgeons($P=0.860$). Plastic surgeons graduating in the last 20 years were more likely to be affiliated with an academic hospital than those graduating more than 20 years ago($P<0.5$). Although there has been an increase in female plastic surgeons, there was a decline in female plastic surgeon proportion who graduated after 1999. Finally, DO graduates make a smaller proportion of plastic compared to general surgeons(1.7% vs 5.2%, $p<0.0001$).

CONCLUSIONS:
Although the plastic surgery workforce is gaining female representation and shifting to academia, significant progress in serving rural communities has not been made. Moreover, the decline in practicing female surgeons warrants further investigation along with the potential shift from graduates to academia rather than private practice.

REFERENCES:
[1] Butler PD, Britt LD, Longaker MT. Ethnic Diversity Remains Scarce in Academic Plastic and Reconstructive Surgery. Plastic and Reconstructive Surgery. 2009;123(5):1618-1627. doi:https://doi.org/10.1097/prs.0b013e3181a07610
[2] Silvestre J, Serletti JM, Chang B. Racial and Ethnic Diversity of U.S. Plastic Surgery Trainees. Journal of Surgical Education. 2017;74(1):117-123. doi:https://doi.org/10.1016/j.jsurg.2016.07.014
[3] Hernandez JA, Kloer CI, Porras Fimbres D, Phillips BT, Cendales LC. Plastic Surgery Diversity through the Decade: Where We Stand and How We Can Improve. Plastic and reconstructive surgery Global open. 2022;10(2):e4134. doi:https://doi.org/10.1097/GOX.0000000000004134
[4] Smith BT, Egro FM, Murphy CP, Stavros AG, Nguyen VT. An Evaluation of Race Disparities in Academic Plastic Surgery. Plastic and Reconstructive Surgery. 2020;145(1):268-

277. doi:https://doi.org/10.1097/prs.0000000000006376
[5] Oberoi MK, Reghunathan M, Aref Y, Dinis JJ, Balumuka D, Gosman A. Racial/Ethnic and Gender Disparities Over the Last Decade Within Microsurgery and Craniofacial Fellowship Training. Annals of Plastic Surgery. 2023;Publish Ahead of Print. doi:https://doi.org/10.1097/sap.0000000000003403

Access to Certified Burn Centers in the United States: The Geospatial and Transport Cost of Transfer

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PURPOSE: Specialized burn centers are critical in minimizing burn-associated morbidity and mortality. However, American Burn Association (ABA)-verified burn centers are unequally distributed across the U.S., and fewer verified centers are available for pediatric patients relative to adults. The economic burden of transport to verified centers represents a significant proportion of the already high cost of burn-associated care. The present study aims to quantify inequitable burn care access in the contiguous U.S. due to age group and locality as a function of physical proximity and transportation cost.

METHODS: County-level distances (n=3,108) to the nearest ABA-verified adult or pediatric burn center were determined and mapped. Distances were then analyzed separately for rural (n = 1441) and urban (n = 1667) counties for both adult and pediatric burn centers. Distance calculations for each population were combined with transport cost data (2022 CMS Ambulance Fee Schedules) to determine the average cost of transport for each patient population (adult versus pediatric, urban versus rural).

RESULTS: 59 adult and 43 pediatric ABA-verified centers were identified from the ABA burn center directory. Pediatric patients reside 30.57 miles ($p < 0.001$) further than adults from the nearest center, accounting for a 10.53% - 15.79% transport cost increase. Transport costs increased dramatically between urban and rural counties, with rural patients facing a cost increase of 33.97% and 81.85% for ground and air transportation, respectively.

CONCLUSIONS: Physical proximity to burn care may appear to differ only modestly across age and region. However, the seemingly marginal increase in distance significantly impacts the cost of patient transport. The present study highlights physical and economic barriers to burn care access faced by rural and pediatric patients. Increasing ABA burn center certification in

targeted areas across the U.S. may decrease the disparities in access to burn care faced by these groups. Future studies should be conducted to expand on this report's findings and more completely characterize additional costs associated with inequitable burn care access.

Women in Plastic Surgery Leadership: Keys to Success

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INTRODUCTION: In the current landscape, women are entering medicine at the same rate as men. Subsequently, the number of women pursuing a career in surgery is increasing. However, the increase in women has not yet translated to equal representation in leadership positions. Previous studies have commented on women in academic and leadership positions and the specific challenges often faced to obtain these positions. While this information is vital to foster change, recognizing the pathway, perspectives and commonalities of women who have become leaders in the field is also crucial to inspire future leaders. The purpose of this study is to take a constructive look at success in leadership and identify the key characteristics women in leadership positions hold, as well as the institutional initiatives to encourage future women leaders.

METHODS: A cross-sectional study was conducted in 2022-2023 evaluating the gender representation of U.S. academic plastic surgery faculty leaders. Websites of plastic surgery residency programs, medical journals, non-profit organizations, and national societies were accessed for demographic information. Leadership roles included Chair/Chief, Program Director (PD), Principal Investigators (PI) and positions held in professional, research, editorial board, healthcare facility, non-profit, political/advocacy, and industry organizations. Residency program websites were searched for Diversity, Equity, and Inclusion (DEI) elements, including dedicated webpages and targeted vocabulary. Self-identification and profiles were used to categorize gender. A survey through the American Society of Plastic Surgeons was distributed evaluating the pathway of leadership.

RESULTS: A total of 85 plastic surgery programs were identified, including 1209 residents, 108 fellows and 1011 faculty, and 83 PIs. 44% of the residents, 35% of the fellows, 25% of the

faculty and 39% of the PIs were women. Of the PIs identified, 25% of the women PIs had a PhD and 13% had both MD and PhD. There were 9 women Chair/Chief of plastic surgery and 16 women Program Directors. Among these, 28% held additional degrees (MBA, MS, ect) and 76% completed a fellowship after residency. Of the women faculty identified, 26% held leadership positions in other organizations, averaging 1-2 positions each, with a major focus in educational leadership. Residency programs with a woman Chair/Chief and/or PD had an affiliated DEI committee. Less than half (40%) of all residency programs had dedicated DEI efforts clearly mentioned on their webpage, and of those a majority had a woman Chair/Chief or PD.

CONCLUSION: Plastic surgery has almost equal percentage of women and men residents, suggesting that there is no shortage of qualified women to fill leadership roles in the specialty. The trajectory to a leadership role may however look different between genders, especially when we expand our definition to include all types of leaders and academic roles. Women are holding a variety of leadership positions that equally impact the field of plastic surgery, and those roadmaps are important. The keys to success identified here are not only applicable to women, but all future leaders, and can be used to develop more initiatives and pathways for trainees pursing leadership positions in plastic surgery.

Analysis of Medical School Clerkship Grading Systems for Matched Plastic Surgery Applicants

Abstract Presenter
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BACKGROUND: With United States Medical Licensing Examination (USMLE) Step 1 becoming pass/fail, clerkships grades are projected to serve a more critical role in assessing plastic surgery applicants' academic performance. However, there is considerable variation in clinical clerkship grading scales among medical schools. This lack of standardization may be disadvantageous towards Plastic and Reconstructive Surgery (PRS) applicants from institutions that grade more competitively. The variation of grading scales in relationship of institutions and the outcomes of matching PRS applicants has yet to be thoroughly explored leading to a lack of consensus opinion on the best way institutions can elevate students in their academic pursuits. As such, the aim of this study was to evaluate the percentage of clerkship honors awarded at medical schools and determine whether grade distributions correlated with matching in PRS residency.

METHODS: We identified 300 matched plastic surgery residents that attended 58 US-accredited medical schools from September 2020 to September 2022. Grade distribution, and percentage of clerkship honors awarded was extracted from Medical Student Performance Evaluations (MSPE) from publicly available data or from the ERAS system obtained from The

Ohio State University Department of Plastic and Reconstructive Surgery. PRS applicants' home institution and matched institution were extracted from a self-reported Google Docs spreadsheet. US News and World Report (USNWR) ranking of each applicant's home institution was collected and Doximity Residency Navigator was used to idenify the ranking to the respective plastic surgery residency programs. Bivariate linear regression and student t-test was used to determine the significance of scores.

RESULTS: Fifty-two institutions reported grade distributions and six did not. Clerkship honors were awarded to students ranging from 5% to 68% and three institutions operated on a pass/fail system. There were a higher number of matched applicants (n=172) from schools where honors were awarded to over 40% of students (p=0.0016). USNWR top 25 schools were more likely to award more students with clerkship honors whereas institutions ranked below 25 were less likely to award honors (44% vs. 30%, p =0.0037). Further, applicants coming from schools who awarded more clerkship honors matched at plastic surgery residency programs with higher Doximity Residency Navigator ranking (55% v 32%, p=0.041).

CONCLUSION: Although the match process is multifactorial, grades are a critical component of the application. PRS programs should be astute in understanding the differences in medical school grading systems and recognize that top 25 institutions award honors more often, despite similar absolute grades. Although medical schools are allowed to decide on their own grading system and distribution. We call to action that a more standardized approach to clerkship grades is needed to fairly compare the academic performance of PRS applicants more objectively from all institutions.

Close

Forecasting Physician Productivity: Model Creation and Testing

Abstract Presenter
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PURPOSE: Physician productivity is a critical metric for both hospitals and practice plans, and accurate forecasting is needed to ensure adequate resource distribution. Forecasts are also used to set salaries and to aid in recruitment efforts. Physician productivity in academic health centers (AHCs) can be measured in a number of different ways, of which charges, cash collections, and work Relative Value Unit (wRVU) generation are the most common. From a practice perspective, wRVUs are a useful metric of productivity because they isolate physician work from payor mix and can capture a more holistic picture of a physician's contribution to the clinical enterprise. Hospitals and practice plans, which often budget and plan for a year but collect monthly data, most commonly use a naïve forecasting technique, in which the forecast for time t (Ft) is the actual value at t-1 (Yt-1). Another common method is to use the actual value from one year previously such that the forecast for time t (Ft) is the actual value at t-12 (Yt-12).

In this project, we use data from surgeons within a practice plan to answer two discrete questions: 1. What is the best forecast model for these data? 2. Can the same forecast model be used for different surgeons within a group, or must each surgeon have his own model?

MATERIALS AND METHODS: We obtained deidentified surgeon-level RVU productivity for the past three years from a single Division within a Surgical Department. Data from January 2019 to April 2022 were used for three surgeons with different practice patterns. Statgraphics Centurian 19® was used for all analysis. To smooth monthly variation, the data were aggregated into quarterly data and quarterly data were used for analysis.
The data were placed into time series plots and autocorrelations and periodograms were created. Regression analysis was performed for all time series plots. We modeled the data using exponential smoothing, simple linear regression, multiple regression, time series decomposition, and ARIMA. Each forecasting method was tested for randomness of residuals using runs above and below the median, runs up and down, and Ljung-Box test, as well as residual partial autocorrelations.

RESULTS: Exponential smoothing showed non-random residuals for surgeons C and H, and random residuals with a large variance for the surgeon F. Simple Linear Regression explained 60% of the variation in data for surgeon C, 17% for surgeon F, and 23% for surgeon H. Multiple Linear regression was not statistically significant or explained less than 50% of the variation in data for all surgeons. Time Series Decomposition was not an adequate model for surgeons without seasonality. ARIMA was a good model for surgeons with trend and seasonality.

CONCLUSIONS: The appropriate forecast model is dependent on practice maturity, and naïve forecasting is likely inadequate. A seasonally adjusted model is most appropriate for growing practices, and an ARIMA model is most appropriate for mature practices. Accurate forecasting models can help ensure adequate resource distribution and appropriate salary determinations.

Beating the Curve: Longitudinal Evaluation of Surgeon Proficiency in Microsurgical Breast Reconstruction Post-Training

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INTRODUCTION: Microsurgical breast reconstruction is technically demanding, yet the learning curve is not well described. Various other surgical subspecialties have measured the learning curve of certain procedures and defining the learning curve for microsurgical procedures is especially important due to the high technical skill required. This study aimed to characterize the number of procedures required to master microsurgical breast reconstruction proficiently and efficiently.

METHODS: An institutional database was queried from 2006-2018 to identify all abdominally-based, breast free flaps performed by an experienced surgeon (ES) with almost 800 flaps prior to the beginning of the study period and a novice surgeon (NS) entering practice immediately post fellowship. The primary outcome was operative time and secondary outcomes were major/minor complications. Risk-adjusted cumulative sum curves were used to determine expected number of procedures required to attain optimal efficiency, defined as the peak of rapid improvement in operative duration. Linear regression was used to stratify complication rates by procedure number, while controlling for confounders.

RESULTS: A total of 1,288 procedures with a mean of 393 minutes (SD 123) were identified for both surgeons. NS's operative time persistently decreased (-36.6 seconds/procedure, $P<0.001$) over the study period while ES was unchanged ($P=0.353$). There was no association between number of procedures and complications or partial/total flap loss (ES: $P=0.423$; NS: $P=0.215$). Greatest differential improvement in NS operative times was at approximately 300-350 procedures, 5 years post-training, while ES remained constant over the study period.

CONCLUSIONS: Early microsurgical experience intimately correlates with reduced operative times and reaches a peak after completing 300 free flaps. Increases in efficiency do not compromise patient outcomes or safety of the procedure. Establishing a learning curve is important for breast microsurgeons to benchmark their progress and to create expectations for themselves after post-graduate training.

Racial/Ethnic Disparities in Cosmetic Procedure Utilization: A Microeconomic Spending Analysis

Abstract Presenter
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PURPOSE: Cosmetic plastic surgery has been growing in demand and popularity, with a 22% increase in total surgical volume since 2000.[1] However, the racial demographic makeup of cosmetic surgery utilization does not proportionally represent that of the United States

population, with underrepresentation found in African Americans and Hispanics.[2] This study evaluates whether microeconomic spending traits as a representation of financial stability can inform trends in cosmetic surgical and minimally invasive procedure volumes by racial group.

METHODS: Annual volumes for the top five cosmetic surgical procedures (breast augmentation, rhinoplasty, blepharoplasty, liposuction, and abdominoplasty) and top five cosmetic minimally invasive procedures (Botulinum toxin type A, soft tissue fillers, chemical peel, laser hair removal, and microdermabrasion) by racial/ethnic group from 2012-2020 were collected from the American Society of Plastic Surgeons' annual reports on plastic surgery statistics.[3] Using factor analysis to determine the consumer expenditure categories that shared the most common variation with other expenditures from the U.S. Bureau of Labor Statistics' (BLS) expenditure and income data by racial/ethnic groupings (White/Asian/Other, African American, Hispanic), food/medical services and entertainment were selected as proxies for the following microeconomic traits, inflexible and flexible consumer spending, respectively.[4] Additionally, average rates in both types of consumer spending, cosmetic surgical procedure volume, and minimally invasive procedure volume were calculated across the three BLS-defined racial/ethnic groupings and standardized so they could be interpreted relative to each other, with larger numbers indicating a larger mean difference.

RESULTS: Compared to the other groups, the White/Asian/Other grouping spent significantly more on average for inflexible consumer spending (estimate = 1.33, $p = 0.0097$), flexible consumer spending (4.38, $p < 0.0001$), cosmetic surgical procedures (6.36, $p < 0.0001$), and cosmetic minimally invasive procedures (2.58, $p = 0.0006$). In contrast, African Americans spent significantly less on average for inflexible consumer spending (-2.95, $p = 0.0069$), flexible consumer spending (-6.32, $p < 0.0001$), cosmetic surgical procedures (-10.04, $p < 0.0001$), and cosmetic minimally invasive procedures (-6.31, $p = 0.0003$). For Hispanics, values were significantly less on average for flexible consumer spending (-2.68, $p = 0.0023$), cosmetic surgical procedures (-6.86, $p < 0.0001$), and cosmetic minimally invasive procedures (-5.11, $p = 0.0002$).

CONCLUSIONS: This study demonstrates that inflexible and flexible consumer spending follow trends in utilization of cosmetic surgical and minimally invasive procedures by racial/ethnic groups, with African Americans and Hispanics tending to spend less on consumer expenditures and having fewer cosmetic procedures done compared to their White and Asian counterparts. These microeconomic spending inequities may help further contextualize the racial/ethnic variation in access to cosmetic surgery.

REFERENCES

1. Ullrich PJ, Garg S, Reddy N, et al. The Racial Representation of Cosmetic Surgery Patients and Physicians on Social Media. Aesthet Surg J. 2022;42(8):956-963.
2. American Society of Plastic Surgeons. Plastic Surgery Statistics Report: 2020. https://www.plasticsurgery.org/documents/News/Statistics/2020/plastic-surgery-statistics-full-report-2020.pdf. (n.d.). Accessed March 1, 2023.
3. Plastic Surgery Statistics. American Society of Plastic Surgeons. Updated April 27, 2021. Accessed December 20, 2022. https://www.plasticsurgery.org/news/plastic-surgery-statistics.

4. Consumer Expenditure Surveys. U.S. Bureau of Labor Statistics. Updated February 15, 2023. Accessed December 20, 2022. https://www.bls.gov/cex/tables.htm.

Urbanization Levels And Outcomes Of Burn Injury: A Nationwide Study In The United States

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PURPOSE: While age, total body surface area (TBSA), and inhalation injury are established predictors of patient outcomes post-burn injury, the impact of urbanization levels remains unclear. This study aims to examine the association between urbanization levels and burn patient outcomes in the United States.

METHODS: We performed a retrospective study using the 2019 National Inpatient Sample database. Patients with a primary diagnosis of burn or corrosive injury were included and categorized into 6 distinct groups based on their urbanization level, as determined by the 2013 Urban-Rural Classification Scheme. From the most urban to the most rural, the 6 groups were large central metropolitan, large fringe metropolitan, medium metropolitan, small metropolitan, micropolitan, and non-core counties. Elective admissions or patients aged <18 years were excluded. Patient and hospital characteristics were compared. Outcomes including in-hospital mortality, shock, prolonged mechanical ventilation, receiving surgery (skin graft), time to surgery, length of stay (LOS), and total costs were analyzed using multivariable linear and logistic regression models to determine the association between urbanization level and burn outcomes.

RESULTS: A weighted population of 23,085 burn patients, among which 68% were male with mean age 48.9 years, were included. As urbanization level decreased, White race increased (38%-75%), while Black (27%-12%) and Hispanic populations (20%-4%) decreased ($p<0.001$). TBSA ($p=0.006$) and payer type ($p<0.001$) differed across urbanization levels, but there was no specific trend. Patients from large fringe metropolitan counties were the most likely to have higher income levels, while those from less urbanized counties had lower income levels ($p<0.001$). Comorbidity and inhalation injury were similar across groups. Most patients were admitted to urban teaching hospitals, with few patients admitted to rural hospitals except for micropolitan (11%) and non-core areas (10%). Patients from less urbanized counties had a slightly higher mortality rate (3% in large metropolitan and 5% in non-core areas), but the difference was not significant ($p=0.139$). Patients from large metropolitan areas had lower rate of

shock compared to non-metropolitan areas (2-3% vs 4-6%, p=0.013). There were no differences in skin graft surgery, time-to-surgery, LOS, or total costs across urbanization levels. Compared to large central metropolitan counties, patients from less urbanized counties had lower odds of in-hospital mortality with adjusted odds ratios (aOR) ranging from 0.57 to 0.92, but these were not statistically significant. Patients from large fringe metropolitan [aOR: 1.81 (1.05-3.12), p=0.033], small metropolitan [aOR: 2.33 (1.15-4.72), p=0.019], and non-core counties [aOR: 2.75 (1.38-5.48), p=0.004] had significantly higher odds of shock, compared to large central metropolitan counties. Similar odds of prolonged mechanical ventilation and skin graft surgery were observed across groups. Compared to large central metropolitan counties, time-to-surgery was less in both small metropolitan counties [-0.71 days (-1.34 to -0.08), p=0.027] and micropolitan counties [-0.78 days (-1.54 to -0.02), p=0.044]. Despite highest total costs observed for non-core counties, the differences were not statistically significant.

CONCLUSION: After adjusting for patient and hospital characteristics, burn patients from less urbanized locations tended to have higher rates of shock during hospitalization. However, in-hospital mortality, morbidity, and resource utilization were similar across urbanization levels.

Out of Pocket Costs and Variation in Panniculectomy Procedures

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INTRODUCTION: Panniculectomy is an elective but medically necessary procedure, and as such, there are important factors that contribute to patient choice that are not present in emergency procedures.1,2 Patient motivations for plastic surgery procedure are multifactorial, including medical, social, and financial considerations.3 This study aims to investigate the variation in out of pocket costs for patients undergoing panniculectomy procedures.

METHODS: The IBM MarketScan Commercial Databases were queried to identify all patients who underwent outpatient panniculectomy in 2021, using CPT code 15830. Financial variables of interest included gross payments to the provider (facility and/or physician) and out of pocket costs (total of coinsurance, deductible, and copayments). Univariate parametric analysis was

utilized to study the variation in financial variables across regions, insurance plan types, and places of service. Mixed-effects linear regression was utilized to analyze parametric contributions to total gross and out of pocket costs.

RESULTS: The query identified 858 patients who had a panniculectomy in 2021. The majority of patients were female (88.8%), were in the South region (45.6%), had surgery in an on campus outpatient facility (82.2%), and had PPO insurance plan (49.9%). The majority of patients were in the 35-44 (35.9%) and 45-54 (33.7%) age groups. The overall median out of pocket cost was $117.71 (IQR $789.78). Out of pocket cost medians did not vary by region (p=0.457), but did vary significantly by insurance plan type (p=0.022) and by place of service (p=0.029). The highest median out of pocket cost was incurred in off campus outpatient facilities ($472.58, IQR $1,099.92) and the lowest median out of pocket cost was incurred in office facilities ($35.00, IQR $875.16). Mixed-methods regression revealed that insurance plan types contributed significantly to out of pocket costs. Comprehensive insurance plans contributed significantly to decreasing out of pocket costs (B = -$531.99, p=0.009), as did HMO plans (B = -$474.14, p=0.001), and PPO plans (B = -$266.71, p=0.020).

CONCLUSION: The out-of-pocket costs for panniculectomy procedures are variable depending on type of insurance plan and by place of service. The highest out of pocket costs are incurred in off campus outpatient facilities, and lowest were incurred in office facilities. For patients seeking panniculectomy, it may be in their best interest to obtain a comprehensive medical plan and seek services in an office facility. Plastic surgeons should be aware of these financial considerations as they approach joint decision making with patients.4,5

REFERENCES

1. Acarturk TO, Wachtman G, Heil B, Landecker A, Courcoulas AP, Manders EK. Panniculectomy as an adjuvant to bariatric surgery. Annals of plastic surgery. 2004 Oct 1;53(4):360-6.
2. Janis JE, Jefferson RC, Kraft CT. Panniculectomy: practical pearls and pitfalls. Plastic and Reconstructive Surgery Global Open. 2020 Aug;8(8).
3. Sterodimas A, Radwanski HN, Pitanguy I. Ethical issues in plastic and reconstructive surgery. Aesthetic plastic surgery. 2011 Apr;35:262-7.
4. Dirk T. Ubbink, MD, PhD, Trientje B. Santema, MD, MSc, Oren Lapid, MD, PhD, Shared Decision-Making in Cosmetic Medicine and Aesthetic Surgery, Aesthetic Surgery Journal, Volume 36, Issue 1, January 2016, Pages NP14–NP19, https://doi.org/10.1093/asj/sjv107
5. Myckatyn TM, Parikh RP, Lee C, Politi MC. Challenges and solutions for the implementation of shared decision-making in breast reconstruction. Plastic and reconstructive surgery Global open. 2020 Feb;8(2).

Instagram Versus Reality: Who are Actually Plastic Surgeons?

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BACKGROUND: Instagram has become one of the most powerful marketing tools available to plastic surgeons as patients have increasingly turned to online resources to find physicians.1 Instagram's easy to use interface and image focus provides an ideal conduit for patients reviewing surgical results online. Within, we review the online presence of self-ascribed plastic surgeons in the United States (US) to identify potential misinformation and dishonest advertising.

MATERIALS AND METHODS: Institutional Review Board approval was not required as all data is publicly available. Inflact is an open access web-based marketing tool which was used to search all Instagram accounts, as queries through Instagram are limited to 60 results. Inflact was queried for the search terms: "plastic surgeon/surgery", "plastic and reconstructive surgeon/surgery", "aesthetic surgeon/surgery", and "cosmetic surgeon/surgery" producing 3,317 initial search results. Accounts were excluded if not in English, were not practicing in the US, were non-physicians, or were trainees. Account information, history of medical education and training, American Board of Plastic Surgery (ABPS) Certification status, and posts were reviewed. Descriptive statistics and independent samples t-tests were used with a predetermined level of statistical significance $p<0.05$.

RESULTS: In total, 1,389 physicians practicing within the US were identified. Most attended medical school in the US (93%), a minority received integrated plastic surgery training in the US (16%), and the majority attended general surgery residency in the US (60%) followed by independent plastic surgery residency in the US (53%). Altogether, 1,125 individuals were explicitly listed as "plastic surgeons" on Instagram, nearly a third of these (28%) were not certified by the ABPS and 225 individuals (20%) received no training in plastic surgery. On average, non-board certified "plastic surgeons" had more followers than board-certified plastic surgeons (52,753 vs. 31,896, $p=0.01$)

A total of 172 facial plastic surgeons were found of which nearly half (49%) identified themselves as a "plastic surgeon", however only 11% trained in an independent plastic surgery residency. A total of 43 oculoplastic surgeons were identified, of which 45% identified themselves as a "plastic surgeon", while only one surgeon completed an independent plastic surgery residency. Interestingly, 101 individuals who were not plastic surgeons listed themselves as "aesthetic/cosmetic surgeons" and had residency training in a myriad of specialties including

dermatology (16%), general surgery (30%), and obstetrics and gynecology (26%). Across all physicians identified, few offered information regarding costs of treatments (11%) while most advertised Botox and/or injectable treatments (91%).

CONCLUSIONS: There is an alarming number of individuals who mis-identify themselves as plastic surgeons on Instagram, as nearly a third of "plastic surgeons" on Instagram are not certified through the ABPS. This is detrimental to the reputation of plastic surgery and has the potential to create far lasting consequences, let alone patients mistakenly receiving care from unqualified physicians. The value of board certification has been previously discussed across a myriad of surgical fields.2 It is paramount that plastic surgeons create a united front against such endeavors through advocacy efforts within the American Society of Plastic Surgeons.

Patient Marijuana Use Reporting Bias: A Review Of Surgical Disclosures

Abstract Presenter
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BACKGROUND: Marijuana use is legalized for medicinal use in 37 states and recreational use in 21 states. Ongoing investigations of marijuana health impact require patient disclosure to healthcare providers, but patients may fear stigma or rejection from surgeons performing non-emergent procedures.

METHODS: A retrospective chart review was performed for patients who received breast reductions from 2013-2022. Data collection included demographics, comorbidities, perioperative data, outcomes, and chart documentation of regular marijuana use. Patients were considered to have peri-operative marijuana use if regular use was clinically documented within a year of surgery. Exclusion criteria included tobacco use or breast cancer history. Statistical analysis included t-tests and Chi-squared tests.

RESULTS: 413 patients underwent breast reductions over 9 years. 53 (12.8%) had regular marijuana use clinically documented within a year of surgery. 14 of 53 (26.4%) disclosed marijuana use to the surgeon performing their breast reduction. 39 disclosed use to non-surgeon providers, including pre-procedure anesthesia (15), obstetrics or emergency (14), and primary care or other provider. Patients had higher disclosure to surgeons after marijuana sale became operationalized instate ($p=0.034$), but disclosure did not increase after legalization, before instate sale. Patients using marijuana without disclosure to their surgeon demonstrated a higher pooled complication rate than patients who disclosed marijuana use to their surgeon ($p=0.012$).

CONCLUSIONS: Marijuana use disclosure to surgeons was lower than disclosure to other healthcare providers, predominantly specialties which emphasize social history screening. While patients may fear stigma from surgeons, it is likely that surgeons are not appropriately screening for marijuana use.

Patient-Reported Outcomes in Plastic Surgery: What Validated Instruments are Available?

Abstract Presenter
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INTRODUCTION: In the current age of digital, patient-centered medicine, optimal care is defined not only by good clinical outcomes, but also by holistic patient wellbeing. The pursuit of this goal has been a driving force behind the philosophic shift to patient-reported outcomes (PROs) and development of high-quality patient-reported outcomes measures (PROMs). Plastic surgery helps patients by restoring or enhancing their form and function. Therefore, our discipline is uniquely aligned with patient-reported outcomes, and PROs are a vital tool for us to assess clinical practice. The authors sought to describe current common PROMs in plastic surgery, both generic and specific, including their validated populations, strengths, and limitations.

METHODS: We queried the most commonly used validated PROMs in PubMed between 2010 and 2022. Each PROM was classified into a field according to their respectively validation study. The number of publications using each PROM was determined using the top 20 plastic surgery journals according to H5-index between 2010 and 2022.

RESULTS: Thirty-three validated PRO instruments were included in our study that covered 12 specific sub-specialties within plastic surgery. Of the 33, 1 PROM was specific to breast, 1 was specific to aesthetic/body, 8 were specific to facial plastic surgery, 2 were specific to craniofacial, 2 were specific to abdominal wall, 4 were specific to upper extremity, 1 was specific to lower extremity, 2 were specific to chronic wounds, 3 were specific to scar, 3 were specific lymphedema, 1 was specific to gender, 2 were specific to migraine, and 3 were generic. The most referenced PRO Instrument was the BREAST-Q with 378 citations over the past 12 years. Following the BREAST-Q, the next four most commonly cited PRO instruments were the FACE-Q (169), Vancouver Scar Scale (144), Disabilities of the Arm, Shoulder and Hand (134), and Nasal Obstruction Symptom Evaluation (133). Three PROMs, the LYMPH-Q, WOUND-Q,

and Wound-QoL have not been cited since their validation. As new forefronts in plastic surgery continue to emerge, more specific PROMs will be developed. For example, the GENDER-Q, a PROM focused on quantifying outcomes of gender affirmation surgery, has finished Phase I international field testing with two modules. Additionally, the LYMPH-Q for lymphedema currently only assess the upper extremity but will likely expand as lymphedema research progresses.

CONCLUSIONS: Our study found 33 specific PROMs that cover 12 sub-specialties within the plastic surgery literature. However, despite the plethora of PROMs available, only a few are cited regularly. As healthcare increasingly recognizes the value of PROs, there will be a shift towards systemic adoption. They will continue to expand to more sub-specialties and provide physicians knowledge about the patient experience that can be used to deliver more individualized, patient-centered care. We encourage plastic surgeons to utilize and incorporate the specific, validated PROMs available to their research and their practice.

Multimedia Demonstration of Migraine Surgery Techniques

Abstract Presenter
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PURPOSE: The purpose of this abstract is to utilize both graphic animation and annotated surgical video clips to highlight techniques in migraine surgery that our team has developed over the past five years.

PREOPERATIVE MARKINGS: After general anesthesia is induced, the patient is properly padded and placed onto the operating room table in prone position. The neck is trimmed a few centimeters above the occipital protuberance.

A vertical line is marked in the midline, thereafter a transverse line is marked on the back of the neck at the level of the occipital protuberance. A ruler is used to measure the lateral distance from the midline, and a tick mark is placed at the 5-cm and 7-cm mark. In our experience, the lesser occipital nerve has always been located below this area.

INITIAL DISSECTION: A 12-cm transverse incision is made 2 cm below this line at the occipital protuberance. We start by lifting a flap superiorly and inferiorly 2 cm in each direction leaving a 5 mm fat flap on the trapezius fascia. Then a 4x2 cm fat flap is raised on each side, based lateral to medial, which will be used later in the case to cushion the greater occipital nerve. The bilateral third occipital nerves are encountered, and they are usually severely entrapped in the trapezius fascia. The bilateral third occipital nerves are decompressed, transected, and buried

into the muscle.

The dissection is directed 0.5 cm laterally from the median raphe. The dissection is continued deeper into the trapezius muscle and fascia until the vertical fibers of the semispinalis capitis muscle are identified.

DECOMPRESSING THE OCCIPITAL NERVES: The trapezius fascia is lifted, and the greater occipital nerves are identified. The semispinalis muscle is dissected around the nerve, and the segment of the muscle medial to the nerve 1 cm in length is separated from the midline raphe and transected. A triangular piece of the trapezius fascia and muscle fiber is removed laterally over the nerve. The nerve is further isolated with a spreading technique using a fine hemostat. The trapezius fascia over the nerve is incised, and the nerve is tracked laterally until it enters the subcutaneous fat. We then track the occipital nerve proximally down to the obliquus capitis muscle fascia. The occipital artery crosses over the greater occipital nerve. This artery is ligated. The lesser occipital nerve is identified. The nerve is tracked proximally until its exit from the posterior border of the sternocleidomastoid muscle. The nerve is transected and implanted into the sternocleidomastoid. This is repeated on the contralateral side.

FLAP CUSHION FOR THE GREATER OCCIPITAL NERVE: After hemostasis is achieved, the 4x2 cm fat flap that was raised earlier is now used to cushion the bilateral greater occipital nerves.

CLOSURE: The areas around the nerves are infiltrated with 40 mg kenalog. The deep subcutaneous layer is closed with 2-0 vicryl and 3-0 monocryl.

Breast Implants After Explantation: A Novel Approach to Medical Waste Management

Abstract Presenter
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OBJECTIVE: The US healthcare sector generates around 5.9 million tons of waste annually, accounting for 8% of the nation's carbon emissions. Final stages of waste disposal include landfilling or incineration of solid waste. Yet, a large portion of discarded medical waste includes recyclable material, such as silicone. In 2021, about 220,000 breast implant removals were performed, (1) and silicone implants accounted for 84% of breast augmentations performed the year prior.(2) Due to increasing demands for this product, the environmental impacts of its current disposal methods are considerable. We propose an alternative to landfilling and

incineration of this resource as a novel initiative to improve medical waste management.

METHODS: This is a pilot study of an institutional medical waste management initiative. After obtaining institutional environmental health services approval and risk management clearance, we collected previously explanted silicone breast implants. We decontaminated the implants using the institution's waste facility autoclave machine under 280 degrees Fahrenheit, at a pressure of 32 psi, for a 35-minute cycle. At our institution, all biohazardous waste is required to be autoclaved prior to disposal. The implants were then collected and packaged for air shipment to a specialized silicone recycling facility. We compared the carbon footprint of the recycled DMS-300 industrial grade silicone fluid produced from the implants versus the same quantity of fluid manufactured using prime materials. We also estimated the carbon footprint of the incineration and landfilling disposal pathway of the collected implants and that of the air-shipped package. We summed the carbon footprint of all the traditional processes and compared it to the summed carbon footprint of our proposed recycling pathway.

RESULTS: A total of 43 implants were collected with a cumulative silicone volume of 20,55mL. After autoclaving, the implants remained intact, and their weight was unchanged. The estimated carbon footprint of the silicone fluid produced from the recycled breast implants is 257x10-4 MTCO2e (metric tons of carbon dioxide equivalent), while that produced from the manufacture of the same amount of silicone fluid using prime materials is 1197x10-4 MTCO2e. An estimated carbon footprint of traditional waste disposal options that include incineration and landfilling of our collected implants is 41x10-4 MTCO2e. Air shipment of the package from our location to the recycling facility emits an estimated 126x10-4 MTCO2e . Total carbon footprint of the recycling initiative pathway is 383x10-4 MTCO2e, a 70% decrease in total carbon footprint compared to the traditional pathway.

CONCLUSION: Recycling silicone breast-implants significantly reduces carbon footprint and is an effective ecological alternative to traditional waste disposal pathways. It also offers a sustainable route to the manufacture of industrial-grade material. Further large-scale analysis including national impacts and costs of each pathway is underway. As advocates of patient health and well-being, plastic surgeons should be conscious about the harms of current waste management practices and encourage innovative initiatives to promote lucrative and sustainable advancements.

REFERENCES

1.The Aesthetic Society. Aesthetic Plastic Surgery National Databank Statistics 2020-2021. www.theaestheticsociety.org/media/procedural-statistics. Published 2021.
2. The American Society of Plastic Surgeons. Plastic surgery statistics report. www.plasticsurgery.org/news/plastic-surgery-statistics. Published 2020.

An Analysis of Medical Malpractice Litigation Involving Orbital Fractures

Abstract Presenter
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BACKGROUND: Orbital fractures frequently require operative management by a Plastic and Reconstructive Surgeon. Due to the proximity to the globe and complexity of the reconstruction, orbital fractures and related procedures are not an uncommon source of medical litigation. The aim of the present study was to review orbital fracture malpractice litigation, including case outcomes and compensatory damages. The information is valuable to Plastic and Reconstructive Surgeons as awareness of these cases may serve to reduce the risk of malpractice exposure.

METHODS: The Westlaw and Lexis Nexis databases were queried for jury verdicts and settlements related to orbital fracture malpractice lawsuits. Cases were included if they were state or federal cases related to both orbital fracture and medical malpractice involving surgical or medical mismanagement or misdiagnosis of orbital fracture. Cases that did not meet inclusion criteria, duplicate cases, and those for which enough information was not available were excluded. The data of interest included motives, legal outcomes, and monetary outcomes of litigations, as well as defendant specialty, location, year, and plaintiff demographics.

RESULTS: A total of 49 cases from 1994-2018 met inclusion criteria between the databases. The most common legal complaint was the defendant's failure to make a diagnosis either by not ordering the proper radiological tests or by not interpreting radiological tests correctly, seen in 35% of cases. In 57% of the cases, the defendant was a surgeon, 46% of which involved a plastic surgeon specifically. Cases were resolved in favor of the defendant 49% of the time. Most cases (57%) resulted in a monetary outcome of $0. However, cases that were decided in favor of the plaintiff had significant compensatory damages with the majority being over $100,000 and one case as high as $8 million.

CONCLUSION: Although almost half of the orbital fracture malpractice cases resulted in an outcome favoring the defendant, significant monetary consequences against the defendant were possible in cases when the plaintiff prevailed. As failure to diagnose either by failure to order diagnostic tests or to interpret radiology films was the most common motive for a plaintiff to pursue litigation, Plastic and Reconstructive Surgeons should thoroughly evaluate patients with suspected orbital fractures to avoid litigation.

Can One Viral TikTok Video Influence a Plastic Surgery Practice?

Abstract Presenter
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INTRODUCTION: In recent years, there has been a multitude of studies examining the evolving relationship of social media platforms on the practice of plastic surgery. However, there are no studies quantifying how patient-generated content can directly affect a plastic surgeon's practice. Here, we present a report of how one viral patient generated TikTok video post bilateral breast reduction led to significant changes in a surgeon's referral base and operative volume at an academic institution. The aim of this study is to analyze the impact of one patient-generated viral video on consultation mix and conversion to surgical cases in an academic plastic surgery practice.

MATERIALS AND METHODS: A retrospective review of the senior author's electronic medical record clinic schedule from nine months before and after the viral TikTok video post-date (January 2021 to September 2022) was performed. All new patient consultations documented by the host institution as consultation for "macromastia consultation," "breast reduction," "breast hypertrophy," "thoracic or lumbar back pain surgical consultation/breast" were recorded and compared between time periods before and after the viral TikTok post. Descriptive statistics and Chi Squared test was used for statistical analysis, ($p < 0.05$). Google Trends analysis was performed to rule out any potential confounding variables with TikTok usage.

RESULTS: A total of 2,275 office visits were included. Consultations for breast reductions doubled after the Tiktok video post-date when comparing time periods (Before: 52 vs After: 110 consultations). Proportion of office visits with new consultations for breast reduction significantly increased (Before: 5.1% vs After: 10.5%; $p<0.001$). A total of 19 breast reductions were performed by the senior author in period prior to the video post-date, compared to 38 surgeries in the nine months after the viral Tiktok post-date. There was not a significant difference in operations per consultations between the two periods ($p=0.80$). Google Trends analysis demonstrated no unexplained rise in usage or participation in TikTok at the time of video or geographically.

CONCLUSION: Tik Tok has become a mainstay in regard to entertainment and educational dissemination, but its use in plastic surgery practice is under investigated. The aforementioned viral Tik Tok video significantly increased the clinical consultation volume and increased the

number of surgeries. In this study, we showed that a single, viral TikTok video was associated with a two-fold increase in consultations for reduction mammoplasty, even in the setting of a COVID-19 surge in our area leading to surgical shutdowns. This is the first study to link a patient-generated social media post to a quantifiable change in surgeon clinic consultation referrals and surgical volume.

Rhinoplasty Enhanced by Neck Liposuction

Abstract Presenter
John Gatti MD

BACKGROUND: Improving facial aesthetics while maintaining normal function is the goal of an elective rhinoplasty. Neck liposuction is an ideal adjunctive procedure to further improve facial aesthetics and contribute to the overall appreciation of the nasal surgery.

METHODS: Neck Liposuction was presented to patients as an associated procedure with an elective rhinoplasty and no additional fee was attached. At the initiation of the rhinoplasty, nasal and neck infiltrations were done with a dilute local anesthetic solution. A 90-cc volume solution (30-cc 1.0% xylocaine with 1/100,000 epinephrine mixed with 60 cc of injectable saline) was prepared. The neck was typically injected with 50 to 60 cc of the solution. Once the nasal surgery, with or without a septoplasty, was completed, the neck area was re-prepped with antiseptic. A small submental incision was made for a short 3 mm-wide canula. Low pressure, 'wall suction' was sufficient for the liposuction, but occasionally traditional liposuction equipment was employed. The canula was passed along the jawline on both sides and lightly across the mid-neck. A single fine absorbable suture closed the incision, and the neck was taped for support with brown-micropore tape or wide steri-strips. No circumferential bindings were placed. After 48 hours, nasal packing and the neck tape were removed.

RESULTS: Over a fifteen-year period, fifty-three aesthetic rhinoplasties were performed in combination with neck liposuction. Forty-seven women and six men comprised the group. Eight patients (six women, two men) underwent a sliding genioplasty in combination with their rhinoplasty and neck liposuction. Six separate patients during this period refused to undergo the additional neck procedure with their rhinoplasty. Addition of the neck liposuction prolonged the surgical time by less than fifteen minutes. Complications included two women with transient, unilateral neuropraxia (altered smile) that resolved within a few weeks. No hematomas occurred but steroid injections were often utilized post-operatively to facilitate softening of small subcutaneous collections. Minimal bruising of the neck was observed. Facial aesthetics were subjectively improved with the combined procedures. An objective improvement could be observed even in young, thin patients with minimal neck fullness. Improvement of the profile and neck contour, with a more defined jawline, complemented the rhinoplasty result. Older patients realized more dramatic results. Patients with mandibular hypoplasia and no genioplasty realized an obvious improvement in their chin aesthetics. Patients appreciated the positive changes in their neck profile, and no one expressed a regret about undergoing the combined

procedures. Addition of neck liposuction as an adjunctive procedure proved a positive inducement for attracting additional rhinoplasty patients.

DISCUSSION: Results define a plastic surgeon within the community. Aesthetic rhinoplasty remains one of the more challenging procedures a surgeon undertakes, and few cosmetic outcomes are as dramatic in improving facial appearance. The addition of neck liposuction to rhinoplasty adds little time or complications, is easy to perform at the completion of nasal surgery and enhances facial aesthetics. Neck liposuction is an adjunctive procedure that should be considered as a routine addition to aesthetic rhinoplasty.

Evaluating the Impact of Implementing an Advanced Practice Provider Body Contouring Clinic

Abstract Presenter
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PURPOSE: Physician Assistants (PA) and Nurse Practitioners (NP), collectively Advanced Practice Providers (APP), have become an essential part of Plastic Surgery practices who improve access and optimize patient care. The purpose of this study was to evaluate the impact of instituting an APP run body contouring clinic on patient access to care and conversion rate to surgery.

METHODS: A retrospective chart review was conducted on patients who presented to an APP run body contouring clinic from February 2020 through January 2021. Demographic data, reason for visit, visit type, and conversion rates to surgery were collected. Descriptive statistics were used.

RESULTS: A total of 196 patients were evaluated in clinic, including 165 new patient visits. Reasons for visits included consultations for: breast reduction, panniculectomy, brachioplasty, and/or thighplasty consults. Of these patients 110 were appropriate candidates for surgery and subsequently evaluated by a surgeon. At the time of review, 18% (n=20) were pending insurance approval, 57% (n=63) patients were approved, 23% (n=25) received insurance denial of which two percent proceeded to self-pay and go on to have surgery. Fifty-five patients were not optimized for surgery at the time of their 30-minute initial APP consult and were subsequently referred for appropriate medical work-up, smoking cessation, and/or weight loss. This represents roughly 27.5 hours of billable time.

CONCLUSION: This study explored the impact of an APP run body contouring clinic in an academic Plastic and Reconstructive Surgery practice. Academic plastic surgeons are pressured to be clinically productive, prolific in research, and rise in the academic ranks. Independent APP

clinics improve patient access to care, generate revenue, both directly and via downstream revenue, and optimize the opportunities for APPs to grow professionally.

Prenatal Lymphedema: A Genotype-Phenotype Analysis

Abstract Presenter
Michal Ad MD

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Primary lymphedema is a rare condition affecting 1/100,000 persons. It typically involves the lower extremities. Swelling develops most commonly in males during infancy and females during adolescence. The condition currently is associated with mutations in approximately 30 genes. Prenatal diagnosis rarely occurs. Our Lymphedema Program Database was reviewed for patients who were diagnosed with lymphedema prenatally. Maternal and paternal history, genetic testing, physical examination, and prenatal imaging were recorded. Postnatal infant physical examination, genetic testing, and lymphoscintigram results were studied. Four of 360 (1%) patients with primary lymphedema in our database were diagnosed with swelling by prenatal ultrasound and/or MRI. Three patients did not exhibit lymphedema after birth, two of which had a VEGFC mutation. One patient with a 16p12.2 deletion continued to have bilateral leg edema postnatally. Lymphedema identified prenatally is associated with a VEGFC mutation and can resolve after birth.

Blueprints for a Successful Clinical Research Enterprise: A Single Institution's Experience

Abstract Presenter
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INTRODUCTION: Integrated plastic surgery is one of the most competitive specialties in the National Resident Matching Program, and in recent years has placed an increasing emphasis on student research productivity prior to residency application. Integrated plastic surgery applicants consistently rank among the top applicants in terms of research experiences, including publications, presentations, and abstracts. As a result, plastic surgery program directors have come to rely on research as an important differentiating measure for evaluating prospective

trainees. Research acumen is also critical component of professional development and promotion for early career professionals in plastic surgery. Thus, clinical research enterprises organized by young faculty and run by medical student research fellows offer a symbiotic solution to the increasing importance of research productivity to both evaluative processes. However, little has been written by way of guidelines for creating a successful clinical research enterprise (CRE) for those aspiring to establish one at their own institution. The purpose of our study was to present our institution's experience with a successful CRE in craniofacial surgery that is overseen by faculty and managed by an annual research fellow(s). In detailing the history, organization, and operations of our program, we hope it will serve as a model to early career professionals intending to implement plastic surgery clinical research programs at their own institutions.

METHODS: Since 2018, our institution's Craniofacial Clinic has been home to a successful clinical research enterprise under the supervision of a craniofacial plastic surgeon as principal investigator (PI). Both internal and external applicants, including medical students and residents, are eligible to apply for a single-year research fellowship position in our craniofacial clinical research enterprise. Funding is provided through school of medicine research fellowship programs, the department of plastic surgery, external grants, or by some combination thereof. Research practices and protocols have been developed with an emphasis on data integrity and security, project and database management, collaboration, and research best practices.

RESULTS: Our CRE was first established in 2018 and has been host to seven medical student research fellows thus far, comprised of three internal and four external fellows. This structure was enabled through funding from medical school clinical research fellowships, external grants, and departmental funding. As part of this clinical research enterprise, protocols are strictly enforced under the guidance of the Institutional Review Board to maintain data security and comply with HIPAA standards. Project management tools such as Trello and Microsoft Teams are used to monitor, track, and expedite workflow while also ensuring data integrity and proper research best practices. This structure has enabled significant research productivity and facilitated increased collaboration among medical students, residents, fellows, and faculty members.

CONCLUSION: The successful research enterprise, led by an early career faculty member and managed by a medical student research fellow each year, has been consistently productive and beneficial to involved students, residents, clinical fellows, and faculty. This manuscript details the essential characteristics of a successful CRE and offers guidelines for implementing similar programs in plastic surgery departments across the country.

Gender distribution and women leadership in German Plastic and Reconstructive Surgery.

Abstract Presenter
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INTRODUCTION:
Despite existing regulations to support gender equality in Germany, it is unclear how these policies have translated into leadership opportunities for female plastic surgeons. This study investigated the gender distribution of leadership positions in German plastic surgery departments.

METHODS:
This cross-sectional study collected demographic data on the physician workforce in 102 plastic surgery departments in Germany in May 2022. Data were gathered from publicly available resources.

RESULTS:
Of the 812 physicians identified, male residents and specialists slightly outnumbered their female counterparts. However, the proportion of women declined steadily with increasing hierarchical rank, with only 7.55% of department heads being female. Male surgeons held significantly more leadership positions than female surgeons (84.04% vs. 15.96%, $p < 0.0001$), and this gap persisted across all hospital types. After adjusting for academic rank, male physicians were still more likely to hold leadership positions (OR, 2.655, 95%CI: 1.628-4.041).

CONCLUSIONS:
Our findings reveal a significant gender gap in leadership positions in German plastic surgery departments, even after accounting for academic rank. These results highlight the need for continuous monitoring and implementing gender equality policies to address this disparity. Specifically, targeted interventions should be developed to promote the career advancement of female plastic surgeons.

Plastic Surgery Footprints Along Emissions Avenues

Abstract Presenter
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HYPOTHESIS: With the continuous rise of plastic surgical cases, this innovative specialty boasts a strong interrelationship with global health and emissions. Frequent use of operating rooms (ORs) and resources largely contribute to healthcare's waste and emissions; waste quantification can help identify barriers within surgical-centered emissions to aid in the identification of efforts that may reduce it overall.

METHODS: Query of PubMed using terms "plastic surgery AND emissions", "plastic surgery AND economics", and "plastic surgery AND climate" produced minimal articles; this highlights the infancy of this area of study. Applied attention and growth within this area has the potential to positively impact patient care, healthcare economics, and overall climate change.

RESULTS: Literature continues to materialize mitigations to climate change in healthcare, but the unique implications of plastic and reconstructive surgery are minimal. Despite this limitation, conceptualizations can be made based on other surgical specialties that share general overlaps in operation with plastic surgery. Surgery continues to amplify its impact being amongst the most waste-producing enactments. Operating rooms produce 2,000 tons of waste each day and average more than 2 million tons annually; they are also responsible for high energy usage through HVAC systems, lighting, and anesthetic gasses. Greenhouse gas emissions in the United States healthcare system has realized 655 million tons with a drastic 30% increase within the past decade. Surgical emissions have an equal and opposite impact on the specialties themselves. The production of excessive natural disasters from climate change increases the demand for plastic and reconstructive surgeries following trauma. Low economic status and resource limitations increase risk of postoperative complications. Air pollution and contamination of consumptive resources increases risks of cancers that may require surgical intervention. The U.S. healthcare sector itself is responsible for 12% of acid rain, 10% of smog, and 9% of respiratory disease secondary to particulate matter.

CONCLUSION: Worldwide healthcare emissions threaten the well-being of the patients that healthcare workers vow to protect. Plastic and reconstructive surgery provides a unique scope of practice that widens its environmental impact as the field itself grows in both demand and innovations. Simultaneously, impacts on the global climate are a common denominator for all surgical specialties. Education is the strongest pillar of change to reducing the environmental impact by the field of surgery; this could begin as early as the medical student level and continue into each subsequent level of training and practice. Future efforts should be channeled into making the operating theatre a surrogate for environmental advocacy through the development and implementation of reduce and reuse initiatives, as well as full disclosure of economic and emissions expenditure for surgical procedures that can be proactively assessed.

Why are More Plastic Surgeons Not Chairs of the Surgery Department?

Abstract Presenter
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BACKGROUND: Department of surgery (DOS) chairs play a significant role in determining the direction of their program and their field. We sought to determine the characteristics that distinguish DOS versus plastic and reconstructive surgery (PRS) chairs and chiefs.

METHODS: We queried the Scopus Author Identifier and Database for all current 2023 PRS department/division chairs of integrated PRS programs along with their respective DOS chairs. Multivariable logistic regression analysis was used to determine the association of chairs' and chiefs' characteristics with the outcome of being a DOS chair.

RESULTS: PRS chairs (N=80) and DOS chairs (N=80) were evaluated for 80 programs. Compared with PRS chairs, DOS chairs had a statistically significant higher median [IQR] h-index (21 [13, 29] PRS vs. 43 [26, 59] DOS, P<0.001), M-quotient (0.82 [0.54, 1.13] PRS vs. 1.34 [0.94, 1.94] DOS, P<0.001), total publications (72 [33, 148] PRS vs. 169 [95, 242] DOS, P<0.001), and first (11 [5, 19] PRS vs. 23 [13, 38] DOS, P<0.001) and last authorships (26 [11, 56] PRS vs. 39 [22, 71] DOS, P=0.008). DOS chairs also had a longer time since publication of their first senior authored paper (P=0.001) and a higher number of advanced degrees compared to PRS chairs (17 PRS vs. 22 DOS, P>0.05). DOS chairs were mostly surgical oncologists (n=18), followed by general surgeons (n=13) and vascular surgeons (n=11). Three department of surgery chairs practiced PRS. PRS and DOS chairs did not differ statistically by sex or race. When controlling for other demographics and characteristics of academic productivity, a higher h-index was found to be significantly associated with the outcome of being DOS chair (OR 1.07, 95% CI 1.01-1.15, P=0.033).

CONCLUSION: There were three PRS DOS chairs, which is a stark contrast in comparison to other specialties. A higher h-index was associated with the outcome of being DOS chair when controlling for other factors. Residents and fellows from PRS and other surgical specialties should keep academic productivity in mind throughout their training to increase their prospects of becoming chair.

Crowdsourcing for Plagiocephaly Helmets – A National Review

Abstract Presenter
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BACKGROUND: Custom helmet therapy is a common treatment for plagiocephaly and other skull deformities seen in the postnatal period. Unfortunately, these helmets can create a significant financial
burden on families, especially when not covered through insurance. GoFundMe (GFM), the largest online medical fundraising platform, reports raising over $650 million annually across 250,000 campaigns. To date, no studies have evaluated the use and results of US-based GFM campaigns for this therapy.

METHODS: GFM campaign data were collected querying terms "plagiocephaly", "brachycephaly", "flat head syndrome", and "helmet therapy". Campaigns that were duplicates, for animals, not
directly raising funds for helmets, covering post-surgical helmets, and foreign campaigns were excluded. These data, including demographics, story themes, and unique characteristics, were analyzed by two independent reviewers. Logistic regression was used to determine each variable's impact on success, defined as attaining ≥75% of a campaign's goal. Statistical significance was set at $p \leq 0.05$.

RESULTS: Overall, 413 campaigns from 2011 to 2022 were analyzed with an average raised of 71% (range: 0%-206%), donated of $2,005 (range: $0-$7,799) and requested of $3,151 (range: $160-
$30,000). In all, 228 (54%) achieved success, 167 (40%) met their goal, and 35 (8%) raised no funds. The mean reported age was 6 months (range: 2-17m). In total, campaigns raised $828,256 of a requested $1,301,317.

Factors associated with positively influencing success were military affiliation (OR=2.480, p=0.008), providing multiple images (OR= 1.764, p=0.005), including a quoted cost (OR=2.090, p<.001), providing campaign updates (OR=1.070, p=0.042), indicating a sense of urgency (OR=1.540, p=0.036), indicating a torticollis diagnosis (OR=1.560, p=0.043), mentioning possible complications without treatment (OR=1.803, p=0.004), and were created during the months of CARES Act stimulus check distribution and the subsequent two months (OR=2.580,p=0.034).

Factors associated with negatively influencing success were raising additional funds for therapy (OR=0.359, p=0.029), unrelated medical costs (OR=0.339, p=0.009) and for multiple helmets for one patient (OR=0.0233, p=0.029).

Race impacted success with Black (OR=0.306, p=0.012) and Hispanic (OR=0.485, p=0.003) campaigns performing worse compared to White campaigns, while Asian and racially anonymous campaigns had no statistical significance compared to White campaigns. No other racial comparisons yielded significance.

Regionally, 220 (53.3%) resided in the South, 76 (18.4%) in the West, 52 (12.6%) were of

unknown origin or territory-based, and 42 (10.2%) in the Midwest. Campaigns in the Midwest (OR=2.356, p=0.017) and Northeast (OR=5.016, p=0.004) performed better compared to Southern campaigns. Northeastern campaigns also performed better compared to Western campaigns (OR=3.272, p=0.047) and unknown origin or territory-based campaigns (4.071, p=0.023).

There was no significance in success based upon the relationship of the patient to the crowdfunder (i.e., friend, family), the age of the patient, or between male and female patients.

CONCLUSION: As the cost of helmet therapy may not be covered by insurance, many families turn to crowdfunding to alleviate this financial burden. While this study explored many factors associated with success, further studies are necessary to identify other variables that may influence campaign success.

A Comparison of Graduating Plastic Surgery Residents' Case Logs with ACGME Requirements, Content at National Meetings, and In-Service Examination Test Items

Abstract Presenter
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PURPOSE: Plastic surgery residents complete thousands of procedures during their training. Differences between the procedures residents perform during residency, evaluation metrics and the broader practice of plastic surgery have not been formally studied. We aim to examine how the distribution of graduating resident case log procedures compares to ACGME minimum procedure count requirements residents are subject to, content on the annual in-service examinations they sit for, and programming at two major annual meetings.

METHODS: Nine procedural categories were identified based on ACGME and in-service training examination categories. Six categories of reconstructive plastic surgery procedures (head & neck, breast, trunk, hand & upper extremity, lower extremity, and integument) and three categories of aesthetic plastic surgery procedures (head & neck, breast, and trunk & extremity) were defined. Three-year averages for the number of procedures completed in each category by plastic surgery residents graduating in 2019-2021 were calculated from ACGME national case log data. The titles and durations of medical programming sessions scheduled for PSTM 2022 and abstract presentations at the PSRC Annual Meeting 2022 were abstracted from online data. Meeting content percentages were determined by dividing presentation duration by total meeting time. Finally, test items from the 2020-2022 administrations of the ASPS Plastic Surgery In-training Exam (PSITE) available on the ACAPS website were abstracted and similarly assigned

to a single procedure category when possible. Meeting content and test items that were unable to be readily placed into distinct categories were excluded. A percentage difference test was used for comparison.

RESULTS: Overall, ACGME requirements had the lowest percent differences with case logs; reconstructive trunk (59.2% difference) and reconstructive integument procedures (55.4% difference) were overrepresented on case logs relative to ACGME requirements. Meeting content at PSTM 2022 and PSRC 2022 had the highest percent differences. PSTM 2022 skewed significantly towards aesthetic procedures overall, with aesthetic head & neck (69.3% difference) and aesthetic trunk & extremity procedures (100.4% difference) overrepresented and reconstructive breast procedures (116.8% difference) underrepresented relative to case logs. PSRC 2022 skewed significantly towards reconstructive procedures overall, with aesthetic breast (71.1% difference) and aesthetic trunk & extremity procedures (136.2% difference) underrepresented relative to case logs and reconstructive head & neck procedures (65.0% difference) overrepresented relative to case logs. Finally, there was reasonable concordance between case log procedures and in-service examination content; reconstructive breast (64.8% difference) and aesthetic breast procedures (57.2% difference) were underrepresented on the PSITE relative to case logs and aesthetic head & neck procedures (51.5% difference) were overrepresented on the PSITE relative to case logs. CONCLUSION: The criteria and standards by which plastic surgery residents are evaluated and content at national meetings differ from the procedures residents actually complete during their training. We hypothesize that this is partially reflective of the heterogeneity of the specialty as well as possible vendor sponsor bias. Following these comparisons over time will likely prove useful in the continual evaluation of plastic surgery residency training, especially in the preparation of residents for the variety of practice settings and further training they pursue.

One Surgeon's Experience with Delayed-Immediate Placement Of Tissue Expanders In Staged Breast Reconstruction

Abstract Presenter
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PURPOSE: Tissue expanders are commonly used in staged breast reconstruction. They are often placed at the time of mastectomy; complication rates following such immediate breast reconstruction are high and range widely in the literature. We wanted to investigate whether the placement of tissue expanders in a delayed-immediate fashion, at least one-week postmastectomy, can reduce complication rates. We present a case series of patients who underwent delayed-immediate placement of tissue expanders and compare their outcomes to

patients with expander placement at the time of mastectomy.

METHODS: We conducted a retrospective review of patients undergoing staged breast reconstruction between 2017 and 2020 performed by the senior author at a single institution. Six breast oncologic surgeons performed the mastectomies. Perioperative complications were compared between those who underwent immediate placement of tissue expanders at the time of mastectomy versus those who had them placed at least a week later.

RESULTS: Between 2017 and 2020, 74 patients underwent 120 mastectomies followed by two-staged breast reconstruction, either with implant or autologous tissue as the final reconstruction. The mean age was 48 years (range 24-76). Fifty-three patients (72%) had immediate placement of tissue expanders, and twenty-one (28%) had delayed-immediate placement, usually about one week postmastectomy. About half of all patients (47%) experienced a complication during their reconstructive course, most commonly infection (32%). Among the 120 tissue expander placements, 38% had a complication. There was at least one complication in 47% of the expanders in the immediate group and 18% in the delayed-immediate group. In multivariable logistic regression analyses, delayed-immediate reconstruction was associated with 82% reduced odds of a complication ($p = 0.04$) and 78% reduced odds of an infection ($p = 0.02$). Furthermore, post hoc analyses suggested that delayed-immediate tissue expander placement was associated with lower healthcare costs.

CONCLUSION: If plastic surgeons have identified high complication rates among their patients undergoing staged breast reconstruction using tissue expanders, delayed-immediate placement is a potential strategy to reduce complications. As we continue to offer it as an option for our patients, we are prospectively examining whether it improves the patient experience and decreases overall healthcare costs.

Ascending the Ladder to Leadership: An Assessment of the Gender Gap Amongst Plastic Surgery and Department of Surgery Chairs and Chiefs

Abstract Presenter
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BACKGROUND: Gender disparities exist in surgery amongst current leadership and the lack of females in high-ranking positions play a significant role in the diversity of institutions and the field at large. Reasons for not reaching gender parity are multifactorial, with current literature attributing lack of exposure to mentorship, disproportionate opportunities, and the surgical

culture as some of the reasons females have not ascended to leadership positions at the same rate as their male counterparts.1 This study explores the scholarly metrics and characteristics that may distinguish females and males who serve as surgery department and plastic surgery department or division leadership.

METHODS: We queried the Scopus Author Identifier and Database for current 2023 PRS department/division chairs of integrated plastic and reconstructive surgery (PRS) programs along with their respective department of surgery (DOS) chairs. Statistical analyses were performed with R (version 4.1.0) and RStudio (version 1.4.1717) software. Descriptive analysis was performed to determine any differences in characteristics of DOS and plastic surgery leadership.

RESULTS: PRS chairs (N=80) and DOS chairs (N=80) were evaluated for 80 programs. In total, 12/80 (15%) of PRS chairs and 12/80 (15%) of DOS chairs were female. Compared with female PRS chairs, male PRS chairs had a longer time since publication of their first senior authored paper (15.1 [7.7, 20.5] female PRS vs. 21.4 [14.3, 26.8] male PRS, $p<0.001$). However, there were no significant differences between male and female PRS chairs in terms of h-index, M-quotient, total publications, last author publications, or years since first manuscript. Compared with female PRS chairs, female DOS chairs had a statistically significant higher median h-index (16.5 [12, 28] female PRS vs. 42 [29, 50] female DOS, $p=0.009$), M-quotient (0.82 [0.71, 1.06] female PRS vs. 1.41 [1.18, 1.65] female DOS, $p=0.033$), total publications (72 [28, 100] female PRS vs. 171 [108, 217] female DOS, $p=0.017$), and first (6 [1, 18] female PRS vs. 21 [13, 27] female DOS, $p=0.03$) and last authorships (22 [7, 35] female PRS vs. 58 [40, 78] female DOS, $p=0.026$).

CONCLUSION: Females constitute just 15% of PRS chairs and chiefs. However, when compared with their male counterparts, our data did not reveal significant differences other than duration in the field. Gender based leadership and promotion disparities exist on all levels of academic plastic surgery. To address the gender gap, interventions targeted at recruitment, retention, and advancement of female plastic surgeons must be implemented.

REFERENCES:

1. Keane AM, Larson EL, Santosa KB, et al. Women in Leadership and Their Influence on the Gender Diversity of Academic Plastic Surgery Programs. Plast Reconstr Surg. 2021;147(3):516-526. doi:10.1097/PRS.0000000000007681

The New Era of Marketing in Plastic Surgery: A Systematic Review and Meta-analysis of social media and Digital Marketing

Abstract Presenter
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PURPOSE: Many benefits from the use of social media, including healthcare businesses, specifically surgery where a service based practice model can exist. More specifically, social media has been demonstrated to serve as a critical tool for plastic surgeons, facilitating patient engagement, peer-to-peer education and learning, and outreach to the broader public community. This study aims to perform a meta-analysis of data to determine the most valuable and useful social media platforms for practicing plastic surgeons developing their practice by assessing the perceived value to the practice and quantifying return on investment.

METHODS/MATERIALS: A systematic review was performed using PubMed. The initial search yielded 3,592 articles. 16 articles met inclusion and exclusion criteria.

RESULTS: The general theme for content recommendations found in this study include focusing on aesthetic attributes, displaying professionalism, and making sure the surgeon was the person delivering the content. One study found that patients are more likely to engage with aesthetic content rather than scientific content. Preferred platform for social media marketing varied, and may be dependent on age. Younger generations are more likely to utilize Instagram, Snapchat, and TikTok, while older generations may be more likely to utilize Facebook and YouTube. Age specific recommendations include utilizing Instagram, Snapchat, and TikTok with emphasis on breast augmentation for patients aged 17-35 given this is the most common procedure performed for this age group. Patients between the ages of 36-70 are most likely to be engaged on facebook, instagram, and Facebook with liposuction being the most common procedure in this age group. For ages 70+, patients are most likely to utilize facebook with the most common procedure performed as blepharoplasty.

CONCLUSION: Effective social media marketing for the plastic surgeon considers delivering the right content and choosing the right platform. The right content and platform is critically dependent on the specific age of the audience.

Artificial Intelligence as a Triage Tool During the Perioperative Period: Pilot Study of Accuracy and Accessibility for Clinical Application

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BACKGROUND: Artificial intelligence (AI) has been rapidly evolving and is awaiting integration into healthcare. With ChatGPT continuing to captivate public attention, greater consideration of its potential impact on plastic surgery is warranted. As a natural language processing software, ChatGPT is inherently dialogistic. Given this property, our aim was to determine if this AI function can be used as a patient directed self-service tool whereby patients can have their clinical questions directly answered by AI. The goal of this research is to determine the functionality of incorporating AI as a clinical tool to help manage patient questions and clinical concerns in the perioperative period. While such tools introduce complex medico-legal questions, which are beyond the scope of this initial pilot study, our objective was to assess the content, accuracy, and accessibility of AI generated content regarding common perioperative questions and complications for reduction mammaplasty.

METHODS: AI interface ChatGPT (OpenAI, February Version, San Francisco, CA) which is publicly accessible was utilized to query 20 common patient questions or complications that arise in the perioperative period of a reduction mammaplasty. Searches were performed in duplicate, where a query was performed for a general term ("breast reduction bleeding") and repeated with a specific clinical question ("I had a breast reduction yesterday and now I have bleeding. What should I do?"). Query outputs were analyzed both objectively for metrics including output length, sentence structure, and readability scores and subjectively for tone, content, and accuracy. Microsoft Excel (Version 7, Seattle, WA) was used for performing descriptive statistics, t-tests, and chi-square tests where appropriate with a predetermined level of significance of $p<0.05$.

RESULTS: A total of 40 AI generated outputs were analyzed. Mean word length was 191.8 words with 998.9 characters. Mean Fresh-Kincaid Grade Level was the 13th Grade and Mean Flesh Reading Ease was 39.7 (1-100 where 100 is most readable). Regarding content, out of all query outputs 97.5% were on the appropriate topic. Medical advice was deemed to be reasonable in 100% of cases. General queries more frequently (16/20) reported overarching background information whereas specific queries more frequently reported prescriptive information (18/20) ($p<0.0001$). Specific queries recommended discussion with the surgeon in 100% of cases, while general queries recommended the same in 95% of cases. AI outputs specifically recommended following surgeon provided postoperative instructions in 86.8% of instances. Notable interesting responses included instances of a congratulations and an apology.

CONCLUSIONS: Currently available AI tools, in their nascent form, are capable of providing recommendations for common perioperative questions and concerns for reduction mammaplasty. While the reading level of these outputs are higher than ideal, this represents a first step in developing a plastic surgery specific AI application that can serve as the first resource for patients undergoing surgery. Limitations include a potential delay in patients seeking urgently needed medical care. With further calibration, AI interfaces may serve as a tool for fielding patient queries in the future, however patients must always retain the ability to bypass technology and be able to contact their surgeon.

Physician innovation in topical wound device development: Is it stifled by costly approval pathways?

Abstract Presenter
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INTRODUCTION: Pre-market notification, also known as 510K, is a cost-effective pathway for FDA medical device approval that bolsters physician innovation in small-to-medium enterprises. Pre-market authorization (PMA) requires pre-approval clinical trials that are cost prohibitive for physician-led enterprises. This investigation aims to examine trends of 510K and PMA device approvals in the field of topical advanced wound care associated with increased regulatory burden.

METHODS: FDA device databases were searched for approvals in wound care. Devices with 510K eligibility or PMA requirements were included if they were dressings with integrated antimicrobials, collagen, or biologics, or constituted a dermal substitute or topical integrative scaffold. Data collection included device classification, date of approval, applicant entity, and applicant annual revenue. Chi-squared analysis, regression models, and t-tests were used in statistical analysis.

RESULTS: 341 PMA approvals and 1093 pre-market notification 510K approvals were identified from 1990-2022, for 1434 approvals in topical advanced wound care. Obtaining pre-market approval was more likely for entities with over 500 employees ($p < 0.0001$) and annual revenues of $100 to 500 million ($p < 0.0001$). Only five unique companies acquired all 341 PMA approvals over the studied three decades. There was a linear decrease in 510K approvals over time ($p <0.0001$), while PMA approvals were not impacted. There was an overall decline in small device enterprises obtaining device approval through the 510K pathway ($p=0.0017$).

CONCLUSIONS: Decline of 510K approvals over time demonstrates opportunity loss for device enterprises rooted in physician innovation. Small enterprises are primarily physician-led and historically most impacted by regulatory burden. Cost-prohibitive approval pathways likely stifle physician innovation in device development and may prevent potentially market-disrupting products designed by physicians from improving patient quality-of-life.

Crowdsourcing Your Gender Journey: Analyzing Trends and Predictors of Success for Gender-Affirming Surgery GoFundMe Campaigns in the United States

Abstract Presenter
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INTRODUCTION: Gender-affirming surgery (GAS) is a life-affirming treatment for gender dysphoria. Patients undergoing GAS may turn to crowdfunding to offset the cost of care. Previous studies(1) have examined how word count, social media shares, goal amounts, and number of donors predict crowdfunding success. Other studies (2,3) have focused on top surgery campaigns alone. Currently, no studies investigate how social determinants of health, including insurance, employment, or hidden costs of care, impact campaign success. This study identifies specific crowdfunding trends among patients seeking GAS in the United States (US), as well as potential barriers to care and predictive factors of successful campaigns.

METHODS: GoFundMe (GFM) searches for GAS-specific campaigns from 2018-2022 were conducted. For inclusion, campaigns raised funds for patients in the US seeking GAS with or without associated costs. Five independent reviewers screened campaigns and extracted the data. Using SPSS, a chi-square analysis determined likelihood ratios of success for demographics, cover image themes, and narrative elements.

RESULTS: Out of 1174 total results, 917 eligible campaigns raised $2,083,539 ($0-$75,353) from 39,176 donors out of $13,994,022 ($1-$160,400) requested. On average, successful campaigns (≥75% of goal) raised $8889 and requested $8971, while unsuccessful campaigns (≤25%) raised $643.29 ($p<0.001$) and requested $11,906 ($p<0.001$). The most represented states were California (n=113), New York (n=85), and Texas (n=63). Patients were typically transfeminine (n=362), white (n=515) and self-employed or independent contractors (n=125). The vast majority raised funds on their own behalf (n=830). Top surgery (n=458) was the most common procedure. Time off work (n=210) was the most commonly cited ancillary cost. Gender identity, race, medical comorbidities, non-dysphoria psychiatric diagnoses, sexual orientation, or cover image did not influence success ($p=0.076$-0.721). Full or partial insurance coverage was the strongest predictor of success ($p<0.001$), while facial feminization ($p=0.002$) and body contouring ($p=0.004$) predicted unsuccessful campaigns.

DISCUSSION: As GAS becomes an increasingly accepted treatment for gender dysphoria by society and medical professionals, hidden and conspicuous financial barriers still exist for patients. Those with adequate insurance coverage requested lower amounts allocated primarily toward associated costs including time off work ($p<0.001$), whereas patients undergoing procedures deemed "cosmetic" by insurance, such as body contouring, requested higher amounts ($p<0.05$) and were less successful. Freelance work serving young LGBTQ+ populations may also increase the likelihood of success. Additional obstacles cited in patient stories include state

Medicaid limitations, surgeons not accepting insurance, and the need to travel for their procedures. Surgeons should strive to identify, and help their patients overcome, these obstacles on their gender journeys. Additional crowdfunding campaign analyses can improve access to this life-saving care.

REFERENCES:

1. Akiki RK, Borrelli MR, Kwan D. Online Crowdfunding Enables Patients' Access to Gender-Affirming Surgery. Transgend Health. 2021 Oct 4;6(5):240-243. doi: 10.1089/trgh.2020.0128. PMID: 34993296; PMCID: PMC8664102.
2. Barcelos CA, Budge SL. Inequalities in Crowdfunding for Transgender Health Care. Transgend Health. 2019 Mar 6;4(1):81-88. doi: 10.1089/trgh.2018.0044. PMID: 31032423; PMCID: PMC6484344.
3. Faletsky A, Han JJ, Lee KJ, et. al. Crowdfunding for Gender-Affirming Mastectomy: Balancing Fundraising with Loss of Privacy. Ann Plast Surg. 2022 Apr 1;88(4):372-374. doi: 10.1097/SAP.0000000000002953. PMID: 34270468.

Determining the Age that Parents Can Act as a Parent-Proxy Report for Children Under 8 Years of Age with Cleft Lip and Palate

Abstract Presenter
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PURPOSE: The CLEFT-Q is a patient-reported outcome measure which assesses outcomes of children and young adults with cleft lip and/or palate (CL/P) aged 8-29 years. There is a gap in measurement of younger children's perspectives as they may be unable to complete the scales themselves, but many interventions occur before age 8. The objective of this study was to determine the age that parents can act as a proxy report for children under 8 years of age with CL/P in order to develop a parent-proxy version of the CLEFT-Q.

METHODS AND MATERIALS: Parents of children with CL/P under 8 years of age were recruited from the Plastic Surgery Clinic to participate in cognitive debriefing interviews to determine if the items in the scales were comprehensible, relevant, age-appropriate, and adaptable to parent-proxy. Interviews continued until saturation was achieved. Scales were adapted based on interview results.

RESULTS: 11 interviews were completed. Parents' ability to report on behalf of their children as a parent-proxy depended on the concept being tested. Parents expressed ability to act as a

proxy starting at age 3 for the Speech scales, when their child began school/daycare for the school scales, and when their child began feeding for the Eating/Drinking scale. Parents' ability to proxy report for the Appearance, Psychosocial, and Social Function scales varied depending on their child's awareness of their appearance and their self-awareness, in some cases as young as age 3. Adapted scales will be field tested based on the earliest age that parents were able to act as a parent-proxy.

Conclusions: The Parent-Proxy CLEFT-Q will allow for better understanding of the perspectives of younger children with CL/P. We have defined age parameters for parent-proxy report. Field-testing the revised scales will further confirm when parents can provide valid proxy report in order to finalize the Parent-Proxy CLEFT-Q scales for clinical use.

Yoga and Meditation in Surgery: A Survey-Based Analysis of Wellness Integration for Surgeons with Implications in Improved Physical and Mental Wellbeing as well as Improved Work Efficiency and Decreased Stress Levels

Abstract Presenter
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BACKGROUND: Surgeons have stressful lifestyles. Yoga and meditation have a 3,000+ year-old history in Eastern Medicine, however only in the last 40 years have Westerners begun to utilize these practices. A reliable method for maintaining physical and mental wellbeing of surgeons has yet to be investigated. Here we aim to analyze which aspects of surgery contribute to poor physical wellbeing and if/how much yoga or meditation is required to see improvements in overall health of surgeons.

METHODS: Willing surgeons at a single-center institution were randomly assigned groups. IRB approval was granted. Treatment group performed yoga or meditation for a minimum of 5 minutes every 2 weeks over a 6-month period; the control group was asked not to perform either. A pre- and post-study survey was sent using RedCaps software to both groups. Data collected and analyzed included demographic information, specialty, surgical instruments, positioning of surgeon, location/severity/duration of pain, mood, sleep, flexibility, balance, posture, and work efficiency. Each individual's post-study responses were analyzed against their pre-responses and treatment group was compared against control group for statistical analysis. Authors were blinded to the participants in each group for the duration of the study.

RESULTS: Surgeon participants included multiple subspecialties. 52 surgeons responded to the pre-survey and 30 of these responded to the post-survey. Of those who responded to both, 15 were in the treatment group and the other 15 were in the control group. Participants included PGY2-PGY9 residents/fellows as well as attendings in practice ranging from 0-20+ years. 63.5%

of those reported acute pains and 30.7% reported chronic pains of various degrees and locations. All in the treatment group reported improved posture, flexibility, sleep, stress, anxiety, feelings of overworked, work performance, and mood compared to their pre-study survey. Those who performed yoga/meditation more often were shown to have greater improvements in pain scores than those who performed inconsistently. The treatment group reported higher average scores than control group for posture in the OR, general posture, flexibility, coordination, balance, and work performance. Sleep quality and stress in the OR were rated as nearly equivalent between groups; those in the treatment group reported decreased rates of stress at home. The treatment group reported average scores at less than half of that reported by control for feelings of overworked, sadness, apathy, fatigue, and anxiety and these were significant.

CONCLUSION: Surgeons dedicate substantial time and energy, often at the cost of physical/mental health. Yoga and meditation have long been utilized to combat these in the general population. This knowledge was extrapolated to a group of surgeons and though our data is limited by power we were able to show significant improvements in work efficiency, mood, stress/anxiety/depression levels, and pain scores both longitudinally amongst individuals as well as in comparison of those individuals against surgeons who did not perform yoga/meditation. Future directions include actigraphy and biofeedback devices to measure degrees of change in posture and flexibility as well as obtain objective data in regards to sleep and vital sign derangements.

Off-Service Residents Demonstrate Significant Learning on Plastic Surgery Rotations

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INTRODUCTION: Exposure to different specialties during residency is highly variable with ongoing discussions regarding the educational benefits for residents on any given rotation. We believe that a crucial aspect of residency is developing awareness of how different specialties complement each other in patient care. It has been shown that the use of experiential learning, feedback, effective relationships with peers, and diverse educational methods are the most important factors in quality medical education.1 Simply reading about a disease process does not provide the same lasting educational benefit as clinical exposure and practical experience for both cognitive and technical skills. This increased plastic surgery exposure allows for the enhancement of core plastic surgery techniques while performing essential surgical services which will lead to more efficient and effective approaches to surgical problems. Our plastic surgery service welcomes rotating PGY1 general surgery, orthopedics, neurosurgery, emergency medicine, and podiatry residents. It is important that the goals and objectives be delineated and achieved for off-service residents in order to provide a valuable and relevant educational

experience. To assess the quality of education provided to non-plastic surgery residents on our service, we developed and administered a questionnaire to provide a quantifiable metric of learning.

METHODS: We administered a quiz to PGY-1 residents before and after their plastic surgery rotation. The quiz was developed and validated in collaboration with medical educators and attending plastic surgeons with questions based on prescribed rotation objectives. A total of 20 questions were used. 16 questions included de-identified wound and radiographic images. 10 questions were randomly assigned to residents prior to joining our service and after the rotation. Results were tabulated as percentage correct. Exclusion criteria for questions were: lack of agreement on the best response among attending plastic surgeons, pre-test correct response > 50%, and post-test correct response < 50%. Annual audit of the questions ensured exclusion criteria were not being met.

RESULTS: A total of 378 tests were given with 117 paired pre- and post-rotation tests completed (30.95%). The average percentage of correct answers for the pre-test was 29.45% and for the post-test was 87.7%, showing an improvement of 58% ($p < 0.001$). There were no differences in test performance between the different rotating specialties.

CONCLUSION: While rotating on our service, residents increase their knowledge base in concordance with the provided curriculum highlighting the importance of a well-rounded residency education. As much of this knowledge is unique to our specialty, it is reassuring to see that without our rotation those skills may not be imparted in the first year of residency. This work is important with respect to advocating for non-plastic surgeons to be exposed to our specialty. Exposure to plastic surgery serves to build interest in the specialty, reinforce our principles of tissue management.

REFERENCE:

1. Reed S, Shell R, Kassis K, et al. Applying adult learning practices in medical education. Curr Probl Pediatr Adolesc Health Care. 2014;44(6):170-181. doi:10.1016/j.cppeds.2014.01.008

Patient Comfort with Before and After Photos at Plastic Surgery Offices

Abstract Presenter
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BACKGROUND: Patients who pursue plastic surgery often undergo before and after photography. Given possible insecurities and the common need for photography to occur while the patient is unclothed, this experience can be uncomfortable for some people. The purpose of this study was to assess patient comfort levels with before and after photography given certain parameters like who is taking the photo and with what type of camera.

METHODS: Amazon's Mechanical Turk (mTurk) crowdsourcing service and REDCap's survey manager were used to recruit survey participants. An anonymous survey was distributed to ascertain demographic information, previous encounters with plastic surgery, and levels of comfort in various before and after hypothetical scenarios using a 5-point Likert scale. A verification question was included to ensure participants were paying adequate attention to each survey question.

RESULTS: There were 411 respondents with an average age of 36.1 years old. Of them, 46% were female and the majority were white (90%) and non-Hispanic (64%). Nearly one third (31%) had previously undergone plastic surgery, with 80% receiving before and after photography. Surgeons took these photos 51% of the time with similar rates of smartphone cameras use (47%) versus digital/professional cameras (52%). Overall, the public had similar levels of comfort when a nurse or a surgeon took their before and after photos ($p = 0.08$). However, patients were significantly less comfortable when non-medically trained office staff took their photos ($p=0.0041$). The public had similar comfort levels with the use of smartphones and digital/professional cameras when dressed but were significantly less comfortable with the use of a smartphone if they were undressed ($p=<0.001$). People were not less comfortable receiving photography while unclothed if a professional-grade camera was used ($p=0.1$). Various assurances regarding security of patient photos on smartphones did not result in improved patient comfort ($p = 0.1262$).

CONCLUSION: To ensure the best patient experience, before and after photography should be taken by a medical professional. If photos are to be taken with the patients unclothed, the use of a professional-grade camera may help ease patient discomfort.

The Plastic Surgery Conference Season Crunch is Real: plastic surgery conferences and abstract deadlines are distributed in dense clusters

Abstract Presenter
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BACKGROUND: In plastic surgery training, conference attendance and research abstract submission are often encouraged. However, research productivity occurs at its own pace, while abstract submission deadlines are firm. Residents who miss one deadline might need to wait several months for another suitable conference submission. In addition, residents who present abstracts at multiple conferences may find that some conferences overlap, or that multiple back-to-back conferences pull residents from clinical duty for prolonged periods. Residents anecdotally report conference and abstract "seasons", but no literature examines plastic surgery conferences and abstract deadlines for clusters or other trends. We therefore sought to comprehensively describe the annual timeline of conference abstract submission deadlines and conferences themselves.

METHODS: A list was generated of all international, national, regional, and state-level plastic surgery conferences and related subspecialty conferences, using the ASPS website and historical conference submissions from the authors' institutions. Conference websites were accessed to obtain abstract submission deadlines and conference dates. If information was not available from organization websites or social media pages, Wayback Machine was used to access prior iterations of webpages to find absent data. Submission deadlines and conference dates were examined for trends.

RESULTS: There were 18 international, 16 national, 7 regional, and 17 state-level conferences identified; data was not available for 3 international and 14 state-level conferences. While international abstract submission deadlines were evenly spaced throughout the year, North American abstract submission deadlines were very clearly bimodally distributed into a dense "late-winter season" (11 deadlines, Feb 1 – Mar 15) and a spread-out "fall season" (15 deadlines, Sept 12 – Nov 30). The remainder of the year was sparse, with a cluster of 2 deadlines on Apr 24-26, and a cluster of 3 deadlines on May 1-Jul 15.

Actual conference dates were clustered differently. International conferences were densely clustered to early fall (6 conferences, Aug 24 – Sept 22). When North American conferences were separated by national, regional, and state-level conferences, no trends emerged. However, in aggregate, a busy spring season emerged (19 conferences, Apr 13 – Jun 18), with another cluster in late winter (7 conferences, Feb 18 – Mar 13). The remainder of North American conferences were evenly distributed.

CONCLUSIONS: For North American plastic surgery and subspecialty conferences, abstract submission deadlines do, in fact, occur in two distinct seasons – a busy spring season with 11 deadlines over 1.5 months, and a larger fall season with 15 deadlines over 2.5 months. Conferences themselves also occur in clusters, with 19 plastic surgery and subspecialty conferences occurring in a 2-month period in late spring. Researchers who intend to submit research work to these conferences should keep this time distribution of deadlines and conferences in mind during planning, and conference organizers should consider coordinating abstract submission deadlines to be more evenly distributed, rather than clustered.

Failure to Disclose: Plastic surgery programs fail to match other specialties' willingness to disclose exam scores, pass rates, and operative log averages

Abstract Presenter
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BACKGROUND: Applicants to plastic surgery residency programs consistently rate didactic education, board exam pass rates, and operative experience as key factors in rank lists. However, plastic surgery program websites rarely disclose this information. Additionally, the American Board of Plastic Surgery (ABPS) only discloses yearly pass rates, not a breakdown by program, and Plastic Surgery In-Service Training Exam (PSITE) score data is not available to applicants.

Meanwhile, many training programs in general surgery, internal medicine, and other specialties publicly disclose exam pass rates, mean in-service exam scores, and average graduating operative volume directly on program websites. Similarly, the American Board of Internal Medicine, American Board of Surgery, American Board of Family Medicine, and American Board of Pediatrics all have publicly accessible full breakdowns of pass rates and scores on a program-by-program basis. This study sought to determine if plastic surgery residency programs were also forthcoming with this information.

METHODS: A review was conducted of program websites for every integrated plastic surgery residency program in the US, and their corresponding general surgery residency programs. Websites were accessed in February 2023 and searched for PSITE and ABPS exam score data, including annual mean score and pass rates, as well as operative log data. Operative log data was classified as "Total" (number of cases on graduation) or "Detailed" (total cases per procedure type).

RESULTS: Of the 88 integrated plastic surgery programs in the US, 2 did not have program websites, and 1 had not yet opened. Only 5/85 plastic surgery programs (6%) disclosed board exam pass rates; each had a 100% pass rate, but did not disclose if these were "first-attempt" scores. There were also 5/85 (6%) of general surgery programs that disclosed board exam pass rates, each of which was 100%. However, 3 of these 5 programs explicitly stated that their 100% pass rate was specifically for "first-attempt" exams.

For operative logs, total cases were disclosed by 1 plastic surgery program and 15 general surgery programs (18%), and detailed cases were disclosed by 4 plastic surgery (5%) and 14 general surgery programs (16%). General surgery programs were significantly more likely to disclose total operative cases ($p = 0.0002$) and detailed case logs ($p = 0.013$).

CONCLUSIONS: Plastic surgery residency programs lag behind comparable general surgery and non-surgical residency programs with regard to exam and operative log disclosure. Plastic surgery programs rarely disclose resident performance on the PSITE or ABPS exams on their websites, and program-specific pass rates or mean scores are not available from plastic surgery organizations. Programs should consider disclosing this information on public-facing websites and/or during interviews, as this may aid applicants in making informed decisions and may provide programs with data to support when presenting proposed program changes to leadership. Plastic surgery organizations should also consider making this information readily accessible to applicants.

Can You Hear Me Now? Quantifying Noise Pollution in the Operating Room

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INTRODUCTION: Noise is widely established as a stressor and as such, should be limited in the OR whenever possible. Problems with noise in the OR have occasionally been described in the literature; however, studies quantifying the degree of noise pollution are limited in the number and type of cases they examine, as well as in the location of their recording devices. The purpose of our study was to quantify the level of noise around the OR in a variety of Plastic Surgery cases. A secondary aim was to determine factors associated with significant noise pollution and to measure the amount of time OR personnel are exposed to damaging noise levels.

METHODS: Noise was recorded at three locations in the OR: by anesthesia, by the circulating nursing station, and by the surgeon. PCE 322-A sound level meters (PCE Instruments, Germany) were used to record decibel levels each second. Variables collected included surgical procedure, number of people scrubbed in, presence of music, and instruments used. Maximum, minimum, and mean decibel levels, as well as time above specific thresholds (60dB, 70dB, 80dB), were recorded. Statistical analyses were performed using SPSS statistical software (version 27, SPSS Inc. Chicago, IL).

RESULTS: Data was collected for 25 operations conducted across two distinct Plastic Surgery services: Breast and Craniofacial. Average noise level across ORs was 63.34 dB (SD, 3.61). Noise levels were similar between locations, and averaged 62.23 dB (SD, 3.74) at anesthesia, 63.78 dB (SD, 3.46) by the circulating nurse, and 63.99 dB (SD, 3.62) at the surgeon's location

(p =0.379). There was significantly more noise recorded in craniofacial cases than in breast cases (p =0.036). Breast cases averaged noise levels of 62.56 dB (SD, 3.56), while craniofacial cases averaged noise levels of 65.07 dB (SD, 3.20). During breast cases, 64.4% of the time, noise levels exceeded 60dB (average of 7492 sec; SD 5111 sec). 7.8% of the time (average 920 sec; SD, 1256s), noise levels exceeded 70dB, and noise exposure exceeded 80dB for an average of 21 seconds per case. During craniofacial cases, 88.7% of case duration had a volume over 60dB (average of 15011 sec; SD, 9568 sec), and 11% of the duration of these cases had recorded decibel levels over 70 (2099 sec; SD, 3210s). There was no significant difference in the proportion of the case with noise levels over 60 dBs (p = 0.217) between craniofacial and breast cases; however, more time was spent over 70 dBs in craniofacial cases (p = 0.021), and more time was spent over 80 dBs in breast cases (p = 0.005).

CONCLUSION: Average noise levels across 25 surgical cases exceed recommended exposure levels outlined by the WHO. Craniofacial cases were significantly louder, likely due to use of more noise-making equipment such as drills. Due to the importance of minimizing stressors in the operating room, it is critical to be aware of this issue and to work towards improving OR conditions.

Media Portrayal of Plastic Surgery is a Driver of Interest in Students Without Home Plastic Surgery Programs

Abstract Presenter
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BACKGROUND: Integrated Plastic Surgery is a highly competitive residency. There are currently 88 Integrated Plastic Surgery residencies-83 of which are affiliated with medical schools. Out of the 155 allopathic medical schools in the U.S., 74 do not have an affiliated integrated plastic surgery residency. Literature has analyzed how medical students with no home program fare during residency match for a spot in integrated plastic surgery programs, yet little research is dedicated to discovering what these students know about plastic surgery, given lack of exposure to the field during their medical education as well as minimal mentorship opportunities. This study aims to identify the means of education about plastic surgery among these students in hopes of determining resource gaps through which we can familiarize more students with plastic surgery and increase recruitment from a more diverse pool of students.

DESIGN: An anonymous survey was distributed to medical students at a single-institution without a home integrated plastic surgery residency. The survey was designed to elicit students' subjective experiences with, and attitudes about, plastic surgery, and knowledge of available resources, and collected demographic information. The survey allowed for free text suggestions and comments.

RESULTS: The study is ongoing. Preliminary data from 21 respondents indicate trends and patterns. Sixty-nine percent of respondents were unaware of the lack of integrated plastic surgery program when choosing to attend this particular institution. The most common initial exposures to plastic surgery were interacting with media about plastic surgery (27%) or self-research (27%). Respondents who selected "media" as their first exposure to plastics cited television shows or online videos about plastic surgery, social media pages of popular plastic surgeons, the news, or celebrities who post on social media about their experiences with plastic surgery as their sources. One hundred percent of the respondents reported not being a part of plastic surgery-related national or regional group like ACAPS, ASPS, etc.-with 64% unaware of these programs existence and 14% citing inadequate membership resources as reasons for not partaking in these groups. Ninety percent of respondents voiced a limited or absent understanding about plastic surgery subspecialties. Eighty-two percent expressed that they felt they didn't know enough about Plastic Surgery to consider applying for a residency position. Fifty-six percent of respondents communicated desire to learn more about the daily responsibilities of plastic surgeons, to gain a deeper understanding of the different plastics subspecialties, and to get in contact with a plastic surgeon to learn more about their field.

CONCLUSIONS: There is a need for increased familiarity with plastic surgery among students with no home program. These students are already disadvantaged by lack of face-to-face interaction with an integrated plastic surgery residency and residents, and they are further in an unfavorable position due to minimal resources, sparse mentorship opportunities, and incomplete understanding of the plastics field. Students may not feel empowered to consider plastic surgery as a residency option given its competitive nature without exposure to plastics through early medical school curriculum, which could hinder the potential diversity of the field of plastic surgery.

Rebounding from Rejection: Journal Submission Algorithms for Plastic Surgery and Curated Lists of Relevant Journals

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BACKGROUND: Junior trainee participation in plastic surgery research is increasing. However, junior researchers may not have prior experience or sufficient involvement in the manuscript submission process, and may not be familiar with journals and their respective scope.

This may make journal selection difficult. In addition, manuscript rejections cost authors additional effort and prolong time to publication. Selecting a subsequent journal for submission may be challenging for junior researchers, who are already unfamiliar with the plastic surgery journal landscape. No curated list of plastic surgery journals exist, nor is there any resource to guide new researchers through selecting journals for submission or after rejection. This study aims to curate a list of journals relevant to plastic surgery, and to offer guidelines for submission pathways.

METHODS: The master journal lists for PubMed and Web of Science were used to identify plastic surgery journals and journals in subspecialties proximate to plastic surgery. Journals were classified as "plastic surgery journals" if they were associated with a plastic surgery organization or if their primary audience were plastic surgeons. Journals associated with other specialty organizations, or with a mixed audience, were grouped separately. Additional surgical journals accepting case reports were identified, as were medical education journals. Journals were excluded if they were both unaffiliated with a medical or educational organization, and if they had article-processing charges (APCs). Open-access journals were excluded if they were not listed on the Directory of Open Access Journals. Additional journal information, such as impact factors and specific article-processing charges (APCs), and manuscript formatting and submission data were gathered.

Plastic surgery faculty, trainees, and research fellows from American training programs were asked their processes for targeting journals for submission and were also asked how they identified subsequent journals if an article were rejected. The authors of the present study also reviewed historic practices during their own submissions. Algorithms were developed using this information.

RESULTS: There were 94 journals identified, including 24 plastic surgery journals, 52 subspecialty journals, 13 medical education journals, and 5 case-report journals. Within plastic surgery journals, 66% (16/24) accepted case reports and 42% (10/24) were fully open access. There were 8 journals with APCs, all of which were fully open-access; there were 2 fully open-access journals with no APCs, and 2 journals with submission fees but no APCs.

Faculty and trainees identified four clear categories of manuscript which were amenable to algorithm development: "high-impact studies", "general studies", "subspecialty studies", and case reports. These categories did not necessarily match Levels of Evidence. Factors were identified which would lead to slight changes in target journals. Algorithms are proposed as follows.

CONCLUSIONS: Identifying a target journal for a manuscript, and subsequent journals in case of rejection, can be intimidating for a new researcher. We therefore present a curated list of journals in plastic surgery and other relevant fields, and a general algorithm for determining journals for submission.

Breaking the Mold: Composite Diversity Indices as a Novel Tool for Measuring Diversity in Plastic Surgery Residency Programs

PURPOSE: Diversifying plastic surgery remains a goal of the American Society of Plastic Surgeons (ASPS), per the Diversity & Inclusion Committee. However, the multidimensional nature of diversity remains difficult to measure. The most common method of quantifying the magnitude of various population demographics has significant limitations, yet it persists due to a lack of viable alternatives. Limitations of this approach include that traditional measures may not be monotonically related to diversity and that different attributes (e.g., race, gender) cannot be measured simultaneously. Such restrictions force researchers to use solely one attribute as a proxy for diversity. Simpson's diversity index and Sullivan's composite diversity index (CDI) can overcome the limitations of traditional measures and alleviate the need to identify a single attribute to reflect diversity. The purpose of this study is to highlight the feasibility of using diversity indices to compare the diversity of plastic surgery residency programs to all other surgical fields.

METHODS: Demographic reports from the Accreditation Council for Graduate Medical Education were obtained for the years 2008–2020. Self-reported race/ethnicity, gender, and medical school affiliation (allopathic, osteopathic, international, Canadian) for residents in plastic surgery and nine other surgical fields (general surgery, OB/GYN, ophthalmology, neurosurgery, orthopedic surgery, otolaryngology, thoracic surgery, urology, and vascular surgery) were recorded. Simpson's diversity index was calculated for each demographic attribute to determine the probability that two randomly selected individuals would represent a different identity. Then, the CDI was calculated using the combined probability of randomly selecting two surgical resident physicians representing a different race, gender, and medical school affiliation. The CDI expresses the diversity of a given population by representing the percentage of attributes upon which two randomly selected individuals will differ. A Mann-Whitney U test was used to compare calculated indices between plastic surgery and all other surgical fields, with $p \leq 0.05$ being deemed significant. Statistical results are reported as the median and interquartile range.

RESULTS: Plastic surgery residents ranked third out of all surgical fields with respect to gender diversity. Racial and medical school affiliation diversity within plastic surgery ranked among the lowest of all surgical fields. Plastic surgery Simpson diversity was significantly less than that of all other surgical fields for gender (0.47 [0.43–0.49] vs. 0.49 [0.49–0.49]; $p=0.01$), race (0.47 [0.43–0.49] vs. 0.49 [0.49–0.53]; $p<0.001$), and school affiliation (0.09 [0.07–0.10] vs. 0.28 [0.26–0.30]; $p<0.001$). When examining all diversity attributes as a single value, plastic surgery CDI (0.34 [0.31–0.36]) was significantly lower than that of all other surgical fields CDI (0.42 [0.41–0.44]; $p<0.001$).

CONCLUSIONS: The authors highlight the feasibility of using a multidimensional statistical model as a measure to evaluate the complex nature of diversity. These findings suggest that plastic surgery lags behind other surgical fields in several categories of diversity. The implementation of the described metrics will assist leaders in plastic surgery in accurately monitoring diversity progress in the field.

Abstract Presenter

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Poor Availability and Readability of Spanish Patient Educational Materials for Cleft Lip and Palate — Review of the Nations' Top Children's Hospitals

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PURPOSE: Cleft lip with or without cleft palate (CL/P) occurs at higher incidences in Hispanic communities, representing 18.9% of the US population.1 We analyzed the availability and readability of Spanish-written patient education materials (PEM) on CL/P from top-ranking US children's hospitals.

METHODS: This study is a descriptive analysis of online Spanish PEM on CL/P from top-ranked children's hospitals (per 2021-2022 US News & World Report).

Availability was assessed via Google search and authorized hospital websites. For each hospital, a Google search was conducted using the phrase, "labio leporino y/o paladar hendido (translation: CL/P) + name of the children's hospital." Additionally, independently written Spanish text was distinguished from a basic English translation.
English PEM readability was assessed using SMOG, a formula that calculates the reading grade level of a text. Spanish PEM readability was assessed using SOL, the SMOG formula converted for the Spanish language. Unpaired two-tailed t-tests were used to compare readability.

RESULTS: 51 children's hospitals met inclusion criteria; five were excluded due to lack of PEM on CL/P. Only 35.3% (n=18) of hospitals had some form of Spanish PEM available: 89% (n=16) available on google search, 78% (n=14) on the official website, and 56% (n=10) on both. Only 10.9% (n=5) were independent Spanish texts. There was a significant difference in reading levels between Spanish and English PEMs; SOL = 9.6 and SMOG = 11.3 (p-value= 0.001).

CONCLUSION: There is a paucity of Spanish PEM for CL/P among the nation's top children's hospitals. Additionally, English and Spanish PEMs are both provided at unacceptably high reading levels.

REFERENCES: 2020 US Census

Close

Reconstructive

Multiple Lower Extremity Salvage Procedures Do Not Delay Time To Amputation In Diabetics With Lower Extremity Wounds

Abstract Presenter
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PURPOSE: Lower extremity (LE) wounds are costly and common sequelae of diabetes and vascular disease. These patients may require multiple operative interventions to achieve healing, but some progress to amputation. The 5-year mortality after major amputation in the diabetic foot ulcer population ranges from 40% to 80%. The current management paradigm for diabetic patients with non-healing wounds emphasizes preservation of limb length with necessary salvage procedures rather than pursuing early amputation.1 However, critical assessment of cost effectiveness, care access disparities, impacts on quality of life, and functional outcomes for patients have raised challenges to this paradigm.2,3 This study aims to assess if undergoing multiple LE salvage procedures (LESP) has effects on amputation rates, time to amputation, and time to healing of chronic diabetic wounds.

METHODS: A retrospective cohort study of patients with chronic LE wounds treated at a large tertiary care center from 2015-2022 was conducted. Diabetic patients with at least 1 non-traumatic LE wound were included. Cohorts were initially grouped by having had a salvage procedure or not; those that had not undergone a salvage procedure were excluded from the analysis. Cohorts were further stratified by number of salvage procedures into having only had one (1) procedure or multiple (2+). Further stratification was made by number of wounds (single vs. multiple), amputation status (yes/no), and healing status (healed vs. non-healed). Cox proportional hazards regression was conducted to assess effects of multiple LESPs on time to limb amputation and time to healing among patients with diabetic wounds. Other confounding variables (race, gender, glycemic control, nutrition status, smoking status, comorbidities, social vulnerability index) were accounted for in the analysis.

RESULTS: When adjusted for race, comorbidities, SES, and smoking status, there was no

significant difference in amputation rate between multiple LESP and single LESP cohorts (73.5% vs. 61.3%, p=0.097). Patients with poor glycemic control (HbA1c >7%) had delayed time to healing when compared to patients with more optimal control (HR=1.36, CI 1.136-1.514, p=0.04). Time to amputation was not significantly different between multiple LESP and single LESP cohorts (HR: 0.93, 95% CI 0.608-1.418, p=0.7).

CONCLUSIONS: Multiple surgical interventions to attempt limb salvage may not be warranted in diabetic patients with lower extremity wounds. Based on these data, patients who undergo one salvage attempt versus multiple had no difference in amputation-free survival. In the era of value-based care, this suggests that one operative limb salvage attempt may be warranted, but multiple attempts may incur unnecessary costs and ultimately delay rehabilitation and recovery.

REFERENCES:

1. Black CK, Ormiston LD, Fan KL, Kotha VS, Attinger C, Evans KK.Amputations versus Salvage: Reconciling the Differences.J Reconstr Microsurg.2021 Jan;37(1):32-41.doi: 0.1055/s-0039-1696733.Epub 2019 Sep 9.PMID: 31499559.
2. Labovitz JM, Day D.The Biomechanics of Diabetes Mellitus and Limb Preservation. Clin Podiatr Med Surg.2020 Jan;37(1):151-169.doi: 10.1016/j.cpm.2019.08.011.Epub 2019 Oct 21.PMID: 31735265.
3. Driver VR, Fabbi M, Lavery LA, Gibbons G.The costs of diabetic foot: the economic case for the limb salvage team.J Vasc Surg. 2010 Sep;52(3 Suppl):17S-22S.doi: 10.1016/j.jvs.2010.06.003. Erratum in: J Vasc Surg.2010 Dec;52(6):1751.PMID: 20804928.

A Qualitative Analysis of Advanced Biologic Products in Diabetic Foot Wounds: A Single Institution Study

Abstract Presenter
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BACKGROUND: As management of complicated wounds secondary to diabetes mellitus (DM) and other chronic comorbidities become more laborious in presenting patients, biologically engineered tissue products have shown great promise in augmenting healing and faster return-to-normal function in soft tissue reinforcement and regenerative soft tissue repair."1" While adjunctive use of biologics have proven to provide considerable benefits in reconstruction, there are significant associated product costs.

PURPOSE: To compare outcomes of chronic diabetic wounds adjunctively treated with a

biologic product with goals to develop effective treatment algorithms and policies for using biologics to provide the most benefit to patients while promoting hospital resource efficiency.

METHODS AND MATERIALS: A single-institutional retrospective chart review from 2016 to 2021 evaluated 155 diabetic patients adjunctively treated with a biologic product during reconstruction. Biologics include porcine urinary bladder matrix (pUBM), bovine collagen (BC), amniotic membrane/tissue (AM/T), acellular dermal matrix (ADM), and porcine dermis (PD). Patients were classified by having an open lower extremity wound(s) with or without DM. Patient demographics and medical history were collected. Evaluated outcomes included lower extremity amputation, osteomyelitis, and mortality stratified by specific biologic product implemented in patient care. Categorical variables were analyzed using Pearson chi-square and Fisher exact test. Binomial logistic regression and Akaike Information Criterion analysis (AIC) assessed potential impacts biologics may have on patient outcomes in addition to determining the regression model with the best fit for the quality of data.

RESULTS: Mean follow-up was 3.5 years. Sixty-two percent were male and 38% were female. Seventy-nine percent were Caucasian, 19% African-American, 1% Native American/Alaska Native, and <1% Native Hawaiian or Pacific Islander. Mean age was 60.1 years. Thirty-four percent of patients had chronic history of DM. Forty-three percent of patients experienced ulcer recurrence. Sixty-two percent of patients received pUBM. The remaining 37% were treated with higher-costing biologics."2" Thirty-eight percent of patients had history of osteomyelitis with 17% recurrence rate. Twenty-three percent of patients suffered amputation. Of amputees, 51% were diabetic. Thirty percent of patients were assessed per Wagner's classification. Charlson Comorbidity Indexes were 11% low-risk, 21% mild-risk, 25% moderate-risk, and 44% severe-risk. Overall mortality was 15%, with 23% and 12% being with and without DM, respectively. In the cohort that received treatment with pUBM, patients with DM experienced higher amputation rates compared to patients without DM ($p = .0035$). There were no significant differences found in outcomes for both groups overall in mortality and osteomyelitis with use of any specific biologic product.

CONCLUSION: To our knowledge, there is no published evidence to-date reporting associated outcomes of low/high-cost biologics in managing lower extremity DM wounds. Further investigation is warranted to better delineate and understand cost-benefit ratios of outcomes in this specific patient population.

REFERENCES

1. Johnson RM, Harrison LM, Anderson SR. The Adjunctive Use of Biologically Engineered Products in Plastic Surgery Practice. J Am Coll Clin Wound Spec. 2018;8(1-3):4-9. Published 2018 Jan 31. doi:10.1016/j.jccw.2018.01.002
2. Martinson M, Martinson N. A comparative analysis of skin substitutes used in the management of diabetic foot ulcers. J Wound Care. 2016;25(Sup10):S8-S17. doi:10.12968/jowc.2016.25.Sup10.S8

Transfemoral Osseointegration: Surgical and Patient Reported Outcomes for Lower Limb Reconstruction

Abstract Presenter
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BACKGROUND: The use of osseointegration (OI), a process in which there is a direct structural and functional connection between living bone and the surface of a load-bearing artificial implant, has long been used in dental reconstruction. The notion of expanding this process to extremity reconstruction has been explored within the past three decades. OI implants have become broadly utilized in the European sector using the Osseointegrated Prostheses for the Rehabilitation of Amputees (OPRA) protocol system. This system was recently adopted in the United States, with 20 medical centers nationwide offering OI implant treatments for amputees. In this study, we examine surgical and patient-reported outcomes of transfemoral osseointegration compared to socket-based prosthetics.

METHODS: A retrospective review of patients who underwent OPRA stage I and II lower limb reconstruction between September 2021 to December 2022 at our institution was performed. Exclusion criteria included any patients outside the age range of 21-89. Patient demographics, operative details, surgical outcomes, and patient-reported outcomes were collected for analysis. Surgical outcomes included infectious complications, skin graft dehiscence, neuropathic pain, and redundant tissue surrounding the abutment. Patient-reported outcomes included skin irritation, drainage surrounding the abutment, the fit of the prosthesis, ease of prosthesis function, frequency of prosthetic use, and pain associated with weight bearing on the implant.

RESULTS: Six patients were treated. The mean age at the time of Stage I and Stage II reconstruction was 47.83 ± 12.93 and 48.33 ± 12.94, respectively. The mean body index (BMI) was 26.63 ± 3.37 kg/m3. Comorbidities of patients included tobacco use (16%), marijuana use (83.33%), hypertension (50%), and hyperlipidemia (50%). Of the six transfemoral osseointegrated implants, three patients experienced superficial wound dehiscence surrounding the abutment (50%), two patients experienced hematoma development (20%), three patients returned to the OR for redundant tissue debulking (50%), and one patient returned to the OR for skin dehiscence (16%). Of the patient-reported outcomes, one patient reported skin irritation (16%), three patients reported serous drainage (3%), one patient reported difficulty of fit (16%), and all of the patients (100%) reported weight bearing without pain.

CONCLUSION: Based on our data, transfemoral osseointegration in patients with previous

above the knee amputation may be an effective alternative to socket-based prosthetics in lower limb reconstruction. Further studies on the applications of osseointegrated implants for extremity reconstruction in plastic surgery and patient-reported outcomes may determine this treatment modality to have benefits not seen in socket-based prosthetics when considering method of extremity reconstruction.

Anatomical Study of the Sensate Pedicled Anterolateral Thigh (ALT) Flap for Reconstruction of Pelvi-Perineal and Knee Region Defects

Abstract Presenter
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PURPOSE: The pedicled anterolateral thigh (ALT) flap is a well-known flap that can be used in lower trunk soft tissue reconstruction through standard ALT dissection.1 This flap may also be dissected in a reverse pedicled fashion for knee region defects.2 Literature is limited in detailed descriptions of the surgical technique for the elevation, rotation, and submuscular tunneling of the pedicled ALT. Furthermore, literature is limited in a standardization that expresses reliability. Through cadaver dissections and clinical outcomes, we will standardize this technique, making it reproducible and safe for clinical application in patients undergoing complex pelvi-perineal and knee region reconstructions.

METHODS AND MATERIALS: Anatomic studies of 40 ALTs were harvested in 20 cadavers. Freestyle technique with perforator preserving incision was performed to identify perforators and isolate flap components. The lateral femoral cutaneous nerve (LFCN) was identified in all flaps. From May 2010 to May 2016, 42 patients, ages 28 to 60 were treated with freestyle perforator preserving technique for the pedicled ALT. Vessels to the rectus femoris muscle were ligated for elongation of the main pedicle as necessary. Inguinal and perineal defects required submuscular tunneling under the sartorius and rectus femoris muscles. Contralateral defects necessitated additional suprapubic, subcutaneous tunneling. For the reverse type, superdraining was performed. Dissection and preservation of the LFCN maintained flaps as sensate.

EXPERIENCE: Forty-two patients were treated with pedicled ALT flaps. Eight months mean follow-up.

RESULTS: Twenty-two fasciocutaneous and 20 myocutaneous flaps were harvested, 60% including the LFCN. Six functional vaginal reconstructions, 3 functional penile reconstructions, and various hip, perineal and abdominal defects were successfully treated. The reverse ALT required superdraining to the greater saphenous vein in all cases. Sensate flaps regained two-point discrimination comparable to the contralateral thigh within 6 months average. The donor area was grafted in 8 (19%) patients and no major complications or flap losses were observed. Five minor wound dehiscences were treated conservatively.

CONCLUSIONS: The freestyle sensate perforator preserving pedicled ALT flap is a flexible workhorse flap, suitable for a wide variety of lower trunk reconstructions. Our described method is optimal for preservation of blood flow, as well as pedicle and nerve reach, especially when tunneled submuscularly beneath the rectus femoris and sartorius muscles. With the preservation of the LFCN, the flap can gain sensation similar to the contralateral thigh in a two-point discrimination test within a reasonable amount of time. Moreover, preservation of the LFCN allows for coaptation to locoregional nerves. Superdraining the reverse ALT is suggested to prevent flap congestion. We report our results with the ALT flap as a safe, versatile, and reproducible means of pelvi-perineal and knee region reconstruction.

CITATIONS

1.Ng RW, Chan JY, Mok V, Li GK. Clinical use of a pedicled anterolateral thigh flap. J Plast Reconstr Aesthet Surg. 2008;61(2):158-164. doi:10.1016/j.bjps.2007.10.028
2.Demirseren ME, Efendioglu K, Demiralp CO, Kilicarslan K, Akkaya H. Clinical experience with a reverse-flow anterolateral thigh perforator flap for the reconstruction of soft-tissue defects of the knee and proximal lower leg. J Plast Reconstr Aesthet Surg. 2011;64(12):1613-1620. doi:10.1016/j.bjps.2011.06.047

Reverse Sural Artery Flap: Anatomic Study of Peroneal Perforators and Clinical Modifications for Coverage of Medial and Distal Foot Defects

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BACKGROUND: Reconstructing defects in the distal third of the leg presents challenges given a relative lack of pliable and robust local-regional flap options. While free flap transfers may be used for defects in this region, greater understanding of perforator anatomy has invigorated the use of local fasciocutaneous flaps as a viable alternative. Here, we describe terminal peroneal perforator anatomy in cadaveric leg dissections and propose four novel modifications to the

reverse sural artery flap (RSAF) that allow for greater coverage of the medial and distal forefoot.

METHODS: Peroneal perforators were studied in 38 fresh cadaver leg dissections. Details regarding fibular length and number, position, diameter, and length of perforators were obtained. A surgical case series was performed utilizing four modifications to the RSAF flap: perforator skeletonization, Achilles tendon release, tunneling under the Achilles tendon, and proximal peroneal artery ligation.

RESULTS: Anatomic dissection: 38 cadaveric legs were dissected, 14 left and 24 right. A total of 138 perforators were identified for an average of 3.63 ± 1.04 perforators per leg. On average, terminal perforators were 10.96 ± 3.67cm from the lateral malleolus, with arterial caliber 0.83 ± 0.34cm and length 4.10 ± 3.42cm. 71% of the terminal perforators were between the 60-80% portion of the fibula, which corresponds to a distance of 6.76-13.52cm from the lateral malleolus. 10.6% of terminal perforators were localized distally and 18.4% were localized more proximally. There was a significant negative correlation between total number of perforators and distance from the lateral malleolus ($r = -0.343$, $p = 0.035$).

Surgical case series: 5 pediatric and 7 adult patients underwent lower limb reconstruction with RSAF. On average, the terminal perforator supplying the RSAF was at 71.0% of the total fibular length, or 9.31 ± 1.80cm, from the lateral malleolus in adults and 70.6%, or 7.14 ± 1.69cm, in children. The final pivot-points were invariably lower than the perforator location, on average 2.64cm and 3.20cm lower than the perforator position in adults and children, respectively. All patients underwent perforator skeletonization and Achilles tendon release. 4 patients also underwent tunneling under the Achilles tendon for coverage of medial foot defects and one patient underwent proximal ligation of the peroneal artery for further reach. Post-operatively, two cases had distal tip necrosis less than 10% and one case resulted in 50% superficial epidermolysis which healed with local wound care. No cases required re-operation or experienced flap failure.

CONCLUSION: Perforator skeletonization, Achilles tendon release, tunneling under the Achilles tendon, and proximal peroneal artery ligation are effective modifications to the RSAF that provide enhanced coverage of defects along the medial and distal forefoot. Anatomic dissection demonstrates that the terminal peroneal perforator may lie significantly higher than the recommended 5cm pivot-point above the lateral malleolus, making these modifications crucial in select cases. With careful technique, these modifications can improve the versatility of the RSAF as a local reconstructive option for distal lower limb defects.

Techniques and Outcomes for Microsurgical Treatment of Post Traumatic Lymphedema: A Systematic Review

Abstract Presenter
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INTRODUCTION: Lymphedema is a chronic, progressive, condition that significantly reduces quality of life and impacts up to 200 million individuals worldwide.[1] An understudied cause of secondary lymphedema is post traumatic lymphedema (PTL), a known complication of traumatic injury affecting up to 20% of patients who undergo surgical treatment for a traumatic injury. Untreated PTL leads to complications including poor wound healing, recurrent infection, skin fibrosis, and functional impairment. Physiologic lymphatic reconstruction (i.e. LVA or VLNT) has been well characterized in the setting of lymphedema secondary to malignancy treatment. However, diagnosis and treatment of PTL using physiologic lymphatic reconstruction is not well documented in the literature. The authors performed a systematic review of physiologic lymphatic surgical reconstruction in patients with PTL.

METHODS: A search was conducted of PubMed, MEDLINE, Embase, and Web of Science, to identify reports of PTL treated with microsurgical lymphatic reconstruction. Inclusion criteria were 1) must describe lymphedema occurring secondary to traumatic injury; 2) must describe microsurgical method of lymphedema treatment. Exclusion criteria were 1) conservative treatment; 2) debulking or lymphatic ligation only; 3) primary lymphedema or malignancy.

RESULTS: A total of 18 reports, representing 112 patients, were found. This included 60 cases of lymph flow restoration via lymph axiality and interpositional flap transfer (LIFT), 39 vascularized lymph node transfers (VLNTs), 11 lymphatic vessel free flaps (LVFFs), 10 lymphovenous anastomoses (LVAs), and 2 autologous lymphovenous transfers (ALVTs). Average patient age was 40.2 years old. The most frequent mechanisms of injury were traffic injuries and crush injuries. The most common site of lymphedema was in the lower extremity. All studies reported clinical improvement of symptoms. No study reported specific diagnostic criteria for PTL outside of clinical diagnosis. Length of time from traumatic injury and mechanism were both not consistently reported, with 52.4% reported as unspecified traumatic injury. Quantitative outcome measures varied, and the most frequently used was lymph flow reduction (LFR) in 45% of cases, followed by reduction of excess volume (REV) in 26%, Lymphedema Severity Index (LIS) in 22%, Lymphedema Life Impact Scale (LLIS) in 13%, and 19% of patients had no quantitative outcomes reported.

DISCUSSION: Our results demonstrated that PTL remains a poorly studied condition with unclear diagnostic criteria. Quantitative outcome measures of lymphedema are not consistently used or reported in this population, making comparisons between surgical techniques and patient cohorts difficult. However, based on our preliminary findings PTL has a favorable clinical prognosis with treated with physiologic lymphatic reconstruction. There are several promising techniques for prophylactic treatment of PTL in the setting of soft tissue reconstruction that should be considered for high-risk patients, especially preventative LIFT or LVFF for simultaneous soft tissue and lymphatic reconstruction. Traditional LVA and VLNT can be

reserved for patients who already have PTL. Increasing awareness of PTL and establishing standardized outcome measures will help clinicians better understand how to diagnose and treat this condition. Prospective and comparative studies are needed to determine the true prevalence of PTL and optimal treatment strategies.

REFERENCE:
1. Sleigh BC MB. Lymphedema. StatPears: StatPearls Publishing; Updated 2022.

A Retrospective Pre-Pectoral Implant-Based Breast Reconstruction Study: The Impact of Breast Implant Cohesivity on Revision Procedures & Post-Operative Complications.

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PURPOSE: Implant based reconstruction (IBR) can include prepectoral or sub-pectoral reconstruction.[1] While up to 50% of plastic surgeons perform prepectoral IBR, implant rippling secondary to poor superior pole coverage is a common postoperative complaint from patients.[2] Silicone implants that are used in these procedures vary in cohesivity. In the prepectoral plane, it is suspected that highly cohesive implants reduce rippling rates; however, this has not yet been demonstrated.

METHODS & MATERIALS: A retrospective cohort analysis of two-stage IBR in the pre-pectoral plane was conducted. Patients who had undergone unilateral or bilateral, skin or nipple-sparing mastectomy and two-stage IBR from January 2020 to June 2022 were identified in our institution's database. Patient demographic data, procedure characteristics (e.g., implant size and cohesivity, concurrent autologous fat grafting), and complications were captured. Patients who were less than 6 months after IBR were excluded. Univariate logistic regression analysis was conducted to identify relationships between implant cohesivity and the likelihood of patients requiring revision procedures and developing post-operative complications.

EXPERIENCE & RESULTS: 129 patients met the inclusion criteria for this study. The mean follow-up time was 235 (+/- 190) days. Mean age was 48.5 (+/- 10.5) years old. All patients received Allergan Naturelle Silicone Gel Implants. Seventy-two (56%) patients received fat grafting at the time of tissue expander removal and implant placement. A total of 52 patients received the least cohesive implants, 24 patients received moderately cohesive implants, and 53

patients received the most cohesive implants. Fourteen patients (11%) received revision fat grafting after the original implant placement. Thirty-six patients (28%) experienced rippling after the original implant placement. Univariable regression modeling indicated that the patients who received the most cohesive implants were less likely to require additional sessions of fat grafting after the implant placement when compared to the patients who received the two other implant options (OR 0.07, $p < 0.05$). Furthermore, the patients who received the moderately cohesive (OR 0.30, $p < 0.05$) and the most cohesive (OR 0.39, $p < 0.05$) implants were less likely to experience rippling after the implant placement compared to the patients who received the least cohesive implant. In a subgroup analysis, patients with the most cohesive implants who did not receive fat grafting at implant placement did not require additional fat grafting at a later instance (0%). However, 11 (31%) patients who received the least cohesive implant without fat grafting at time of IBR ultimately required additional sessions of fat grafting.

CONCLUSIONS: Rippling after prepectoral IBR is a common complication and can be mitigated with fat grafting. The use of highly cohesive implants in prepectoral IBR correlates with significantly fewer rippling complications and revision fat grafting procedures. Study of the cost implications of these findings may further support the advantages of using highly cohesive implants in prepectoral IBR procedures.

REFERENCES;

[1] Kappos EA, Schulz A, Regan MM, et alPrepectoral versus sub-pectoral implant-based breast reconstruction after skin-sparing mastectomy or nipple-sparing mastectomy (OPBC-02/ PREPEC): a pragmatic, multicentre, randomised, superiority trialBMJ Open 2021;11:e045239. doi: 10.1136/bmjopen-2020-045239.
[2] Marks, J. M., Farmer, R. L., & Afifi, A. M. (2020, August 19). Current Trends in Prepectoral Breast Reconstruction: A Survey of American Society of Plastic Surgeons Members. Plastic and reconstructive surgery. Global open. Retrieved May 25, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7489685/.

Safety and efficacy of immediate lymphatic reconstruction in patients with melanoma: a systematic review

Abstract Presenter
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INTRODUCTION: Secondary lymphedema is one of the biggest complications of lymph node dissection and causes serious morbidity to the affected patients. As such, focuses have shifted towards the prevention of lymphedema. While immediate lymphatic reconstruction for breast cancer patients has been widely studied,1 studies of reconstruction for melanoma patients are lacking. We sought to review the safety and efficacy of immediate lymphatic reconstruction for preventing lymphedema in patients with melanoma.

METHODS: A systematic review of studies reporting lymphedema outcomes in patients with melanoma who underwent immediate lymphatic reconstruction was performed in accordance with the PRISMA guidelines using the following databases: PubMed, Embase, Web of Science, and Cochrane Central Register of Controlled Trials (CENTRAL). A total of 37 titles and abstracts were screened, and six articles were extracted for analysis.

RESULTS: The six studies included 298 patients who underwent either axillary or groin lymphatic dissection for melanoma treatment. Immediate lymphatic reconstruction via lymphovenous anastomosis (intervention group) was done in 115 patients (38.6%), and 183 patients had no lymphatic reconstruction (control group). Follow-up length ranged from 6 to 67 months. Melanoma recurred in 40.7% of the intervention group versus 52.1% in the control group ($p=0.067$). 5.2% developed lymphedema in the intervention group versus 28.9% in the control group ($p<0.0001$). Reported complications in the intervention group include wound infections (1.7%), seromas (1.7%), and transient lymphedema (0.9%), while 10 (5.5%) in the control group developed wound infections. There were no significant differences in mortality.

CONCLUSION: In patients with melanoma who undergo lymph node dissection, immediate lymphatic reconstruction is effective for the prevention of secondary lymphedema. No differences were found between the groups in recurrence of melanoma or mortality, but further studies should be conducted to concretely validate these findings.

REFERENCES:

1. Hill WKF, Deban M, Platt A, Rojas-Garcia P, Jost E, Temple-Oberle C. Immediate Lymphatic Reconstruction during Axillary Node Dissection for Breast Cancer: A Systematic Review and Meta-analysis. Plast Reconstr Surg Glob Open. 2022;10(5):e4291. Published 2022 May 9. doi:10.1097/GOX.0000000000004291

Use of Barbed Suture in Complex Back Closure Decreases Operative Time and Cost with Comparable Safety Profile

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PURPOSE: Plastic surgery involvement in complex locoregional closure of back wounds following spine surgery has increased significantly within recent decades. Muscle flap closure, as opposed to traditional layer-by-layer approximation, has been shown to decrease rates of wound complications such as seroma, infection, and dehiscence. However, the impact of the use of barbed suture on operative time, surgical cost, and patient outcome for complex back closure remains unknown.

METHODS: A retrospective analysis was conducted on all patients who underwent spine surgery followed by locoregional muscle flap complex closure between January 2016 and July 2021. Patients were divided into barbed suture and conventional suture cohorts (Figure 1). Operative characteristics, including duration of surgery, were extracted from the medical record. Postoperative complications such as seroma, infection, dehiscence, and need for reoperation were collected. An estimated cost savings was calculated using figures reported in the literature.

RESULTS: Of 110 patients, 67.3% (74/110) underwent muscle flap-based reconstruction with barbed suture. Rates of seroma ($p = 1.0$), infection ($p = 0.21$), dehiscence ($p = 0.66$), and other complications were statistically similar between groups. After adjusting for the length of surgical closure, the meantime per centimeter was 3.1 min/cm versus 4.6 min/cm for barbed and conventional suture cohorts, respectively, resulting in a time savings of 1.5 min/cm ($p < 0.001$) (Table 1). The calculated time savings for muscle flap closure of average incision length was 34.5 min (18.6 – 50.4 min), and the overall financial savings was calculated to be $1094.10 ($513.75 – $1674.45) per case.

CONCLUSION: The use of knotless barbed suture in complex closure of back wounds results in
decreased operative time and hospital cost, while conferring similar rates of complication to conventional suture.

Major Depressive Disorder Effects on Wound Healing in Peripheral Arterial Disease Patients Following Lower Extremity Amputation

Abstract Presenter
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INTRODUCTION: In patients with peripheral arterial disease (PAD), there is a high prevalence of Major Depressive Disorder (MDD). PAD patients with MDD have an increased risk of lower extremity amputation (LEA) compared to PAD patients without MDD. In the general population, it is established that LEA preserves physical health but decreases quality of life and may increase symptoms of MDD. It is unclear which direction LEA influences mental health in complex plastic reconstructive surgery patients, and thus, this study aims to assess MDD symptomology in PAD patients after LEA.

METHODS: A retrospective chart review of patients from a single institution wound center with PAD, a diagnosis verified by multiple chart documentation, who received LEA from a senior author (C.E.A.) were reviewed from January 2018 to July 2022 was conducted. All patients with a Patient Health Questionnaire (PHQ) or Hamilton Depression Rating Scale (HAM-D) were included. A PHQ score ≥ 4 and subsequent HAM-D ≥ 8 prior to the date of amputation were included in the MDD cohort. HAM-D scores within 3 months before and after LEA date were collected. Paired t-tests were used for analysis through STATA VSN 7.0 with a significance level set at 0.05.

RESULTS: Out of 305 patients with PAD who underwent LEA, 92 (30.6%) were diagnosed with MDD prior to amputation. These patients had an average age of 58.81 +10.81 years and BMI of 30.64 + 7.68 kg/m2; 31 (33.69%) were females; 42 (45.65%) had a history of smoking; 56 (60.86%) were diagnosed with type II diabetes; and 39 (42.41%) with peripheral neuropathy. These patients had an average of 2.23 + 2.39 invasive vascular interventions (stent placement, balloon angioplasty, or open bypass) prior to LEA. Of the patients with MDD, HAM-D scores significantly decreased after LEA three-fold (12.88 + 4.19 vs. 4.12 + 5.76, p=0.0001).

CONCLUSIONS: Psychiatric well-being in reconstructive surgery patients is not well-researched but its understanding is important in improving patient care, as our study found a high prevalence of MDD amongst PAD patients. Our cohort of MDD patients reported decreased depressive symptoms after LEA. Future studies will explore whether a history of MDD influences post-LEA coping and resilience in vulnerable plastic reconstructive surgery patients.

Incisional Negative Pressure Wound Therapy Impacts on Wound Healing and Quality of Life Following Lower Extremity Amputation: A Prospective Randomized Control Trial

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INTRODUCTION: In the setting of non-traumatic lower extremity amputations (LEA), there is a high risk of postoperative complications due to the complex comorbidities of patients undergoing this invasive procedure. Incisional negative-pressure wound therapy (iNPWT) is a device that could potentially mitigate adverse effects post-LEA in the setting of wound healing of closed surgical incisions. Currently, there are no trials utilizing iNPWT of closed wounds after LEA. This is a pilot study that compares incisional negative pressure wound therapy and standard dressings in patients.

METHODS: Patients indicated for non-traumatic LEA presenting to a high-volume wound center were randomized to receive either an iNPWT (3M-Prevena, Ireland) or a standard dry dressing over their incision at the conclusion of LEA. Demographics and comorbidities were obtained through chart review: diabetes mellitus type 1 (DM1) diabetes mellitus type 2 (DM2), HbAlc, peripheral arterial disease (PAD), chronic kidney disease (CKD), end stage renal disease (ESRD). Incidence of hematoma, seroma, wound dehiscence, and maceration was assessed at 5, 30, and 90-day time points post-procedure. Medical Outcomes Study 12 Short Form Health Survey (SF-12) was given before surgery (entry) and at a 90-day follow-up appointment (exit); change in SF-12 was measured by subtracting scores of entry from exit. Data analysis was performed using STATA (StataCorp, College Station, TX) version 17.0 with statistical significance set at values of $p<0.05$. Results were reported as (Dry dressing vs. iNPWT).

RESULTS: A total of 108 patients were chosen for participation and evenly randomized (n=54 per group); eight patients were lost to follow-up and removed from the study. Demographics between dry dressing and iNPWT groups were similar in age (58.92 ± 13.88 vs. 57.10 ± 12.89 years, p=0.49), BMI (28.12 ± 7.11 vs. 30.04 ±7.80 kg/m2, p =0.20), and gender (25/51, 29.41% vs. 18/49, 36.73% females). Prevalence of DM1/DM2 (11.76% vs. 10.20%/74.51% vs. 67.35% p=0.52), CKD (9/51, 17.60% vs. 6/49, 12.24%, p=0.42), ESRD (18/51, 35.29% vs. 10/49, 20.41%, p=0.092) did not differ. The dry dressing group had a higher portion of patients with PAD (30/51, 58.82% vs. 15/49, 30.61%, p=0.005). Hospital length of stay was similar (12.65± 9.54 vs. 13.27± 8.06 days, p=0.74), however, the dry dressing group waited significantly longer to successfully use a prosthetic (93.2±100.6 vs. 82.09±179.2 days, p=0.031). There were no differences in rates of hematoma, seroma, or maceration between both groups at all three time points. No differences were recorded in rates of failure to heal (4/51, 7.84% vs. 6/49, 12.25%, p=0.44) or fall requiring hospitalizations (3/51, 5.88 % vs. 7/49, 14.29%, p=0.16) at the 90-day follow-up. Patients in both groups reported comparable decreased quality of life after LEA (-13.83±10.35 vs. -14.02±11.09 SF-12 score, p=0.46).

CONCLUSION: There was no difference in complications between the control and iNPWT groups, even as the control had a higher proportion of patients with PAD. Patients receiving iNPWT waited less time to use a prosthesis, however, still had the same degree of decrease in SF-12, indicating lower quality of life, post-amputation as the control group. We welcome other institutions to explore whether iNPWT can be a promising tool to improve patient care following LEA.

Alternative Patterns of Superficial Lymphatic Drainage in the Breast and Trunk After Breast Cancer Surgery

Abstract Presenter
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PURPOSE: Anatomic and functional descriptions of trunk and breast lymphedema following breast cancer treatment are emerging as indicators of lymphatic dysfunction, better elucidating the disease process. ICG-lymphangiography has been instrumental in characterizing this dysfunction in extremity lymphedema and can be used to assess other regions. Previous work has established a validated Trunk Lymphedema Staging System (TLSS) to characterize such affected areas. This study aims to identify risk and protective factors for the development of truncal and upper extremity lymphedema using alternative lymphatic flow, providing implications for medical and surgical treatment.

METHODS: Patients undergoing revisional breast surgery with suspicion of upper extremity lymphedema between 12/2014 and 3/2020 were offered lymphangiography. The breast and lateral/anterior trunks were visualized and blindly evaluated for collateral axillary and inguinal lymphatic flow. Summary statistics were computed, and a linear-weighted Cohen's Kappa statistic was calculated comparing alternative drainage evaluation. Binomial regression was used to compute relative risks (RR). Significance was assessed at alpha=0.05.

RESULTS: 86 sides (46 patients) were included. 12 sides underwent no treatment and were considered controls. 88% of the non-controls had alternative lymphatic flow. This was seen in ipsilateral axillae (64%), ipsilateral groins (57%), contralateral axillae (20.3%), and contralateral groins (9.3%). Cohen's Kappa for alternative drainage was 0.631 ± 0.043. Ipsilateral axillary and contralateral inguinal drainage was associated with a reduced risk of developing truncal lymphedema (RR 0.78, CI 0.63-0.97, p=0.04; RR 0.32, CI 0.13-0.79, p=0.01, respectively). Radiation therapy increased the risk of truncal and upper extremity lymphedema (RR 3.69, CI 0.96-14.15, p=0.02; RR 1.92, CI 1.09-3.39, p=0.03, respectively). Contralateral axillary drainage and axillary lymph node dissection increased the risk of upper extremity lymphedema (RR 4.25, CI 1.09-16.61, p=0.01; RR 2.83, CI 1.23-6.52, p=0.01, respectively).

CONCLUSIONS: Building upon previous work on truncal lymphedema, this study shows risk and protective factors for the development of truncal and upper extremity lymphedema. Most prevalent alternative channels drain to the ipsilateral axilla and groin. Ipsilateral axillary and contralateral inguinal drainage are protective against truncal lymphedema. Patients with radiation, axillary lymph node dissection, and contralateral axillary drainage have the highest risk of upper extremity lymphedema. This study amplifies existing data on collateralization in post-operative breast cancer patients while expanding its implications in trunk and breast

lymphedema. These findings have important clinical implications for post-operative manual lymphatic drainage and for determining eligibility for lymphovenous bypass surgery.

Hardware Salvage in the Lower Extremity following Pedicled or Free Flap coverage: Ten-Year Single Center Outcomes Analysis

Abstract Presenter
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BACKGROUND: An unanswered question with open tibial fractures is whether the type of flap used affects hardware retention. In many instances, flap survival does not necessarily equate hardware retention, or even eventual limb salvage. Nevertheless, hardware failure or infection would at the very least necessitate multiple repeat surgeries and long-term intravenous antibiotics with a decreased chance of limb salvage. In this study, we performed a 10-year single-institution review and analysis of all patients who had placement of hardware for open tibial fractures followed by flap coverage.

AIMS: The primary aim of the study was to investigate if there was a relationship between flap type (pedicled vs free and muscle vs fasciocutaneous flaps) and primary and secondary outcome measures. A secondary aim of the study was to determine if there was any difference in primary and secondary outcome measures when comparing the period of time from 2012 to 2016 (where there was not a formal orthoplastic collaboration) and from 2017 to 2021, where our institution had a formal orthoplastic team.

METHODS: Inclusion criteria consisted of patients who underwent pedicled or free flap coverage of Gustilo IIIB or IIIC tibial fractures requiring ORIF. An initial cohort of 100 unique patients was retrieved based on EMR analysis by CPT codes. After individualized chart review, a cohort of 58 patients had sufficient data for inclusion in the study. Of these 31 had pedicled flap reconstruction, while 27 had free flap reconstruction. In addition, in this cohort, 36 had reconstruction with muscle flaps, while 22 had reconstruction with fasciocutaneous flaps. Within the pedicled flap cohort, there were 14 fasciocutaneous and 17 muscle flaps. Within the free flap cohort, there were 8 fasciocutaneous and 19 muscle flaps. Outcomes and complications were statistically analyzed based on flap type. Flap type was stratified into free vs pedicled flaps and muscle vs fasciocutaneous flaps. Primary outcome measures included hardware failure and infection requiring hardware removal. Secondary outcome measures included limb salvage, flap success, and fracture union.

RESULTS: Overall primary outcome measures were better for pedicled flaps (n=31), with lower rates of hardware failure and infection (25.8%; 9.7%) compared to free flaps (n=27) (51.9%; 37.0%). Limb salvage and flap success were not different comparing pedicled and free flaps. There was no significant difference in outcomes between muscle and fasciocutaneous flaps. Multivariable analysis showed that patients who had free vs pedicled flaps or muscle vs fasciocutaneous flaps had a higher chance of hardware failure. A formal orthoplastic team was established in the second 5 years, after which flap numbers were higher and hardware failure less for pedicled and fasciocutaneous flaps.

CONCLUSIONS: Pedicled flaps were associated with lower rates of hardware failure and infection requiring hardware removal. A formal orthoplastic team improves hardware-related outcomes.

Protecting Your Back and Your Wallet: Decreased Complications and Healthcare Costs Associated with Prophylactic Muscle Flap Coverage After Spinal Fusion

Abstract Presenter
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BACKGROUND: Spinal degenerative deformities have a prevalence of over 27% in US adults.1 $34 billion is spent annually on spinal instrumentation and fusion to address these deformities.2 Wound closure after fusion using paraspinal muscle flaps has been associated with reduced rates of complications, including infection and reoperation.3 However, no study has addressed the cost effectiveness of this added intervention. The high prevalence of degenerative deformities and subsequent healthcare expenditures highlights the need for resource utilization studies to inform decision-makers on best operative practices.

METHODS: A retrospective review was performed on adult patients at our institution who underwent posterior spinal fusion due to degenerative deformity between 2019 and 2022. Patients with infection, spinal tumor, or connective tissue disease were excluded. Patients were stratified by the prophylactic use of muscle flap closure following fusion, and outcomes were compared between groups using chi-square tests and odds ratios (OR) with an alpha of 0.05. Costs were applied to operative, inpatient, and outpatient resources, and univariate and multivariate regression were performed to measure the impact of muscle flaps on costs.

RESULTS: 520 patients were included in this study. Diagnoses included 319 patients (61%)

with spondylosis, 142 (27%) with scoliosis, 47 (9%) with discopathy, and 12 (2%) with other musculoskeletal pathologies. 240 patients received muscle flap closure and 280 underwent primary closure. These cohorts were similar in terms of sex, race, ethnicity, BMI, and length of fusion. The flap group was statistically younger (mean age 57.7 vs 61.4 years) and more likely to have had prior spine surgery (63% vs 54%). Flap closure patients had significantly fewer readmissions (10% vs. 17%, OR 0.56), reoperations (8% vs 14%, OR 0.56), and hardware failures (0.4% vs. 4%, OR 0.10), and more seromas (10% vs. 2%, OR 6.11) than the control group. There were no differences in infection, hematoma, or wound dehiscence rates. Operative time, hospital length of stay, and subacute rehabilitation use did not vary between groups. In the multivariate regression, when controlling for independently significant factors like age, diagnosis, comorbidities, and length of fusion, muscle flap closure remained a significant predictor of costs, and was associated with a $7,376 reduction in overall costs per patient.

CONCLUSIONS: This resource utilization study shows that muscle flap closures correlate with improved outcomes by reducing complication rates, while also leading to decreased costs per patient. These findings support the use of prophylactic muscle flap closures following posterior spinal fusion from patient safety and health economics perspectives.

REFERENCES:

1. Parenteau CS, Lau EC, Campbell IC, Courtney A. Prevalence of spine degeneration diagnosis by type, age, gender, and obesity using Medicare data. Sci Rep. 2021;11(1):5389. doi:10.1038/S41598-021-84724-6
2. Rajaee S, Bae H, Kanim L, Delamarter R. Spinal fusion in the United States: analysis of trends from 1998 to 2008. Spine (Phila Pa 1976). 2012;37(1):67-76. doi:10.1097/BRS.0B013E31820CCCFB
3. Wright MA, Weinstein AL, Bernstein JL, et al. Muscle flap closure following complex spine surgery: A decade of experience. Plast Reconstr Surg. Published online 2020:642E-650E. doi:10.1097/PRS.0000000000007274

Edematous Dermal Thickening as a Biomarker for Lymphatic Surgical Outcomes

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BACKGROUND: Surgical treatments for breast cancer related lymphedema (BCRL) include vascularized lymph node transplant (VLNT) and debulking lipectomy. Clinical outcomes are

assessed using subjective patient questionnaires (LYMPH-Q), bioimpedance scores (L-dex), and relative volume change in the limb of interest, which often do not correlate with each other. However, there are potential quantitative imaging biomarkers that have yet to be explored in depth that could be used to assess clinical outcomes. Our clinical experience suggests that dermal thickness, measurable on MRI, may correlate with BCRL severity. This may also may negatively correlate with improvement of the disease process after surgical intervention. Therefore, the aim of this study is to investigate whether dermal thickness could be utilized as an objective indicator of postoperative changes following VLNT and debulking.

METHODS: A retrospective review identified patients with BCRL treated with VLNT and/or debulking. Patients were included if they had both pre- and post-operative MRIs. Dermal thickness was measured at 4 points (medial/ulnar, lateral/radial, posterior/dorsal and anterior/ventral) in 2 different locations in the upper arm and 2 different locations in the forearm, for a total of 16 sites per arm. For each patient, the unaffected arm was set as the control for the affected arm. Maximum dermal thickness was determined at the anatomical location that had the highest dermal thickness measurement. Data was analyzed stratified by treatment groups: VLNT, debulking, or VLNT + debulking. Wilcoxon rank sum test was used to compare changes to the affected arm with the unaffected (control) arm. Univariate linear regression was used to assess the relationship between dermal thickness reduction with changes to LYMPH-Q scores, L-dex scores, and relative volume change.

RESULTS: 89 patients were identified, of which 24 met the inclusion criteria. Ten patients underwent debulking, 6 underwent VLNT, and 8 underwent sequential debulking and VLNT. Overall, there was a significant reduction in relative volume change, in the pre and post operative measurement ($p < 0.001$). Maximal dermal thicknesses significantly decreased in all treatment groups, apart from the VLNT cohort ($p = 0.5$). There was a median dermal thickness change of 0 mm across all regions in the control arm, while there was a significant reduction in 12/16 limb compartments in the affected arm. Change to dermal thicknesses significantly correlated with changes to LYMPH-Q, L-dex, and relative volume change in 4/16 limb compartments.

CONCLUSION: Dermal thickness may potentially be used to track post-operative outcomes in BCRL after debulking, but further understanding of variations due to anatomical location and the selection of the optimal imaging technique require further exploration.

The Hidden Risks of Perioperative Transfusions in Traumatic Lower Extremity Free Flap Reconstruction

Abstract Presenter
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BACKGROUND: Despite the common administration of blood product transfusions for traumatic lower extremity (LE) injuries, their effect on LE free flap outcomes is uncertain. There is evidence that blood transfusions are associated with infection and other surgical complications; however, these studies are not specific to LE reconstruction. We evaluated the effect of perioperative blood transfusions on LE free flap outcomes in trauma patients.

METHODS: A retrospective chart review was performed on patients undergoing free flap reconstruction following acute LE injuries from 2016 through 2021. The perioperative period for blood product transfusions was defined as ±3 days from the procedure. Parameters included patient demographics, perioperative characteristics, and outcomes. Major complications were used as a composite variable and defined as complications requiring reoperation (hematoma, flap thrombosis, flap necrosis >10%, infection requiring reoperation). Univariate analysis between the transfusion and non-transfusion group was performed using Student's t test and Chi-square analysis. Multivariable analyses were performed using generalized linear models and negative binomial regression to adjust for additional factors that might influence outcome. All statistical tests were performed with significance $p< 0.05$.

RESULTS: Of the 205 patients, 48% received packed red blood cells (PRBC) perioperatively. The rate of major complications was higher in the transfusion group (19% vs. 10%, p=0.09). Units of PRBCs transfused were independently associated with major complications (OR=1.34 per unit PRBC, CI:1.06-1.70, p=0.015). While wound size (314 cm2 vs 168 cm2), injury severity score (17 vs. 13), and intraoperative estimated blood loss (134 mL vs. 76 mL) were greater in the transfusion group ($p<0.01$), they were not significantly associated with major complications on multivariate analysis.

CONCLUSION: The number of units of PRBCs given perioperatively was the only variable independently associated with major complications. This association suggests the usage of restrictive transfusion protocols in patients requiring LE reconstruction. In centers already transfusing restrictively, supplemental treatment modalities such as tranexamic acid should be further studied to decrease blood loss and transfusion needs in LE microvascular reconstruction.

We Are Not Speaking The Same Language: CPT Coding and Access To Care in Lymphatic Reconstruction Surgery

Abstract Presenter
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BACKGROUND: Current Procedural Terminology (CPT) codes provide a uniform language for reporting and billing surgical procedures. Reconstructive techniques have been available for over 15 years to treat lymphedema, a debilitating and progressive disease, yet specific CPT codes have not been assigned to these procedures. We hypothesized that great heterogeneity would exist in coding practices, and that inadequate codes may ultimately limit the treatments offered.

METHODS AND MATERIALS: A 22-item questionnaire was offered to members of the American Society of Reconstructive Microsurgeons. The Qualtrics survey assessed the type and volume of lymphatic reconstruction procedures performed, the CPT codes used for each procedure and their combinations, as well as the challenges related to coding and patient access to care.

RESULTS: 66 board-eligible/board-certified plastic surgeons completed the survey in full. 83.3% had microsurgical fellowship training, and 56.1% were practicing for >5yrs. All indicated that lymphatic surgery is integral to cancer care, and 86.4% indicated that immediate lymphatic reconstruction should be offered following lymphadenectomy. Most respondents performed lymphovenous anastomosis (LVA; 81.8%), immediate lymphatic reconstruction (ILR; 77.3%), liposuction (80.3%), and vascularized lymph node transfer (VLNT; 80.3%). Respondents who performed LVA (92.6%), ILR (92%), liposuction (62.5%), and VLNT (70.6%) reported that the available CPT codes did not accurately reflect the work done for these procedures. Consequently, 32% of the respondents reduced or stopped offering some procedures, and 69.7% had to forgo operations due to their patients' inability to pay. The study found that insurance coverage and current CPT codes posed significant barriers to patient care, with 98.5% and 95.5% of respondents, respectively, indicating them as challenges. Respondents used a median of 3 CPTs for LVA, 3 for ILR, 3 for liposuction, 1 for indocyanine green imaging, and 1 for VLNT. Across all respondents, 8 different codes were employed for LVA, 9 for ILR, 8 for liposuction, 9 for ICG, and 6 for VLNT. Significant variation was observed in the different CPT code combinations reported by respondents for each procedure: 28 for LVA, 24 for ILR, 12 for liposuction, 20 for ICG, and 14 for VLNT.

CONCLUSION:
Respondents agreed that lymphatic reconstruction is essential to cancer care. A large and heterogeneous set of CPTs is currently employed for billing. Most believe available CPTs are inadequate and limit access to care. Our results suggest that the creation of appropriate codes is necessary to expand access to care and ultimately improve outcomes for lymphedema patients.

Combined Central and Peripheral Nerve Stimulation Improves Functional Recovery of Mixed Nerve Injury in Rat Forelimb: Peripheral Nerve Injury Model

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INTRODUCTION: Peripheral nerve reinnervation following nerve injury is often a slow and incomplete process, resulting in significant morbidity and permanent loss of function of the injured extremity in many patients. Prior studies have shown the efficacy of electrical stimulation to accelerate the recovery of both motor and sensory neurons in peripheral nerve injury models. Moreover, separate investigations have also shown the use of closed-loop cranial nerve stimulation to improve the neuroplasticity of the motor cortex, improving functional outcomes. However, no study has investigated the synergistic effects of both intraoperative electrical stimulation and cranial nerve stimulation for functional improvement within a peripheral nerve injury model. This investigation quantifies the efficacy of both intraoperative electrical stimulation and trigeminal nerve stimulation on motor and sensory functional recovery in a rat peripheral nerve injury model.

METHODS: Twelve Lewis rats were trained in a reach-to-grasp task for a food reward using their right forelimb in the MotoTrak training system. Baseline sensory data was also retrieved using a Von Frey monofilament test. All rats underwent surgical transection of the median and ulnar nerve of their right forelimb, followed by one hour of intraoperative electrical stimulation. Adjuvant trigeminal nerve stimulation was completed via supraorbital headcap electrodes. Force and sensory data were compared to cohorts of sham surgery (no nerve transection), brief intraoperative electrical stimulation, adjuvant trigeminal nerve stimulation, and a no-stimulation group.

RESULTS: The combined cohort of rodents were able to recover to their pre-injury motor function by the third week of rehabilitation, faster than either of the singular electrical stimulation cohorts assessed previously. Moreover, the combined stimulation cohort's functional sensory data demonstrated no change compared to their pre-injury baseline, indicating a full functional recovery prior to the first data timepoint.

CONCLUSIONS: Peripheral nerve electrical stimulation and adjuvant trigeminal nerve stimulation are two separately acting mechanisms of therapy that employ electric waveforms to improve the functional recovery of injured peripheral nerves. The former acts within the periphery to accelerate axonal growth and regeneration of the nerve, while the latter acts centrally as a way for cortical remapping, improving the task-specific function of newly regenerated nerves. When used simultaneously in a rodent peripheral nerve injury model, these modalities have shown to build upon each other to deliver a faster motor and sensory functional recovery.

Let Sleeping Ulcers Lie: Maintenance Debridement Unnecessary in Treatment of Chronic Pressure Injuries of the Bony Pelvis and Greater Trochanter

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PURPOSE: Pressure injuries (PI) are a major burden on the American healthcare system with an annual incidence of 1 to 3 million and estimated to cost up to $26.8 billion annually.(1,2) While stage 3 and 4 PIs are ideally treated with surgical reconstruction, complex medical and social comorbidities often make members of the affected patient population poor candidates for surgery.(3) Current guidelines for the non-surgical management of chronic PIs recommend serial debridement in an attempt to disrupt the "senescence" of the wound bed and promote an acute wound state.(4) This study examines the assumption that serial surgical debridement accelerates wound healing of pelvic girdle and trochanteric PIs and likely predictive factors related to ulcer resolution.

METHODS: This retrospective study identified a random sample of 800 inpatient and outpatient diagnoses with ICD-10 codes associated with pressure injuries located over the bony pelvis and greater trochanters seen at the Yale-New Haven Health system from 2013-2020. PIs with <6-months follow-up were excluded. Patient demographics, presence of diabetes, smoking status, count of surgical/sharp debridements, Braden score, ulcer stage, and volume of tissue loss at presentation were collected as likely predictive factors. Primary outcomes included ulcer resolution, surgical closure, recurrence, and mortality. Data were manually cross-referenced with patient charts to ensure accuracy. Chi square tests were used to compare ulcer resolution between experimental groups and multivariate logistic regression was used to determine factors associated with ulcer resolution. Significance was defined as $p < 0.05$.

RESULTS: Out of 325 wounds, 37.2% (n=121) had documented resolution with 20.9% (n=68) receiving reconstructive surgical closure. Overall mortality rate was 16.6% (n=33) and one-year recurrence was 8.6% (n=28). Of the 148 ulcers labeled Stage 3 or 4 treated with conservative management alone, 23.0% (n=34) achieved resolution. No significant increase in resolution was observed in ulcers receiving >1 debridement ($p=0.08$) . Of the likely predictive factors analyzed, none were found to correlate with PI resolution ($p>0.05$).

CONCLUSION: Given the inconvenience, discomfort, and cost associated with serial surgical debridement, we recommend more judicial and selective application of sharp debridement rather than a frequent weekly use of sharp debridement for all patients with chronic wounds. Future research on pelvic and trochanteric PIs must recognize the limits of the senescence model and seek new ways of thinking about wound healing.

REFERENCES:

1. Padula WV, Delarmente BA. The national cost of hospital-acquired pressure injuries in the

United States. Int Wound J. 2019;16(3). doi:https://doi.org/10.1111/iwj.13071
2. Mervis JS, Phillips TJ. Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation. J Am Acad Dermatol. 2019;81(4):881-890. doi:https://doi.org/10.1016/j.jaad.2018.12.069
3. Edsberg LE, Black JM, Goldberg M, McNichol L, Moore L, Sieggreen M. Revised National Pressure Ulcer Advisory Panel Pressure Injury Staging System. J Wound Ostomy Continence Nurs. 2016;43(6):585-597. doi:https://doi.org/10.1097/won.0000000000000281
4. Cardinal M, Eisenbud DE, Armstrong DG, et al. Serial surgical debridement: A retrospective study on clinical outcomes in chronic lower extremity wounds. Wound Repair Regen. 2009;17(3):306-311. doi:https://doi.org/10.1111/j.1524-475x.2009.00485.x

Robotic-assisted surgical repair of rectus diastasis and abdominal bulge following abdominally based breast reconstruction

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PURPOSE: The DIEP flap is the gold standard in autologous breast reconstruction. Despite advances in perforator dissection, abdominal donor site morbidity still occurs. Traditional rectus diastasis (RD), bulge, and hernia repair with open techniques and onlay mesh have high complication rates. We present a case series of delayed robotic repair of symptomatic RD and bulge following abdominally based breast reconstruction.

METHODS: A single-center, retrospective review was conducted of patients who underwent DIEP flap breast reconstruction and subsequent robotic-assisted repair of RD and bulge. Pre-operative demographics and post-operative clinical and patient-reported outcomes were reviewed. RD up to 5 cm and any ventral/umbilical hernias were repaired by a single general surgeon via plication with running suture and reinforcement with macroporous mesh.

RESULTS: Ten patients with an average age of 49 years (range 41-63) and BMI of 31 kg/m2 (range 26-44) were included in the study. The average DIEP flap size was 664.95 g (range 315-1197), the average number of perforators harvested was 2.5 (range 1-4). RD and hernia sizes were 2.9 cm (1.5-4.2) and 5.8 cm2 (<1-15), respectively. One patient (10%) experienced post-operative surgical site complications including seroma and wound infection. Two patients (20%) reported a post-operative bulge but CT scan showed no evidence of hernia recurrence. Five patients completed a post-op survey which demonstrated that in general, one's abdominal wall

affects their health and mental well-being. At 30 days post-op, most patients felt that their abdominal wall does not interfere with activities of daily living.

CONCLUSIONS: In a small percentage of patients, abdominal free flap-based breast reconstruction is associated with symptomatic rectus diastasis and abdominal bulge. Minimally invasive robotic repair of rectus diastasis up to 5 cm can be performed with mesh reinforcement. This technique is effective with low complication rates and improvement in quality of life.

A Comparative Analysis of Outcomes Following Surgical Management of Upper and Lower Extremity Lymphedema

Abstract Presenter
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PURPOSE: In the United States, lymphedema often arises as an adverse effect of lymph node dissections and radiation employed to treat a primary malignancy.(1) Following diagnosis and physical therapy, physiologic surgery such as vascularized lymph node transfer (VLNT) and lymphovenous bypass (LVB) are effective in preventing and managing the physical and functional morbidity associated with lymphedema.(2,3) However, further characterization of their relative efficacy in upper and lower extremity, primary and secondary lymphedema is warranted.

METHODS: A retrospective cohort study of adult patients who underwent therapeutic VLNT or LVB of the upper and lower extremity from January 2018 to August 2022 was conducted. Patients were divided into upper and lower extremity cohorts based on the location of the procedure received. Patient demographics, lymphedema characteristics, operative details, postoperative complications, limb measurements, and pre- and postoperative Lymphedema Life Impact Scale (LLIS) scores were compared between cohorts.

RESULTS: A total of 85 patients underwent LVB or VLNT within our study period, of which 65 were of the upper extremity, and 20 patients were of the lower extremity. At the median time of follow-up of 20 (IQR: 11,33) months, patients of the lower extremity cohort had significantly lower reductions in differential measurements at >1 year postoperatively ($p=0.0372$) and at the time of last follow-up ($p=0.047$) compared to the therapeutic upper extremity cohort. Similarly, the lower extremity cohort had significantly higher LLIS scores at 1- ($p=0.001$), 3- ($p=0.020$),

and 6 months (p=0.013) and >1 year postoperatively (p=0.005).
Conclusions: Lymphedema surgery may be less effective in improving clinical and patient-reported outcomes in the lower extremity than in the upper extremity. These results emphasize the importance of setting proper preoperative expectations, optimal procedure selection, and a multidisciplinary approach in providing individualized patient care.

REFERENCES

1. Lopez M, Roberson ML, Strassle PD, Ogunleye A. Epidemiology of Lymphedema-related admissions in the United States: 2012–2017. Surgical Oncology. 2020; 35:249-253.
2. Scaglioni MF, Fontein DB, Arvanitakis M, Giovanoli P. Systematic review of lymphovenous anastomosis (LVA) for the treatment of lymphedema. Microsurgery. 2017;37(8):947-953.
3. Chang DW, Suami H, Skoracki R. A prospective analysis of 100 consecutive lymphovenous bypass cases for treatment of extremity lymphedema. Plastic and reconstructive surgery. 2013;132(5):1305-1314.

When it Drains it Pours: Assessing Drain Duration and Infectious Outcomes in Lower Limb Osseointegrated Prostheses

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PURPOSE: Osseointegrated prostheses are a novel solution for lower limb amputees that seek to improve mobility, nerve pain, and other issues related to poorly tolerated sockets. Surgical drains are placed during implantation and soft tissue contouring to reduce post-operative fluid accumulation. Postoperative complications of osseointegration include soft tissue infection and osteomyelitis, which may require operative washout, debridement, and even implant removal if not diagnosed and treated early. Little is known about the impact of drain placement or duration on rates of infection. Firsthand information on drain use and infection rates in this population will aid physicians in preventing and managing adverse outcomes in this comorbid population.

METHODS: A retrospective analysis was performed on all patients who received a single-stage lower-limb osseointegration at our institution between 2017 and 2022. Demographics, medical history, and postoperative complications were reviewed. Each patient included in the study had at least 3 months post-operative follow up. Pearson's chi-squared test and Student's t-tests were used to assess the association between patient characteristics and infections, using an alpha of

0.05. Multivariable regression was used to determine the impact of drain duration on infection rate after controlling for other significant predictors of infection identified in the univariate analysis.

RESULTS: Our study included 70 patients: 45 males and 25 females with 50 transfemoral and 20 transtibial amputations. Surgical drains were maintained for an average of 4.5 ± 3.7 days after implantation. 67 patients had 1 drain, and 3 patients had 2 drains. Of these 70 patients, 20 developed a soft tissue infection or osteomyelitis within the first 3 months after implantation. Female sex and history of prior amputation before osseointegration were significant predictors of post-operative infection ($p<0.01$). Drain duration was not a significant predictor of postoperative infection in the univariate analysis ($p>0.05$). After controlling for patient sex and history of prior amputation, drain duration was still not a significant predictor of infection when controlling for sex and prior amputation ($p>0.05$). Notably, there were no instances of postoperative seroma or hematoma in this cohort.

CONCLUSIONS: As osseointegrated prostheses become more accessible for lower limb amputees, plastic surgeons will become increasingly responsible for managing soft tissue concerns, including postoperative infection. Our study shows that drain duration is not a predictor of these infections, while sex and previous amputations are nonmodifiable predictors. These results aid physicians in anticipating infectious complications in certain patient populations and demonstrate that drain duration should not influence the decision to remove drains.

Minority Pediatric Burn Survivors Require More Surgeries: A Single Center's Five-Year Experience

Abstract Presenter
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INTRODUCTION: Burn injuries remain a significant source of trauma in the United States. Of approximately two million burns annually, 100,000 warrant hospitalization. Furthermore, burn injuries disproportionately affect racial and ethnic minorities. Adult African American and Hispanic patients experience worse post-burn outcomes in wound healing and community integration compared to White patients. Although disparities are well documented in adult populations, less is known regarding those in pediatric patients' burn care. To address this gap in literature, we aim to better characterize burn injuries, inpatient treatments, and post-discharge management in minority pediatric burn patients. We hypothesize these patients require more surgery for their burns and undergo more unplanned re-admissions than non-minority patients.

METHODS: A single institution retrospective chart review of pediatric patient admissions with burn injuries from July 1st, 2016 to July 1st, 2021. Demographics, mechanism of burn injury, details of inpatient surgical and non-surgical care, post-discharge follow-up, re-admissions, and post-discharge treatments for scar management were collected. Minority status was determined from patients' self-reported race/ethnicity in the electronic medical record. Patients identifying as Hispanic/Latino, Black, and Asian were coded as minority patients. Univariate analysis was utilized to determine statistical significance in primary outcomes such as burn injury characteristics, readmissions, and follow-up rates between minority and non-minority patients.

RESULTS: A total of 332 patients with average age of 4.9 years (SD: 4.4) and average total burn surface area (TBSA) of 8.5% (SD: 10.0) were collected. Average length of stay was 9.3 days (SD: 15.2). Sixty-five (19.6%) patients required burn intensive care unit (ICU) admission, of which average ICU length was 12.7 days (SD: 24.9). Regarding burn treatment, 103 (31.0%) patients underwent surgical management. There were 23 (6.9%) patients who were readmitted, with 314 (94.6%) patients presenting for at least one follow-up visit.
Minority (Hispanic, Black, Asian) patients were significantly more likely to experience non-accidental burn injury ($p < 0.01$), inhalational injury ($p < 0.01$), surgical management ($p < 0.01$), and to require skin graft ($p < 0.01$) than White patients. Minority patients were significantly more likely to undergo laser treatment after discharge ($p < 0.01$) than White patients. Minority patients were not significantly more likely to be readmitted ($p = 0.82$) and have higher TBSA ($p = 0.66$) than White patients.

CONCLUSIONS:
Minority pediatric patients often present with worse burn injuries and are significantly more likely to experience non-accidental burns and inhalational injury. These burn injuries require surgical management such as skin graft, which then require longitudinal reconstructive procedures including laser therapy. Further research is necessary to characterize and provide resources and support minority pediatric patients require in their post-burn recovery. Short-term goals should be to better facilitate physical and psychosocial outcomes in this often-underserved patient population.

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The Impact of Body Mass Index on Adverse Effects Associated with Panniculectomy: a Multimodal Analysis

Abstract Presenter

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BACKGROUND: Obesity rates have dramatically increased over time, with an anticipated 50% of the population to be considered obese or overweight by the year 2030. Correspondingly, the demand for bariatric surgery continues to increase as well. With universal acceptance and significant weight loss following these procedures, the subsequent interest in body contouring increases similarly. Within this unique population of patients who experience massive weight loss, universal BMI cutoffs may inappropriately exclude individuals who may otherwise ultimately be safe surgical candidates who stand to profoundly benefit from the procedure. We aim to systematically review the literature surrounding the role of BMI in the development of post-panniculectomy complications after massive weight loss and establish new BMI cutoff recommendations for preoperative screening.

METHODS: The authors performed a systematic review and meta-analysis of the literature according to PRISMA guidelines using PubMed, Embase/OVID, and Cochrane databases from inception through June 2022. A meta-regression utilizing a random-effects model was then conducted examining the effect of BMI on all cause post-operative complications with both Cochrane Q and I2 test statistics to assess study heterogeneity. A cohort of patients receiving panniculectomies between 2007-2019 were then identified using NSQIP and used to build a univariate logistic model with respective ROC curves that were internally validated using Python and R.

RESULTS: A total of 34 studies were included in the systematic review. A meta-regression model conducted to examine the effect of BMI on all cause post-operative complications utilizing a random-effects model with Cochrane Q and I2 tests demonstrated significant study heterogeneity that precluded meta-analysis. Our NSQIP training cohort univariate logistic regression demonstrates that BMI is significantly associated with all complications (OR 1.05, 95% CI 1.04-1.0). ROC curves developed from this regression demonstrate that BMI significantly predicted all complications and wound complications, with an AUC of 0.64 (95% CI 0.62-0.66) and 0.66 (95% CI 0.63-0.69), respectively. With a testing cohort, we calculated and internally validated a BMI cutoff for all complications to be 33.2 and for wound complications to be 35, that were fit to RSC's which illustrates that after which, we observe only marginal increases in complication incidence with incremental BMI increases.

CONCLUSION: In the setting of rising obesity, the number of patients undergoing bariatric surgery and requesting body contouring procedures after massive weight loss are increasing. Our systematic review and analysis illustrate that the risk of surgical complications rises most dramatically for patients with a BMI over 33.2, which is above several institutions' eligibility

cutoffs. By increasing preoperative BMI screening cutoffs, a more nuanced patient-centered conversation regarding risks and benefits of body contouring can be had to ultimately increase access and inclusion for this unique population.

Close

Scar Contracture Recurrence After Axillary Burn Reconstruction: A Retrospective Review of a Single Institution's 13-Year Experience

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INTRODUCTION: Post-burn axillary scar contracture can lead to significant morbidity and impaired upper limb function. However, the incidence of complications and scar contracture recurrence following such surgery remains unclear. This study aims to evaluate the rate of scar contracture recurrence and other complications after axillary burn reconstruction.

METHODS: A retrospective review of patients who underwent surgical release of axillary burn scar contractures at UPMC Mercy between June 2009 and October 2022 was conducted. Variables collected included demographic information, comorbidities, type of injury, defect size, reconstruction details, follow-up, number of re-operations, and complications.

RESULTS: Over a 13-year period, 27 patients with 30 axillary burn scar contractures underwent reconstructive surgery. Our cohort was 74.1% male and 25.9% female, with a mean age of 36.8±15.2 years and a mean BMI 26.0±5.9. The most common comorbidities were smoking (55.6%), hypertension (22.2%), obesity (22.2%), and asthma (11.1%). Thermal injuries accounted for the majority of burn etiologies (95%), while electrical injuries made up the remaining 5%. Mean time between day of injury and reconstructive surgery was 10.3±8.5 months, and the mean follow-up period was 18.1±26.4 months. The mean defect size was 138.8±127.5 cm^2.

Of 30 axillary contractures, 4 were treated using a two-stage approach: Integra (n=3) or Theragenesis (n=1) was applied during the first procedure and replaced 2 weeks later with a split-thickness skin graft (STSG) during a second procedure. The remaining 26 axillary contractures were treated with Z-plasty only (n=12), Z-plasty and V-Y advancement (n=3), V-Y advancement only (n=2), latissimus dorsi flap (LDF) with STSG (n=3), STSG only (n=5), or adjacent square flap (n=1). The overall complication rate was 13.3% (n=4). Two of the two-stage Integra + STSG procedures resulted in partial (60-80%) skin graft take. The remaining two cases of complications occurred bilaterally in the same patient, who experienced graft loss, infection

(erythema, cellulitis), and wound opening after STSG only.

The overall contracture recurrence rate was 30% (n=9). Contracture recurrence rate for specific procedures are as follows: two-stage Integra + STSG (n=1; 33.3%), Z-plasty only (n=2; 20%), STSG only (n=3; 60%), LDF with STSG (n=2; 66.7%), and adjacent square flap (n=1; 100%). Re-operation was performed in 77.8% of contracture recurrences (n=7). An average of 1.7±1.1 re-operations were performed per contracture recurrence. Re-operations included Z-plasty only (n=3), W-plasty (n=2), STSG only (n=2), Z-plasty and STSG (n=1), Z-plasty and V-Y advancement (n=1), two-stage Integra + STSG (n=1), and latissimus dorsi flap (n=1). Complication rate for re-operation was 16.7% (n=2), including mild dehiscence after Z-plasty only and infection after STSG only.

CONCLUSION: There is a high rate of contracture recurrence after axillary burn reconstruction, often requiring multiple re-operations. Therefore, it is important to inform the patient about the possibility of undergoing multiple interventions when addressing post-burn axillary scar contracture. More studies are necessary to identify the surgical treatment options that can minimize the likelihood of contracture recurrence.

Assessing Risk of Targeted Muscle Reinnervation as Prophylaxis for Lower Limb Postamputation Pain: An Analysis of the NSQIP Database (2011-2020)

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BACKGROUND: Prophylactic targeted muscle reinnervation (TMR) performed at the time of lower extremity amputation (LEA) is a relatively new technique that may reduce risk of postoperative pain and improve ambulatory function.1 This study aims to assess national trends and early adverse events of prophylactic TMR.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database (2011-2021) was queried for LEA patients who received TMR as a secondary procedure or planned reoperation. Patients who underwent LEA without TMR were identified and randomly sampled to obtain unmatched controls for a 3:1 case-control study. Univariate and multivariate analyses were performed.

RESULTS: Of the 45 prophylactic TMR cases identified across 2014-2021, 36 (80%) were performed in 2020-2021. Compared to controls, patients who received TMR were significantly younger ($p<0.0001$), less frail ($p<0.0001$), and less likely to have diabetes ($p=0.0006$),

hypertension (p<0.0001), and chronic kidney disease (p=0.0470). Prophylactic TMR was performed more frequently in patients requiring amputation for acute injury, diabetes, and malignancy/neoplasm, and less frequently with amputations for peripheral vascular disease, and infectious, chronic or non-healing wounds (p<0.0001). Operative time was significantly longer with TMR (p<0.0001). Rates of hospital stay >30 days, return to operating room, and readmission did not differ for TMR patients. All-cause complications were not associated with prophylactic TMR both on univariate analysis and after adjusting for age and frailty on multivariate analysis. Patients receiving TMR did not have significantly different rates of wound, mild systemic, and severe systemic complications. On subset analysis of diabetic LEA patients, all-cause complications were not found to be significantly associated with TMR.

CONCLUSION: Prophylactic TMR performed secondary to LEA for the prevention of post-amputation pain has become increasingly common since the technique and its efficacy was first described by Valerio et al. in 2019.2 Although prophylactic TMR was found to be more frequently performed in younger and healthier patients, complication rates between TMR and non-TMR amputation patients were equivocal, even on adjusted and subset analyses. TMR should be performed in more patients undergoing lower extremity amputation to prevent postamputation lower limb pain.

REFERENCES:

1. Chang, Brian L. M.D.; Mondshine, Josh B.S.; Attinger, Christopher E. M.D.; Kleiber, Grant M. M.D.. Targeted Muscle Reinnervation Improves Pain and Ambulation Outcomes in Highly Comorbid Amputees. Plastic and Reconstructive Surgery 148(2):p 376-386, August 2021. | DOI: 10.1097/PRS.0000000000008153

2. Valerio IL, Dumanian GA, Jordan SW, et al. Preemptive Treatment of Phantom and Residual Limb Pain with Targeted Muscle Reinnervation at the Time of Major Limb Amputation. J Am Coll Surg. 2019;228(3):217-226. doi: 10.1016/j.jamcollsurg.2018.12.015

Perivascular Scar Decompression before Lymphedema Surgery in Patients with Breast Cancer-Related Lymphedema: Is it Necessary?

Abstract Presenter
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PURPOSE: One in eight women will develop breast cancer within their lifetime. Of these women, up to 40% may go on to develop breast cancer-related lymphedema (BCRL).1,2

Traditionally, it is thought that perivascular scarring following mastectomy procedures can cause functional venous stenosis, leading to downstream venous hypertension in the affected extremity. This becomes a concern when a patient with BCRL undergoes physiologic lymphedema surgery, as the success of these procedures relies heavily on optimized vascular hemodynamics. Therefore, current surgical practice is to decompress perivascular scarring in the proximal upper extremity at the time of vascularized lymph node transfer (VLNT) or lymphovenous bypass (LVB). The purpose of this study is to evaluate for the presence of functional venous stenosis in patients with BCRL and thus, determine whether scar decompression is a necessary part of physiologic lymphedema surgery.

METHODS: The authors conducted a retrospective review of 64 patients with unilateral BCRL that presented to our lymphedema designated center of excellence at University of Miami Miller School of Medicine between November 2020 and September 2022. Venous duplex ultrasound reports of the bilateral upper extremities identified any disturbances in venous blood flow or indications of venous stenosis in the affected extremity.

RESULTS: Of the 64 patients with BCRL, 81% (n=52) had a prior axillary lymph node dissection. Forty-two (65%) of these patients completed ultrasound imaging, of which, one patient (2%) had venous stenosis in the affected lymphedematous extremity identified on duplex ultrasound that may have suggested functional scarring. Rather than functional scarring from mastectomy, radiologist readings interpreted the patient to likely have vessel stenosis from a prior subclavian thrombosis. VLNT to the proximal affected upper extremity was performed in six patients (9%). Mean follow-up was 12.5 months. Average lymphedema life impact scale (LLIS) score and L-dex were 35 and 17 units preoperatively. LLIS decreased by an average of 17.5 postoperatively. Mean postoperative reduction in L-dex was 15.0 units.

CONCLUSION: Perivascular scarring in patients with BCRL did not lead to identifiable functional venous stenosis on duplex ultrasound apart from one patient, in which radiologist readings suggested post-thrombotic changes. Five patients received VLNT procedures without perivascular scar decompression of the axilla, all of which having substantial decreases in both subjective and objective measures of lymphedema postoperatively. Perivascular scar decompression may therefore not be necessary for physiologic lymphedema surgery, reducing operative times and eliminating the risk of injury to neurovascular structures in the axilla.

REFERENCES:

1. Giapuinto AN, Sung H, Miller KD. Breast Cancer Statistics, 2022. CA: A Cancer Journal for Clinicians. 2022;72(6):524-541.
2. Hayes SC, Janda M, Cornish B, Battistutta D, Newman B. Lymphedema after breast cancer: incidence, risk factors, and effect on upper body function. J Clin Oncol. 2008 Jul 20;26(21):3536-42.

The Equivocal Perioperative Risk Profile for Supercharged and Non-Supercharged TRAM Flaps in Breast Reconstruction: A NSQIP Database Study

Abstract Presenter
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INTRODUCTION: The pedicled transverse rectus abdominis myocutaneous (TRAM) flap is reliable and versatile for breast reconstruction largely due to its predictable vascular supply based on the superior epigastric vessels. However, certain reconstructions may require larger TRAM flaps with skin paddles that extend beyond the typical angiosome territories. To ensure adequate perfusion to the larger extra-angiosomal flap, surgeons may utilize microvascular "supercharging" techniques to create additional anastomoses from the distal flap to available recipient vessels within the defect. Despite its reported clinical benefit, no large study to date has investigated the perioperative risks associated with TRAM flap supercharging. As a result, this study utilizes the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database to determine risks associated with supercharging.

METHODS: The perioperative outcomes for patients undergoing breast reconstruction using pedicled TRAM flaps with and without supercharging were compared using data from the ACS-NSQIP database (2017 to 2020). Patients were identified according to Current Procedural Terminology (CPT) codes 19367 (breast reconstruction with TRAM flap 1 pedicle) and 19378 (breast reconstruction with TRAM flap 1 pedicle with microvascular anastomosis).

RESULTS: The total cohort was 567 patients with an average age of 52.7 years (SD 10.0 years). There were 388 patients who received regular TRAM (R-TRAM) flaps and 179 who had supercharged TRAM (S-TRAM) flaps. There were no significant differences in age ($p = 0.07$) or BMI ($p = 0.49$) between both groups. Patients with supercharging were not at increased risk for readmissions ($p = 1.00$), superficial surgical site infections ($p = 0.30$), or wound disruptions ($p = 0.76$). Patients with S-TRAM flaps experienced significantly longer operations (458.7 minutes vs 333.3 minutes, $p < 0.01$) and hospitalizations (4.1 days vs 3.1 days, $p < 0.01$) than the R-TRAM cohort.
S-TRAM flaps did not have an increased risk for re-operation ($p = 0.24$) compared to R-TRAMs. However, among patients requiring re-operation, S-TRAMs were significantly more likely to undergo breast revision (risk ratio: 3.5, $p = 0.03$). Both R-TRAM and S-TRAM groups had similar rates of re-operation for Incision and Drainage (17 vs. 7, $p = 1.00$) as well as debridement (6 vs. 3, $p = 1.00$).

CONCLUSIONS: Patients with supercharged TRAM flap breast reconstructions are at no greater overall risk for perioperative adverse events compared to patients whose TRAM flaps did not require supercharging. However, this study reports supercharged TRAM flaps are at increased risk for longer surgeries and hospitalizations. Additionally, among patients requiring breast re-operations, those with supercharging more often required breast revision although the exact reason for breast revision was not available within the NSQIP database. There were no identifiable risk factors from the database which could explain those patients most at risk for

complications within the two cohorts. This study calls into question the utility of supercharging as an effective augmentation for TRAM flaps as the risks may outweigh the benefits.

Tissue Expansion Results in Prominent Epigenetic Changes in the Epidermis

Abstract Presenter
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PURPOSE: The skin is unique among mammalian organs with its capability to undergo dramatic size changes in adults in response to physiological conditions like pregnancy, pathophysiologic states such as obesity, or therapeutically as in tissue expansion. Our previous work uncovered a role for mechanical tension in mobilizing Lgr6+ stem cells to regenerate the epidermis (1). However, the role of epigenetic control of gene regulatory programs governing skin growth remains to be explored. DNA methylation at the 5-position of cytosines followed by enzymatic hydroxylation (5hmC) is known to be prevalent epigenetic modification in terminally differentiated cells, with stem/progenitor cells expressing low 5hmC levels (2). Here we investigate the proportion and distribution of epidermal skin cells expressing high levels of 5hmC in both expanded and non-expanded skin using a novel system of controlled tissue expansion in mice.

METHODS: Small silicone tissue expanders with remote injection ports were inserted in a subcutaneous, suprafascial plane in young adult mice. After 1 week of surgical recovery (Day 0), saline was injected into the ports to induce gradual expansion over 14 days in the treatment group. Skin samples were obtained at Day 0 and Day 14 and cut into serial 4-μm sections. Immunohistochemical detection of 5hmC was performed followed by an H&E counterstain to visualize nuclei. Slides were scanned and imaged at 80x, and the number of epidermal cells expressing high levels of 5hmC was quantified. A minimum of 4 mice per group were used and 2 to 6 tissue sections were fully quantified per mouse. A one-way ANOVA test was performed to determine significant differences ($p<0.05$) among groups.

RESULTS: At Day 0, 25.5% of epidermal cells expressed high levels of 5hmC in the non-expanded group and 26.3% in the expanded group ($p=0.99$). At Day 14, 21.4% of epidermal cells expressed high levels of 5hmC in the non-expanded group but only 3.0% in the expanded group ($p=0.003$). There was a significant decrease in 5hmC positive cells at day 14 in the expanded group compared to both expanded and non-expanded groups at day 0 ($p<0.001$). In the day 14 expanded skin, cells expressed more 5hmC as they migrated further from the basal layer in a hierarchical distribution.

CONCLUSIONS: Tissue expansion triggers epigenetic changes in epidermal skin with nearly an order of magnitude decrease in the number of cells expressing high 5hmC, demonstrating a decrease in terminal differentiated cells and an increase in progenitor/stem cells. From the basal to suprabasal layers in expanded skin, there is a hierarchy in cell differentiation. These findings form a basis for identifying epigenetically controlled genes governing skin growth and demonstrate the utility of our tissue expansion platform to understand organ size dynamics.

References:

1. Xue Y, Lyu C, Taylor A, et al. Mechanical tension mobilizes Lgr6+ epidermal stem cells to drive skin growth. Sci Adv. 2022;8(17):eabl8698.
2. Haffner MC, Chaux A, Meeker AK, et al. Global 5-hydroxymethylcytosine content is significantly reduced in tissue stem/progenitor cell compartments and in human cancers. Oncotarget. 2011;2(8):627-637.

Comparison of Postoperative Outcomes in Patients undergoing Lower Extremity Reconstruction based on the Estimated Prevalence of Pre-existing Peripheral Arterial Disease

Abstract Presenter
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PURPOSE: Limb salvage following lower extremity (LE) trauma requires optimal blood flow for successful microsurgical reconstruction. Peripheral arterial disease (PAD) decreases LE perfusion, affecting wound healing. Patients who present with LE trauma may have undiagnosed PAD, particularly those with atherosclerotic risk factors. There is limited literature on microsurgical reconstruction outcomes in these patients. (1) This study assesses outcomes following LE salvage in patients at risk for PAD.

MATERIALS AND METHODS: This retrospective review evaluated patients who underwent LE reconstruction at a Level 1 trauma center between 2007-2022. Patients with a nontraumatic mechanism of injury, missing postoperative records, and unspecified race were excluded. Demographics, flap characteristics, and postoperative complications were abstracted. The prevalence of lower-extremity PAD was calculated using a validated risk assessment tool. (2)

RESULTS: At our institution, 285 LE flaps performed on 254 patients were included in the study. Patients were categorized by prevalence of PAD, including 12 (4.7%) with high-risk, 45 (17.7%) with intermediate-risk, and 197 (77.6%) patients with low-risk. The high-risk cohort had

higher rates of partial flap necrosis (p=0.037), flap loss (p=0.006), and amputation (p<0.001) compared to the low-risk group. Fewer high-risk patients achieved full ambulation compared to the low-risk (p=0.005) cohort. Overall flap survival and limb salvage rates were 94.5% and 96.5%, respectively. Among the intermediate- and high-risk cohorts, only 50.9% of patients received a preoperative vascular assessment, and 3.8% received a vascular surgery consultation.

CONCLUSION: PAD represents a reconstructive challenge to microvascular surgeons. Patients with high-risk for PAD had higher rates of partial flap necrosis, flap loss, and amputation. In the setting of trauma, emphasis should be placed on preoperative vascular assessment for patients at risk of having undiagnosed PAD. Prospective studies collecting ankle-brachial index assessments and/or angiography will help to validate this study's findings.

REFERENCES:

1. Karachentsev S. Blunt vascular trauma in a patient with peripheral arterial disease: a case report and review of the literature. J Surg Case Rep. Oct 2020;2020(10):rjaa412. doi:10.1093/jscr/rjaa412
2. Matsushita K, Sang Y, Ning H, et al. Lifetime Risk of Lower-Extremity Peripheral Artery Disease Defined by Ankle-Brachial Index in the United States. J Am Heart Assoc. Sep 17 2019;8(18):e012177. doi:10.1161/JAHA.119.012177

The Microsurgeon's Role in Vascular Repair for Limb Salvage of Neonates and Infants: A Case Series

Abstract Presenter
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PURPOSE: To describe the potentially vital role of microsurgeons in neonatal and infantile vascular emergencies and reconstruction where a current treatment protocol is not well defined for these patients.

METHODS AND MATERIALS: A retrospective review of cases performed between 2018 and 2023 requiring vascular reconstruction of major limb vessels were reviewed. Five cases were identified. Four cases were vascular reconstructions secondary to iatrogenic vascular injury in neonates, and one case was vascular reconstruction in an infant with congenital brachial artery aneurysm. All cases were performed by a pediatric microsurgeon due to size of the vessels. The pertinent literature is also reviewed.

EXPERIENCE: Patient ages ranged from 10 days to 10 months. Two (40%) patients were male, and three (60%) were female. Patient weight averaged 4.1 kg (1.47 to 10.3 kg). Iatrogenic causes

for repair included brachial artery thrombosis, compartment syndrome, and femoral artery injury. One patient had a congenital brachial artery aneurysm. All cases were performed at Phoenix Children's Hospital by a plastic surgery-trained reconstructive microsurgeon.

RESULTS: All patients required vascular repair with a saphenous vein graft (80%) or primary repair (20%). One patient required revision on postoperative day one. All patients had verified flow on follow-up ultrasound and appropriate limb function on physical exam with minimum 1-month follow-up (1-14 months). All limbs were salvaged.

CONCLUSIONS AND RELEVANCE: Vascular injuries in neonates and infants are rare but potentially devastating complications of invasive procedures. Vascular surgeons rarely repair these due to their small size and high spasm rate. The literature has very little data on how to approach these injuries. As cardiac and critical care interventions, especially those requiring vascular access, are performed on more complex patients at younger ages, clinicians should be aware of the potential for vascular injury. In the event of these findings, plastic surgeons with microsurgical expertise can be crucial in improving outcomes in this mounting specialty of neonatal/infantile vascular surgery.

Implications of Single-Vessel Runoff on Long Term Outcomes of Free Tissue Transfer for Lower Extremity Reconstruction

Abstract Presenter
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BACKGROUND: Patients with complex lower extremity wounds and single-vessel lower extremity runoff (1-VRO) are often considered for amputation. While more challenging, free tissue transfer is a means for limb salvage in this patient population. This study aims to demonstrate the feasibility of limb salvage with free tissue transfer in patients with 1-VRO.

METHODS: Patients undergoing free tissue transfer by a single surgeon between 2011 and 2021 were retrospectively reviewed. Information collected included demographics, wound characteristics, vascular status, and operative details. Patients were divided into 1-VRO and 3-VRO runoff groups. Outcomes of interest included postoperative complications with an

emphasis on manifestations of vascular complications, such as distal necrosis and wounds, flap success, limb salvage, and ambulatory status.

RESULTS: A total of 188 patients underwent free tissue transfer to the lower extremity, with 25 patients (13.3%) having 1-VRO. Patients with 1-VRO had a comparable prevalence of diabetes (56.0% vs. 50.0%, p=0.569) and end-stage renal disease (8.0% vs. 3.7%, p=0.319). Osteomyelitis was more common in the 1-VRO group (80.0% vs. 60.1%, p=0.056). Free tissue transfer donor sites and flap composition were similar between cohorts. At mean follow-up of 21.2 months (IQR 24.5: 5.6, 30.1 months), limb salvage rates were similar between cohorts (84.0% vs. 91.4%, p=0.241), with no significant differences in ambulatory status or mortality. Higher complication rates occurred in the 1-VRO cohort (48.0% vs. 21.5%, p=0.004), of which partial flap necrosis was more prevalent in the 1-VRO group (8.0% vs. 1.2%, p=0.029). There was no difference in flap success rates between groups (p=0.805). More post-flap angiograms were performed in the 1-VRO group (32.0% vs. 9.2%, p=0.001); however, the need for repeat percutaneous endovascular intervention did not significantly differ between groups.

CONCLUSION: This study demonstrates that free tissue transfer reconstruction to the LE remains a reliable reconstruction option for limb salvage in patients with single-vessel supply to the LE. Reliance on advanced perioperative management, selective lower extremity angiographic endovascular intervention, and patient optimization is effective at reducing negative outcomes in patients with vascular disease.

NovoSorb Biodegradable Temporizing Matrix: A Novel Bilayer Skin Substitute for Reconstructive Surgery

Abstract Presenter
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INTRODUCTION: Autologous skin grafting is one of the mainstay treatments to wound closure on the reconstructive ladder. However, skin grafts have few well-described inadequacies, such as limited application over avascular structures and graft contracture. Regional or free flaps can be a solution to these challenging defects, but not all patients or situations are amenable to flap reconstruction. In these cases, tissue engineered skin substitutes may provide a reliable solution. Traditional skin substitutes have limitations such as high cost, antigenicity, and susceptibility for infection. NovoSorb Biodegradable Temporizing Matrix (BTM) is a novel, synthetic bilayer scaffold made of biodegradable polyurethane matrix covered with a sealing membrane. BTM has displayed promising performance in recent burn literature and may reduce

costs compared to competing dermal substitutes on the market. Our study sought to evaluate applications and outcomes of BTM in a cohort of complex reconstructive cases with variable patient presentation characteristics and diverse wound etiologies.

METHODS: After IRB approval, a retrospective review was performed on all pediatric and adult patients who underwent reconstruction with BTM from 2018-2022, regardless of wound etiology. Patient demographics, wound presentation characteristics, operative details, and reconstructive outcomes were recorded. Comparisons between successful and failed reconstructions were made with Kruskal-Wallis, Mann-Whitney U, and Fisher's exact tests.

RESULTS: A total of 65 cases from 44 patients were included. Trauma was the primary indication for reconstructing with BTM (32.3%), followed by burns and burn scar contracture releases (16.9%) and infection (16.9%). BTM was placed over exposed tendon in 23 cases (35.4%), bone in 14 cases (21.5%), and/or joints in 6 cases (9.2%). Wound closure was successfully obtained without a flap using BTM and subsequent skin grafting in 96.5% of cases. Cases that experienced poor BTM take (<75%) had significantly higher rates of hypertension ($p=0.007$), peripheral vascular disease ($p=0.009$), and current tobacco use ($p=0.01$) compared to cases with adequate BTM take (≥75%).

CONCLUSION:
Our study highlights the versatility of BTM and favors its use in challenging reconstructive cases as an adjunct to definitive wound closure. Although future prospective studies are forthcoming, our findings support the reliability and versatility of BTM as an exciting addition to the field of plastic and reconstructive surgery.

Close

Evaluation of Data Requirements for Animal Derived Wound Care Devices: Limitations of the 510k Pathway

Abstract Presenter
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INTRODUCTION: Chronic wounds are an increasingly relevant public health concern and are typically managed with local wound care. Selecting an appropriate wound care product for patients can be challenging due to the numerous options available on the market and paucity of comparative data. Because these products are traditionally cleared through the 510K pathway, it is unclear whether the premarket data required by the Food and Drug Administration (FDA) provide sufficient information for providers to make informed patient-specific decisions.

METHODS: The publicly available online 510K database was queried for all animal derived

wound care products (KGN) and summary statements were reviewed. Data requirements for each product were recorded and reported as descriptive statistics.

RESULTS: A total of 133 KGN products have been cleared through the 510K pathway since the FDA Center for Devices and Radiologic Health was established in 1976. Of these, only 114 had a publicly available clearance statement online. The most common animal component was porcine (48, 42%). Preclinical biocompatibility was performed in 85 (74.6%) and leveraged in 10 (8.8%) while preclinical wound healing testing in animals was only performed in 17 (14.9%) products. Clinical safety testing was performed for only 9 products (7.9%), and no products provided clinical effectiveness data from patients.

CONCLUSION: While the 510K pathway provides an appropriate avenue for clearing new wound care products, clinical effectiveness was never evaluated in regulatory review. Wound care products are primarily evaluated by FDA for safety and biocompatibility, and any claims of effectiveness for wound healing require independent validation.

Effect of a Perioperative Educational Video about Mohs Reconstruction: A Randomized Clinical Trial

Abstract Presenter
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PURPOSE: The characteristics of defects created by Mohs micrographic surgery (MMS) is difficult to predict and may require complex reconstruction. This uncertainty about reconstructive options and cosmetic appearance may be difficult emotionally and cognitively for patients. While educational interventions have been evaluated for improving patient knowledge about MMS, few studies discuss the reconstructive and recovery journey that often involve plastic surgeons. We investigated the utility of an educational video to improve understanding among patient undergoing MMS about reconstruction with plastic surgeons.

METHODS: A randomized clinical trial was conducted at an academic hospital in the US. The study was approved by the Vanderbilt University institutional review board. Inclusion criteria for study participation were: (1) adult patients (18 years or older) and (2) undergoing MMS with plastic surgery reconstruction. Patients were excluded if they were not undergoing reconstruction with a plastic surgeon or did not undergo MMS. Patients in the intervention arm watched an educational video about reconstruction after MMS which included content about reconstructive options and potential complications. All patients completed a 33-item survey about their understanding of reconstruction following MMS, satisfaction with their care, and the video if they received the intervention. A four-point Likert scale with responses "no understanding", "a

little", "quite a bit", and "very much" was used to measure patient understanding. Demographics were described and Pearson $\chi 2$ tests with Rao-Scott correction were used to compare outcomes.

RESULTS: A total of 18 patients were recruited for the study and completed the survey. Of these, 9 were randomized to the intervention group and viewed the educational video before completing the survey. There were no statistically significant differences in gender, marital status, race, and payer status among intervention and control groups. Although there were no statistically significant differences in educational attainment, 5 (55.6%) of patients in the control group had a master's degree or higher level of education compared to none in the intervention group.

Only one patient reported that cosmetic appearance was not important to them. All patients in the intervention group would recommend the video to family members with similar diagnoses and rated the video as useful and easy to understand. All patients also reported that they were "comfortable" or "very comfortable" having a plastic surgeon perform their reconstruction compared to a dermatologist (72.2%), otolaryngologist (44.4%), or general surgeon (61.1%). Compared to the control group, patients who watched the video were more likely to report "quite a bit" or "very much" understanding in regard to complications of reconstruction (100% vs 33.3%, $P<.05$), the difference between delayed and immediate reconstruction (100% vs 22.2%, $P<.05$), and the role of plastic surgery in reconstruction after MMS (100% vs 33.3%, $P<.05$). There were no differences in patient satisfaction between the groups.

CONCLUSIONS: This randomized clinical trial found that the use of a multimedia educational intervention improved patient understanding of reconstruction following MMS. Patients who watched the video were more likely to report understanding complications, surgical planning, and the role of plastic surgery.

Chest Wall Reconstruction of Oncologic Defects: An Analysis of Post-Operative Outcomes

Abstract Presenter
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Chest wall reconstruction poses an engaging challenge, requiring protection of underlying thoracic structures while preserving respiratory function. The present study examines post-operative outcomes following chest wall reconstruction due to oncologic defects and the sequela of oncologic treatment.

Retrospective review of cases involving reconstruction of oncologic defects of the chest wall from October 2012- October 2022 was conducted. Cases involving primary resection, metastasectomy, infectious complications of oncologic procedures, or reconstructions needed due to adverse effects of prior treatments such as osteoradionecrosis were included for analysis. Patient demographics, cancer type, neoadjuvant and adjuvant therapy, type of reconstruction, and post-operative complications were compared.

36 patients (mean age of 59.5 years) were included. Male patients (52.8%, n=19) and white patients (72%, n=26) outnumbered female patients (47.2%, n=17) and black patients (27.7%, n=10), respectively. 62.9% of patients had a history of tobacco use, with 22.2% being current smokers. The mean BMI was 28.69 (SD±7.7). The prevalence of obesity and morbid obesity (BMI>40) was 19.4% and 11.1%, respectively. Neo-adjuvant (47.2% chemo-, 47.2% radio-) or adjuvant (41.7% chemo-, 16.7% radio-) therapy were common. Reconstruction consisted primarily of pedicled flap procedures (86.1%); including latissimus dorsi flaps (44.4%), followed by omental flaps (19.4%) and pectoralis muscle flaps (13.9%). Acellular dermal matrix or synthetic mesh was used in 27.8% of reconstructions. The mean length of stay was 10.77 days (SD ± 12.28), and the mean follow-up was 10.17 months (SD ±20.15).

The presence of any major complication occurred in 61.1% of patients; these primarily involved wound breakdown or dehiscence (25%), disease recurrence (22.2%), and cardiopulmonary complication or unplanned intubation (16.7%). Minor complications occurred in 27.8% of patients; primarily minor wound breakdown or dehiscence (19.4%), followed by seroma or hematoma managed conservatively (8.3%). There was a significantly higher incidence of disease recurrence in black patients relative to white patients (50% vs. 11%, p=0.012). Morbid obesity was associated with a higher rate of major flap loss or necrosis (50% vs. 6.25%, p=0.008). Adjuvant chemotherapy showed higher rates of major wound breakdown or dehiscence (6.7% vs. 3.8%, p=0.032), minor wound breakdown or dehiscence (40% vs. 4.7%, p=0.007), minor seroma or hematoma (20% vs. 0%, p=0.033) and presence of any minor complication (53.3% vs. 9.5%, p=0.003). Finally, adjuvant radiation therapy had a higher rate of incidence of any major complication (100% vs. 53%, p=0.033) and disease recurrence (66.7% vs. 13.3%, p=0.003)

Reconstruction of oncologic chest wall defects requires an understanding of anatomy and disease pathophysiology. Pedicled flap closure is often necessary for coverage of the wide resection margins. While local disease control remains the critical factor in disease prognosis, reconstruction of the resultant chest wall defects after neoplasm extirpation often carries a significant rate of post-operative complications.

The ACS NS-QIP Risk Calculator as a Predictor for Post-Operative Complications in Microsurgery

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BACKGROUND: Peri-operative indexes such as the American College of Surgeons National Surgical Quality Improvement Program (ACS NS-QIP) have been widely used as an objective tool by surgical specialties to predict post-operative patient outcomes. This study aimed to determine the accuracy of ACS NS-QIP in predicting the rate of postoperative complications in patients with microsurgical free flap reconstruction.

METHODS: A retrospective review of patients who underwent any microsurgical free flap reconstruction surgery between August 2019 to June 2021. Univariate analysis between complication and no complication groups were completed to identify significant differences between ACS NS-QIP risk percentages. Receiver operating characteristic (ROC) curves of ACS NS-QIP were synthesized using the risk percentage to predict complications in our population.

RESULTS: A total of 79 patients were identified. The mean age of the cohort was 58.5 ± 12.7, mean BMI was 28.4 ± 6.6, where forty-one (52%) patients were men. On univariate analysis venous thromboembolism ($p= 0.01$) and any complication ($p= 0.006$) were found to be significant. Predictability of venous thromboembolism risk was found to have a diagnostic accuracy of 87.5% with an ACS NS-QIP percentage threshold of 2.5% that was associated with a sensitivity of 82.0% and specificity of 71.0%. ACS NS-QIP predicted any complication occurring with a diagnostic accuracy of 66.3% with an ACS NS-QIP threshold value of 22.4%, associated with a sensitivity of 69.2% and a specificity of 60.0%.

CONCLUSION: The ACS NS-QIP risk calculator may be a useful tool for surgeons to identify patients at increased risk for post-operative complications in microsurgery. This index's accuracy could be made stronger by increasing future incorporation of validated free flap preoperative risks and postoperative complications data to continue to direct better patient outcomes.

Risk of autologous abdominal free flap breast reconstruction in Class 3 obese patients

Abstract Presenter
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Obesity is a well-known risk factor for postoperative complications in autologous breast reconstruction. Advancements in flap design and surgical timing of definitive reconstruction have all played a role in diminishing adverse outcomes1-3. The deep inferior epigastric perforator (DIEP) flap has become a workhorse in current breast reconstruction surgical therapies1,4. Despite continued research, there remains conflicting information regarding complications and outcomes in obese patients following DIEP flap reconstruction. To better identify complications and understand the effects of obesity in the setting of autologous breast reconstruction, we describe a single-center outcomes analysis of patients who underwent DIEP flap reconstruction. An initial cohort of 194 patients consisting of 332 DIEP flaps was retrospectively analyzed at the University of Nebraska Medical Center utilizing electronic medical records. Inclusion criteria included patients who have undergone DIEP flap breast reconstruction immediately, delayed-immediate, or delayed from the time of mastectomy. Data will be organized into five categories using World Health Organization (WHO) weight status by body mass index (BMI). BMI will be based on the day-of-surgery weight. Initial data analysis consisted of ANOVA and standard T-Test's evaluating surgical complications and surgical complications requiring procedural intervention between Class III obese patients and patients with a BMI < 40 kg/m2. Surgical complications that were recorded for analysis include seroma, hematoma, infection, fat necrosis, wound dehiscence, skin necrosis, abdominal hernia or bulge, and DVT or PE. Required interventions include surgical and procedural events in the postoperative course to address one of the complications listed above. No follow-up aesthetic interventions were included. Class III obese patients had a significantly higher mean number of postoperative complications, 2.15, compared to those with a BMI of less than 40, who had a mean number of 1.23 ($p=0.0048$). Additionally, the number of postoperative interventions required was significantly higher in Class III obese patients, at 1.38 vs. 0.42 in those with a BMI of less than 40 ($p = 0.00011$). The data presented suggest that a BMI greater than 40 poses a significant risk for complication and required intervention postoperatively. This can lead to further morbidity in a patient population that has largely undergone breast oncologic treatment before and/or after the DIEP procedure. This project is an attempt to guide future breast reconstruction surgery in obese patients to determine safety and outcome data postoperatively. Future directions include comparing surgical outcomes in delayed vs. immediate DIEP flap reconstruction as well as postoperative narcotic usage in those who completed the ERAS protocol at our institution.

REFERENCES:

1. Heidekrueger PI, Fritschen U, Moellhoff N, et al. Impact of body mass index on free DIEP flap breast reconstruction: A multicenter cohort study. Journal of Plastic, Reconstructive and Aesthetic Surgery. 2021;74(8):1718-1724. Doi:10.1016/j.bjps.2020.12.043
2. Patterson CW, Palines PA, Bartow MJ, et al. Stratification of Surgical Risk in DIEP Breast Reconstruction Based on Classification of Obesity. Journal of Reconstructive Microsurgery. 2021;(class III). Doi:10.1055/s-0041-1727202
3. Papadakis M, Schuster F, Djedovic G, Rahmanian-Schwarz A. Super obesity is not necessarily a contraindication to deep inferior epigastric perforator flap breast reconstruction. BMJ Case

Reports. 2018;2018:2017-2019. Doi:10.1136/bcr-2017-223065
4. Sultan SM, Seth AK, Lamelas AM, Greenspun DT, Erhard HA. Bipedicle-Conjoined Deep Inferior Epigastric Perforator Flaps for Unilateral Breast Reconstruction in Overweight and Obese Patients: Do the Benefits Outweigh the Risks? Journal of Reconstructive Microsurgery. 2020;36(5):346-352. doi:10.1055/s-0040-1701209

Perioperative Characteristics and Postoperative Complications of Pediatric Clitoral Reconstruction

Abstract Presenter
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Clitoroplasty, or clitoral reconstruction, are performed in the pediatric population in cases of clitoral hypertrophy to return clitoral form and function. There have been no previous nationwide cohort studies of pediatric clitoral reconstruction. We aim to describe the perioperative characteristics and postoperative outcomes of patients that underwent pediatric clitoral reconstruction in the United States.
A retrospective cohort analysis was conducted using the National Surgical Quality Improvement Program Pediatric (NSQIP-P) database from 2012 to 2020. The database was queried using the CPT code 56805. All patients who underwent clitoral reconstruction were analyzed and descriptive statistics were collected.
111 female patients underwent clitoral reconstruction. The median patient age was 2.7 years (IQR 1.0 – 7.3). Most patients were ASA class 2 (62.6%), followed by ASA class 3 (28.8%) and ASA class 1 (9.0%). The mean (SD) length of total hospital stay was 1.9 days (1.7), and the total operation time was 210.9 minutes (112.3). Out of all the patients, 18.9% were born prematurely, and 16.2% exhibited minor to major cardiac risk factors. 82.7% had a congenital malformation, and 0.9% were underweight neonates (< 1500 grams) at the time of surgery. The most common diagnosis at the time of surgery was congenital adrenal hyperplasia (48.6%). The complication rate was 0.9% and was due to bleeding/transfusions. The readmission rate was 5.6%.
Overall, pediatric clitoral reconstruction is a safe procedure with low 30-day post-operative complication rates and an acceptable perioperative course. Further research into postoperative complications is essential to inform decision-making regarding the operative management approach.

Safety and Function after VRAM Reconstruction for Proximal Lower Limb Defects: A 3-year Single Centre Case Series

Abstract Presenter
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PURPOSE: The reconstruction of large complicated wound defects after soft tissue sarcoma extirpation of the proximal lower limb plays a vital role in the surgical outcomes for these patients [1]. This case series aims to summarize the utility of the vertical rectus abdominis musculocutaneous (VRAM) flap to reconstruct such complicated defects following wide resection of soft tissue sarcoma in the proximal lower limb.

METHODS: A 3-year mixed method, prospective-retrospective case series of 10 patients undergoing VRAM reconstruction for soft tissue sarcoma of the proximal lower limb (thigh and hip) from January 2020 to January 2022 at The Ottawa Hospital. Prospectively collected patient-reported outcomes included the Surgical Satisfaction Questionnaire (SSQ-8) to measure postoperative patient satisfaction and the Lower Extremity Functional Score (LEFS) to measure postoperative function [2,3]. Retrospectively collected outcomes included postoperative complications and recovery.

RESULTS: All 10 patients were ambulant, with limb functions fully restored regarding walking and gait following rehabilitation at 1-year postoperative follow-up. The overall reported function was excellent in all cases, with mean LEFS scores of 70.2 (out of 80 points), which was comparable among hip and thigh cases. All flaps showed complete survival and wound healing with no major complications requiring take-back to the OR. All patients reported feeling "very satisfied" or "satisfied" regarding postoperative pain control, recovery time, and surgical results on the SSQ-8.

CONCLUSION: VRAM flaps provided reliable reconstructive success for coverage of large complex defects in the proximal lower limb of all patients after wide resection. The VRAM flap provides a large well-vascularized soft tissue flap that facilitates healing. The excellent functional and satisfaction outcomes are encouraging, and VRAM should be considered a reconstructive option in treating sarcoma after wide soft tissue resection.

REFERENCES:

[1] Grinsell, D., Di Bella, C., & Choong, P. F. M. (2012). Functional Reconstruction of Sarcoma Defects Utilising Innervated Free Flaps. Sarcoma, 2012, 315190–315198. https://doi.org/10.1155/2012/315190

[2] Binkley, J. M., Stratford, P. W., Lott, S. A., & Riddle, D. L. (1999). The Lower Extremity Functional Scale (LEFS): scale development, measurement properties, and clinical application. North American Orthopaedic Rehabilitation Research Network. Physical Therapy, 79(4), 371–

383.
[3] Haff, R., Stoltzfus, J., Lucente, V. ., & Murphy, M. (2011). The Surgical Satisfaction Questionnaire (SSQ-8): A Validated Tool for Assessment of Patient Satisfaction Following Surgery To Correct Prolapse and/or Incontinence. Journal of Minimally Invasive Gynecology, 18(6), S49–S50. https://doi.org/10.1016/j.jmig.2011.08.171

The Effect of Biologics on Surgical Healing and Postoperative Complications in Hidradenitis Suppurativa Patients

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INTRODUCTION: Hidradenitis suppurativa (HS) is a debilitating skin disease that leads to severe, painful lesions in the apocrine gland areas. Managing this disease is complex and often includes biologic therapy and surgery for severe disease. Studies have suggested that the use of both biologics and surgical intervention may enhance wound healing and reduce the risk of disease recurrence.1,2 However, a study by Worden et al suggests that continuing immune modulating therapy in the perioperative period may negatively impact wound healing.3 The purpose of this study is to analyze postoperative outcomes in patients who use perioperative biologic therapy for HS.

METHODS: This retrospective cohort study included patients who underwent surgery for HS at a single institution between January 1, 2013 and December 31, 2021. Chart review identified patient demographics, HS history, disease severity, surgery characteristics, and postoperative complications. Cohorts included patients who continued taking biologic therapy three months before surgery and those who did not. Our analysis focused on individual surgeries rather than individual patients and compared the presence of a surgery having at least one postoperative complication in the biologics and no biologics cohorts. Unadjusted Chi-square tests were used to evaluate the association between perioperative biologics and postoperative complications.

RESULTS: 78 patients underwent surgery for HS with a total of 143 operations performed. 78 surgeries (55.2%) included patients who used biologics within three months before surgery. Within 30 days after surgery, there were no differences between the biologics and no biologics cohorts in patients that experienced at least one postoperative complication (p-value 0.26). Greater than 30 days after surgery, the biologics cohort had significantly more surgeries with at least one postoperative complication (p-value 0.03). Patients who used perioperative biologics had 2.53 greater odds of experiencing a disease flare, disease recurrence in the same anatomic site, and/or reoperation for a complication (95% CI 1.20-5.33, p-value 0.01). In the biologics

cohort, there were no statistically significant differences in surgeries having any complications across all anatomic sites, surgical methods, and closures in the late postoperative period.

CONCLUSION:
Our study demonstrates that there are no statistically significant differences in postoperative complications between patients on perioperative biologic therapy and those who are not on biologic therapy in the immediate postoperative period. However, in the period greater than 30 days after surgery, patients on perioperative biologic therapy are more likely to experience a disease flare, disease recurrence in the same anatomic site, and/or may need a reoperation--irrespective of the anatomic site operated on, surgical method, and closure method. This may be due to more severe disease being masked by biologic therapy at the time of surgery, suggesting the need for deeper and wider excision of HS in patients continuing their biologic therapy to reduce postoperative complications. These results suggest that surgeons may not need to advise patients to discontinue their biologic therapy prior to surgery but should inform patients about the possibility of experiencing these complications in the late postoperative period.

REFERENCES:
1. Van Rappard DC, Mekkes JR. Treatment of severe hidradenitis suppurativa with infliximab in combination with surgical interventions: Correspondence. British Journal of Dermatology. 2012;167(1):206-208. doi:10.1111/j.1365-2133.2012.10807.x
2. DeFazio MV, Economides JM, King KS, et al. Outcomes After Combined Radical Resection and Targeted Biologic Therapy for the Management of Recalcitrant Hidradenitis Suppurativa: Annals of Plastic Surgery. 2016;77(2):217-222. doi:10.1097/SAP.0000000000000584
3. Worden A, Yoho DJ, Houin H, et al. Factors Affecting Healing in the Treatment of Hidradenitis Suppurativa: Annals of Plastic Surgery. 2020;84(4):436-440. doi:10.1097/SAP.0000000000002105

Effectiveness of Risk Analysis Index Frailty Scores as a Predictor of Adverse Outcomes in Lower Extremity Reconstruction

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BACKGROUND: Frailty has been associated with increased postoperative morbidity and mortality. While calculating frailty is increasing in clinical significance, the effectiveness of its screening tools remains a challenge. This study evaluates the effectiveness of RAI-rev (Risk Analysis Index) at predicting adverse outcomes in lower extremity (LE) local and free flap

reconstruction.

METHODS: All LE local and free flap cases were obtained from the NSQIP database from 2015-2020. Demographics, perioperative factors, flap type, and 30-day outcomes were compared using student's t-test and Fisher's exact test. Frailty score was calculated for all cases using RAI-rev. Frailty scores were separated into increments from 15-35. The non-frail group is represented by scores <15 and the most-frail group by scores >35. Using the non-frail group as the reference, adjusted odds-ratios (aOR) for specific complications were calculated for each frailty score increment. Using chi-squared analysis, frailty scores for local flaps were compared to those for free flaps. Other variables of interest not included in the RAI-rev were collected, including COPD, diabetes, smoking, hypertension, BMI, steroid use, and wound class.

RESULTS: We identified 270 local flap and 107 free flap cases. Univariate analysis of local flaps cases showed increased complications in patients with higher RAI scores, most notably deep surgical site infection (1% non-frail vs. 20% patients with RAI 31-35), stroke (0% non-frail vs. 17% most-frail), and mortality (0% non-frail vs. 17% most-frail). Local flap cases with RAI scores corresponding to the most-frail group were found to have an aOR of 51.0 (95% CI: 1.8 – 1402.5, p=0.02), 43.1 (95% CI: 1.6-1167.6, p=0.03), 6.8 (95% CI: 1.2-37.4, p=0.03) for stroke, mortality, and any complication respectively. While there were trends of higher rates of complications with higher RAI frailty scores in free flap patients, only sepsis had a statistically significant difference between the non-frail and most-frail patients (6% non-frail vs. 100% most-frail; aOR 42.3, CI: 1.45 – 1245.3, p=0.03). Average RAI score was significantly lower in patients receiving free flaps compared to local flaps (14.91 vs. 17.64, p=0.01).

CONCLUSION: Higher RAI-rev frailty scores, specifically score >35, were associated with increased complications in LE local flaps showing that the RAI-rev is a useful tool in predicting complications in patients undergoing LE local flaps. Patients undergoing LE free flap reconstruction had low RAI-rev frailty scores, highlighting that free flaps are less frequently offered to patients who are presumed to be of higher risk. This study showed that the RAI-rev can be used as a risk calculator in LE reconstruction to determine if patients are good candidates for limb salvage, or if amputation may be a better option.

Breaking Barriers: Managing Stomal Stenosis After Continent Urinary Stoma Creation in Bladder Exstrophy

Abstract Presenter
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INTRODUCTION: Classic bladder exstrophy (CBE) is a rare genitourinary malformation, where management is focused on achieving urinary continence. If bladder capacity fails to increase, urinary diversion through a continent urinary stoma (CUS) must be considered. Stenosis of the catheterizable channel is the most frequent and feared complication as it is progressive and recurrent. Stomal stenosis (SS) is initially managed conservatively but if SS persists, dilation under anesthesia becomes necessary. If this is unsuccessful, scarred tissue is excised with healthy mucosa and skin re-approximated in a local tissue rearrangement (LTR). The aim of this study was to identify causes, risk factors, and management strategies of SS amongst CBE patients that previously underwent CUS creation.

METHODS: CBE patients who underwent CUS were retrospectively reviewed for risk factors for SS including outcome of primary exstrophy closure, number of prior midline laparotomies, and suture material used during umbilicoplasty for securing the CUS to abdominal skin. SS was defined as difficulty self-catheterizing due to adhesions, hypertrophic scarring, or keloid formation. Conservative SS management included overnight catheterization, topical corticosteroids or triamcinolone acetonide (TAC) injections. Surgical management included stomal incision or scar excision with a LTR using either a V-Y advancement flap or Z-plasty. Success was defined as the ability to independently self-catheterize at last follow-up.

RESULTS: A total of 265 CBE patients underwent CUS creation at a mean age of 10.9 years. SS developed in 68 patients (25.7%) at a mean interval of 3.7 years after CUS creation (range, 0.1–19.2). Etiology included adhesions in 45 patients (66.2%), keloid in 16 (23.5%), and hypertrophic scar in 7 (10.3%). No difference in SS rates were observed by primary exstrophy closure success rates or number of prior midline laparotomies. Vicryl use for CUS creation was associated with an increased risk of SS compared to PDS ($p=0.0025$).

Of the 68 SS patients, conservative management was successful in 13.3% of adhesion and 4.3% of both hypertrophic scar and keloid patients. Most adhesion patients underwent stomal incision with a success rate of 88.2%. Stomal incision with TAC or stomal excision and LTR were successful in 62.5% and 53.8% of cases, respectively. Patients with hypertrophic scars or keloid ($n=23$), responded best with scar excision and LTR (60.0%) whereas only 16.7% achieved initial resolution after incision and TAC. At last follow-up, all patients achieved successful SS management.

CONCLUSIONS: SS is a common complication following CUS and represents a challenge for the reconstructive surgeon. Vicryl suture may increase risk of SS compared to PDS, perhaps due to monofilamentous suture inducing less hypertrophic scarring compared to multifilamentous suture. Patients with adhesions benefited most from stomal incision while patients with hypertrophic scarring or keloid require scar excision and marsupialization of healthy mucosa to healthy abdominal skin. Utilizing PDS may reduce the incidence of this complication and these management techniques may improve success from primary surgical repair.

Surgical Management of Sirenomelia: A Case Study

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INTRODUCTION: Sirenomelia is a rare congenital condition characterized by fusion of the lower limbs. Patients generally do not survive long after birth, as the condition is associated with multi-system organ dysfunction due to developmental anomalies. In surviving neonates, the levels of organ dysfunction and skeletal fusion determine how to proceed with therapy. However, considering the low incidence and few cases surviving the neonate period, there is minimal understanding surrounding the surgical management of Sirenomelia. We present a unique case of an infant born with Sirenomelia who not only survived the birth process, but at age 11 months, was determined to be a candidate for surgical separation of the lower extremities.

REPORT OF CASE: The patient is an 11-month-old female that was born with fusion of the lower limbs. Additional congenital malformations at the time of birth included an imperforate anus and a single perineal channel draining urine, with complete absence of external genitalia. Ultrasound demonstrated a right solitary kidney and no definitive bladder. Initial patient management revolved around investigating and intervening upon visceral and gastrointestinal issues, given their severity and potential lethality. After stabilization of the patient's other malformations, lower extremity separation could be addressed. First, a thorough pre-operative assessment was performed to assess feasibility and develop an approach for separation. CT imaging revealed no bony involvement of the fusion and adequate vasculature, indicative of type I Sirenomelia. This case was approached much like a dorsal rectangular flap syndactyly release. Large z-plasty flaps were designed and raised, and the soft tissue within the skin bridge was meticulously dissected to preserve anatomy and provide adequate skin flaps without perineal skin grafting. A quadrangular flap was designed to reconstruct the perineum and produce a neo-vulva using de-epithelization. At 15 months old, 4 months post-op, the incisions are well-healed, and she continues to progress with physical activity and weight-bearing bilaterally.

CONCLUSIONS: Management of Sirenomelia is incredibly challenging. There is limited data to guide surgical management of affected patients. We performed a single-stage surgical separation in a surviving Sirenomelia patient, with good aesthetic and functional outcome. Medical comorbidity stabilization, multi-disciplinary care, and thorough pre-operative imaging are vital aspects of successful repair in these patients.

Management of thoracic aortic graft infections with combined omental and bilateral pectoralis major flaps

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BACKGROUND: Following open replacement of the thoracic aorta, vascular graft infection is an infrequent but highly morbid complication, with reported mortality rates as high as 75%. Historically, surgical management has consisted of complete removal and re-replacement of the infected graft. However, several studies suggest vascularized tissue transfer may serve as an effective method for treating aortic graft infections, particularly in patients who may be unable to tolerate extended extra-anatomic bypass procedures required for total graft removal and re-replacement. In this study, we reviewed our experience with treating thoracic aortic graft infections with combined omental and bilateral pectoralis major myocutaneous (PMM) advancement flaps.

METHODS: Records of 600 sternal wound reconstructions performed by the senior author (JAA) at a high-volume cardiac surgery center from 1996-2023 were reviewed. At the time of surgery, all patients underwent sternal hardware removal, debridement, and closure with bilateral pectoralis major (PMM) myocutaneous advancement flaps and pedicled omentum. Patients with clinical and/or radiographic signs of aortic graft infection were included.

RESULTS: Complete data were available for 561 sternal wound reconstructions performed by the senior author during this period. Combined bilateral pectoralis and omental flaps were mobilized in 11 patients with aortic graft infections. 9/11 patients (81.9%) had an ASA score ≥ 4. At the time of index cardiac surgery, 11/11 (100%) patients underwent aortic root repair/replacement, and 9/11 (81.9%) patients also underwent aortic valve repair/replacement. Indications for sternal reconstruction included culture-positive wound infection (8/11; 72.7%), dehiscence (5/11; 45.5%), wound drainage (7/11; 63.6%), and inability to close the chest following the original sternotomy due to hemodynamic instability (5/11; 45.5%). At the time of chest exploration, 6/11 patients (54.5%) underwent complete removal and re-replacement of the infected aortic graft, compared to 5/11 patients (45.5%) who underwent graft-preserving mediastinal washout and debridement. Immediate flap closure was performed in 4/11 patients (36.4%) following graft replacement or mediastinal debridement. Notably, all patients required intraoperative vasopressor therapy during their flap reconstruction procedure. Intraoperative deep mediastinal cultures were positive in 3/11 patients (27.3%). Post-operative complications included partial dehiscence (1/11; 9.1%), seroma (2/11; 18.2%), hematoma (1/11, 9.1%), abdominal hernia (1/11; 9.1%), and recurrent infection (1/11; 9.1%). One patient (9.1%) died within 30 days of sternal reconstruction from tachyarrhythmia secondary to mitral valve failure. No patients have undergone operative re-intervention for perioperative flap-related complications, but one patient underwent elective resection of the omental flap 13 months postoperatively as it caused him discomfort and he did not like its associated bulge. None of the other patients had any aesthetic or functional complaints related to the flaps.

CONCLUSIONS: Patients with thoracic aortic graft infection all had significant preoperative systemic comorbidities. However, given overall low postoperative morbidity and mortality, we found treatment of these life-threatening aortic graft infections with combined omental and pectoralis major flaps to be safe and effective, particularly in patients who may be too frail to undergo complete graft excision procedures.

The Orthoplastic Paradigm in pediatric lower extremity sarcoma: specialized skill sets operating in concert

BACKGROUND: Plastic surgery participation in multidisciplinary surgical subspecialty care has been demonstrated to improve patient outcomes, decrease complications and length of hospital stay, and increase hospital revenue. The reconstructive skills of plastic surgeons are critical in optimizing functional outcomes in settings where injury or necessary ablative procedures can be otherwise devastating. This analysis aimed to characterize the institutional collaboration of plastic surgery and oncologic orthopaedic surgeons in the treatment of pediatric osteosarcoma.

METHODS: A retrospective chart review of operating schedules was conducted for teams consisting of oncologic orthopaedic surgery and reconstructive plastic surgery at a large pediatric tertiary referral center. Data collection included patient demographics, case descriptions, diagnoses, neoplastic pathology, and contributions of surgeons to each case. Cases were sub-stratified by sarcoma location and analysis focused on the most prevalent location, the lower extremity. Descriptive statistics were used to quantify the distribution of sarcoma location and pathology, as well as characterize case involvement of reconstructive plastic surgery in operative treatment of pediatric sarcoma.

RESULTS: 94 patients underwent sarcoma resection and functional reconstruction by an orthopaedic and plastic surgeon team in a 10-year period. 54 patients underwent combined ablative and reconstructive operations for lower extremity sarcoma at an average age of 16.6 ± 8.8 years. Total oncologic knee arthroplasty was the most prevalent procedure, performed in 20 patients and utilized for sarcomas located in the distal femur or proximal tibia. Plastic surgery involvement in oncologic arthroplasty primarily consisted of local pedicled flaps. 15 patients were identified in which osseus fibular free flaps were utilized in a modified-Capanna procedure, in which plastic surgery performed flap harvest, inset, and microsurgical anastomoses. Osseus free flaps were primarily used in cases with ablative defects in the long bone diaphysis. Local flap coverage was utilized in up to 65% of combined lower extremity orthopeadic oncology and reconstructive plastic surgery cases, and osseus free flaps were used in up to 30% of cases. Sarcoma recurrence, infection, chronic wounds, pathologic fractures, non-union, and hardware failure were prevalent in this primarily adolescent population, most of whom were immunosuppressed secondary to resuming chemotherapy regimens.

CONCLUSIONS: An 'Orthoplastic' approach has previously been suggested for severe limb injuries and diabetic foot ulcers. Osseus free flaps are critical to reconstruction of defects in the diaphysis and require the microsurgical skills of plastic surgeons, but tenets of plastic surgery have numerous applications and benefits in this setting beyond osseus flaps. Prevalence of

sarcoma recurrence, non-union and hardware failure requires an individualized, thoughtful yet dynamic approach to reconstruction, a skillset intuitive to plastic and reconstructive surgeons. The Orthoplastic paradigm in the setting of pediatric oncologic reconstruction promotes a holistic approach to optimization of functional outcomes and quality-of-life considerations during and after cancer.

The Evolution of PROs Following Limb-Salvage vs Amputation: An Analysis of LIMB-Q Data

Abstract Presenter
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INTRODUCTION: Lower extremity traumatic injuries can be devastating events for patients. The impact on patients' lives is widespread and long-lasting. However, it is not well understood how patient-reported outcomes (PROs) evolve over time following limb-threatening lower extremity traumatic injuries. Our aim was to measure PROs in limb-salvage and amputation patients at various time points from injury.

METHODS: We performed a cross-sectional study of lower extremity trauma patients with injuries distal to the mid-femur from 25 countries requiring limb-salvage and/or amputation. Clinical, demographic, and PRO data were collected by patient self-report. PRO data was collected using the LIMB-Q, lower extremity trauma-specific PRO instrument. Primary outcomes were LIMB-Q Function, Symptoms, Life Impact, Psychological, Sexual Well-being, Work Life, and Decision Satisfaction scales. Patient and clinical characteristics were tested with ANOVA and controlled for with multivariate linear regressions. A predicted means with 95% confidence interval (CI) was generated for each regression model. Significance was set at $p<0.05$.

RESULTS: Data was collected in 385 patients. Mean time from injury to data collection was 8.4 years (SD 9.8, range: 0-58 years). Across treatment groups, mean time from injury to data collection was 7.6 years in the reconstruction group and 9.7 years in the amputation group. After controlling for patient and clinical characteristics, time from injury was negatively associated with Decision Satisfaction ($p<0.001$; 95% CI [-0.95, -0.38]. When stratified by treatment group,

increasing time from injury was negatively associated with Decision Satisfaction ($p<0.001$; 95% CI [-1.7, -0.5]) in limb-salvage patients only. There were no significant differences in the remaining scales at different time points from injury in either patient cohort.

CONCLUSION: Decision-making following limb-threatening lower extremity injuries is complicated. The ideal treatment is not always clear. We found that following limb-salvage, but not amputation, patients reported higher levels of decision regret with increasing time from injury. Improved education and shared decision-making may be needed to address the high levels of decision regret over time in limb-salvage patients.

Disparities in Lower Extremity Trauma Patients: Differences in the Experience of Receiving Care

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PURPOSE: Healthcare disparities have been observed in patients with lower extremity trauma, including those undergoing limb-salvage and amputation. While it has been demonstrated that patients of racial and ethnic minority groups have worse clinical outcomes, it is not well understood if there are disparities in how patients receive care. Given the amount of patient education, counseling, and surgical decision-making required in the pre-operative care of patients with limb-threatening injuries, how patients experience care is important. Our primary aim was to identify disparities in how care is received by patients, specifically satisfaction with information, decision-making, and the patient-surgeon relationship.

METHODS:
We conducted an international, cross-sectional study of patients following lower extremity trauma (fractures distal to mid-femur) from 10 countries. Clinical, demographic, and LIMB-Q data was self-reported. The LIMB-Q (0-100, higher = better) is a patient-reported outcome instrument designed for patients following lower extremity trauma. Primary outcomes were LIMB-Q Satisfaction with Decisions (measures decision regret), Satisfaction with Information, and Satisfaction with Surgeon scales. A multivariable linear regression model was used to determine associations between patient factors and LIMB-Q scores.

RESULTS: Data was collected from 645 patients (mean age 42 years [standard deviation 17], 62% cisgender male, 70% White, 46% United States residents), 36% underwent soft tissue reconstruction and 18% underwent amputation. In comparison to White patients, decision regret was worse in Asian and Pacific Islander patients (Beta: -17, 95% confidence interval (CI): -29 to -3.7, p = 0.012) as well as patients identifying as "Other" (Beta: -11, 95% CI: -20 to -2.3, p = 0.014). In comparison to cisgender men, decision regret was worse in patients identifying as transgender or nonbinary (Beta: -27, 95% CI: -46 to -7.5, p = 0.006). Patients were generally highly satisfied with their surgeon (median: 91, IQR: 86-100). However, in comparison to White patients, Asian and Pacific Islander patients reported less surgeon satisfaction (Beta: -24, 95% CI: -41 to -6.3, p = 0.008). No disparities by race, ethnicity, or gender identity were observed for Satisfaction with Information.

CONCLUSIONS: Limb-threatening lower extremity injuries are complex and require a significant amount of patient education and surgical decision making. We identified higher levels of decision regret and less surgeon satisfaction in racial and gender minority patients, specifically in patients who are Asian and Pacific Islander. Addressing disparities in the experience of receiving care is a potentially overlooked healthcare disparity in lower extremity trauma patients. In addition, addressing or preventing disparities in the experience of receiving care may have the potential to prevent disparities in long-term functional and quality-of-life outcomes in this patient population.

A Propensity Score Analysis of Wound Complications following Revision Total Knee Arthroscopy (TKA) with Flap Coverage

Abstract Presenter
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BACKGROUND: Despite advancements in total knee arthroplasty, devastating wound complications still occur and require revisions. For complex wounds, soft tissue flap coverage has been established as a valuable reconstructive option improving patients' reported outcomes and knee total range of motion. The purpose of this study is to analyze wound complications

following flap coverage for revision total knee arthroplasties (rTKA) on the national level.

METHODS: Patients who underwent rTKA from 2012-2020 were identified in the NSQIP database using CPT codes. The cohort was divided into two subgroups: patients who underwent rTKA with a pedicled or free flap and those who did not receive a flap. A propensity score was generated from patients' baseline characteristics. A multivariable logistic regression model adjusting for propensity scoring and wound classification at the moment of the surgical procedure was then constructed to assess differences in clinical outcomes.

RESULTS: rTKA was performed in 33,922 encounters, 104 (0.3%) of which utilized a flap, including 99 pedicled and 5 free flaps. Patients who received flaps had poorer preoperative functional status, higher frailty scores and were more likely to have their surgical wound classified as contaminated or dirty/infected. Flap coverage was associated with lower odds of wound dehiscence (OR 0.24, 95% CI 0.08-0.77, p=0.016) and higher odds of wound infection (OR 3.27, 95% CI 1.5-7.12, p=0.003). Further, higher odds of reoperation were found in the group of patients who underwent flap reconstruction (OR 3.19, 95% CI 1.77-5.77, P<0.001) with 75% of documented surgical indications being infection.

CONCLUSION: Soft tissue flap coverage is used more often in the setting of large and infected wounds following TKA. Our study's findings evidenced higher wound infection rates among patients who underwent flap coverage, likely attributable to the complexity of the wounds being treated and the longer operative time compared to patients who did not require flap coverage. Thus, patients undergoing rTKA due to infection may receive treatment to optimize wound conditions before flap placement.

Association Between Authorship Position and Scientific Impact Among Reconstructive Microsurgery Studies

Abstract Presenter
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BACKGROUND: Author experience is an important factor in publishing high-impact articles, but the individual influences of first and senior authors is unclear. This study utilizes the Relative Citation Ratio (RCR) Index to investigate the contributory role of authorship position on article impact in reconstructive microsurgery (RM).

METHODS: A cross-sectional study was conducted with RM-related articles published in three

high-impact Plastic Surgery (PS) journals between 2002 and 2020. A search strategy was conducted in PubMed to extract all relevant articles. A two-stage screening process was performed for study selection. First and senior authors were extracted along with their RCR information from NIH iCite. Unequal variance T-test and Chi-Squared test were used to assess differences between groups. A Spearman correlation was performed to evaluate relationships between authorship and article impact, and correlations were compared using a Fisher's z transformation.

RESULTS: A total of 902 articles were analyzed, corresponding to 1,717 authors. There was a statistically significant difference in the weighted RCR between first and senior authors (91.77 first author vs 157.65 senior author, $p<0.0001$), as well as the mean RCR values (RCR (1.42 first author vs 1.53 senior author, $p=0.0075$). Senior authors also had a significantly higher number of publications compared to first authors (70.78 first author vs 110.90 senior author, $p<0.0001$). Both authorship positions' weighted RCR correlated with the paper's NIH percentile ($r=0.22$, $p<0.0001$ first author vs $r=0.21$, $p<0.0001$ senior author), and their correlations were not significantly different ($p=0.71$).

CONCLUSION: Senior authors represent more experience publishing high-impact articles within RM. However, while there is an association between author and article impact, neither authorship position plays a more significant role. These results likely reflect the role of senior authors as mentors and "chaperones" for first authors to build the experience needed to publish in high-impact PS journals.

Microsurgical and Free Flap Reconstruction in Pediatric Burn Survivors: A Systematic Review

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PURPOSE: Burn injuries in children may be devastating especially if they involve extensive debridement and subsequent reconstruction. Some burn injuries may require microsurgical or free flap reconstruction when locoregional options are unavailable. Though free flap

reconstruction may improve function, complications after pediatric microsurgical and free flap reconstruction for burn injuries are not well-documented in the literature. Our goal was to conduct a systematic review to summarize microsurgical burn reconstruction in pediatric patients and pool complications in published studies.

METHODS: Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses, we searched five databases for observational studies, case series, and case reports in English on postburn microsurgical reconstruction in acute (≤ 6 week) or late (> 6 week) phases. Human subjects < 18 years old at time of reconstruction in were included. Studies with animals, cadaver, and locoregional/pedicled flaps without use of the operating microscope were excluded. Patient demographics, burn information, flap data, and complications were extracted. Complications included death and cause of death, flap failure and causes of flap failure, arteriovenous thromboses, skin/flap necrosis, hematoma/seromas, surgical site infections, venous congestion, wound disruption (i.e. wound dehiscence or epidermolysis), or any other complication not previously mentioned. Data were analyzed with descriptive statistics on Microsoft Excel.

RESULTS: Of 1,071 studies, 17 were included spanning 11 countries and 38 years (1982-2020). Studies were published by 17 authors across 14 unique institutions. There were 3 institutions (21.4%) in the United States, Hong Kong, and Turkey that published 2 studies each. Included were 49 patients encompassing 27 males (55.1%) and 22 females (44.9%) with median age 8 [Interquartile range 7, 10] years. A total of 62 flaps were used to reconstruct 61 recipient sites in acute (n=11, 17.7% of flaps) and late phases (n=51, 82.3% of flaps). Most burns were thermal (n=25 injuries, 46.3%) and most flaps were anterolateral thigh (ALT, n=34 flaps, 54.8%) transferred to the head & neck (n=13, 38.2% of ALT flaps) and upper extremity (n=13, 38.2% of ALT flaps). There were 15 complications (30.6% of patients) with zero deaths or thromboses. Complications included 3 flap failures (6.1% of patients), 3 episodes of wound dehiscence (episodes, 6.1% of patients), 2 episodes of flap necrosis (4.1% of patients), 2 episodes of venous congestion (4.1% of patients), 2 unplanned returns to the operating room (4.1% of patients), 1 recipient site seroma (2% of patients), 1 skin ulcer at recipient site (2% of patients) at 1 year post-reconstruction, and 1 surgical site infection (2% of patients). The two unplanned returns to the operating room were for venous congestion and both flaps survived.

CONCLUSIONS: Our systematic review of postburn microsurgical and free flap reconstruction in the pediatric population identified a complication rate of 30.6% in published studies. There were no reported deaths. Optimizing techniques and postoperative management with an interdisciplinary burn and reconstruction team may lower complications for pediatric burn survivors who may greatly benefit from reconstructive surgery.

The Impact of Perioperative Blood Transfusion on Flap Survival in Lower Extremity Trauma

Abstract Presenter
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PURPOSE: Blood transfusion may be life-preserving and necessary for adequate flap perfusion for hemorrhaging trauma patients. The impact of transfusion on free flap survival in breast reconstruction has been noted in the literature (1), but further investigation is needed in a trauma setting, where transfusions are critical for stabilizing patients. This study evaluates the effect of blood transfusions on postoperative flap complications in traumatic lower extremity (LE) reconstruction.

MATERIALS AND METHODS: This retrospective review identified patients who underwent microsurgical LE reconstruction following trauma at a level I trauma center from 2007-2022. Clinical, perioperative, and blood transfusion data since admission were collected. Flap complications included flap revisions, partial flap necrosis, and flap loss. Chi-squared test, independent t-test, and multivariate logistical regression were used to analyze the collected data.

RESULTS: Upon review, 350 LE flap patients were identified, of which 147 received blood transfusions (Tf+) and 203 received no blood transfusions (Tf-). Age, gender, hypertension, diabetes mellitus, previous injury to the same LE, and flap composition and location did not significantly vary between cohorts. Compared to the Tf- cohort, significantly more flaps in the Tf+ cohort suffered from partial flap necrosis (12.3% vs 5.9%, p=0.034), flap loss (7.5% vs 2.9%, 0.049), and any flap complication (21.2% vs 11.8%, p=0.016). Overall flap survival across both cohorts was 95.1%. Upon logistic regression, blood transfusion status (odds ratio [OR]: 2.13; p=0.027) and female gender (OR: 2.27; p=0.036) were identified as independent predictors of any flap complication. Follow-up time after discharge was 4.3±8.2 months, with no significant variation between cohorts.

CONCLUSION: Our study determined that perioperative blood transfusion resulted in a higher incidence of postoperative partial-to-full flap necrosis. These results indicate that the decision to transfuse should be made cautiously and strategically, limiting transfusion to only life-threatening cases to minimize morbidity and flap loss.

REFERENCES:

1. Karamanos E, Shah AR, Kim JN, Wang HT. Impact of Blood Transfusion in Free Flap Breast Reconstruction Using Propensity Score Matching. J Reconstr Microsurg. 2021 May;37(4):315-321. doi: 10.1055/s-0040-1716388. Epub 2020 Sep 6. PMID: 32892332.

The Impact of Free Flap Harvest Laterality On Ambulatory Function In Lower Extremity Traumatic Reconstruction

Abstract Presenter

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PURPOSE: Free flaps are essential for limb salvage in patients with lower extremity (LE) trauma; however, significant donor-site morbidity could impact functional outcomes. This study compares postoperative ambulatory function between contralateral and ipsilateral free flap harvest in LE traumatic reconstruction.

MATERIALS AND METHODS: A retrospective review was performed on patients who underwent LE reconstruction at a level 1 trauma center from 2009-2022. Flap characteristics, injury history, and ambulatory function were collected. Flap harvest laterality was determined in relation to the wounded leg. The flaps were categorized as either fasciocutaneous or those that included a muscle component (muscle/myocutaneous). Chi-squared and Mann-Whitney tests were used for statistical analysis.

RESULTS: Upon review, 105 LE free flaps were performed, of which 70 (66.6%) were harvested from the ipsilateral leg and 35 (33.3%) were from the contralateral leg. Full ambulation was achieved in 29 (41.4%) patients in the ipsilateral cohort and 14 (40.0%) in the contralateral cohort (p=0.888). Average time to full ambulation did not vary between these cohorts (p=0.174). However, upon subanalysis of the 61 muscle/myocutaneous flaps, the ipsilateral cohort had prolonged time to full ambulation (9.8±8.4 months) compared to the contralateral one (3.3±2.6 months; p=0.016). There was no significant difference in time to full ambulation between flap harvest laterality cohorts among the fasciocutaneous flaps (p=0.733).

CONCLUSION: Among free flaps harvested from the ipsilateral leg, fasciocutaneous flaps promoted faster recovery to full ambulation than muscle/myocutaneous flaps. Surgeons may consider harvesting from a donor site on the contralateral leg if the flap reconstruction requires a muscle component.

Unraveling the Knot: Assessing the Role of Targeted Muscle Innervation in Neuroma Prevention and Management in Patients with Osseointegrated Prostheses

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PURPOSE: Lower limb amputees with socket-based prostheses often have issues with mobility, skin breakdown, and nerve pain. Osseointegrated prostheses, in which a titanium implant is inserted directly into the bone to which the prosthesis is attached, are a novel solution to improve pain and mobility in those with poorly tolerated socket-based prostheses. Targeted muscle reinnervation (TMR) is often done concurrently to alleviate phantom limb pain and prevent painful neuromas from forming. Little is known about the incidence of, risk factors for, and management of neuromas in this unique patient population. Information on the role of TMR in preventing neuromas will aid physicians in determining how best to approach peripheral nerves in an osseointegrated limb.

METHODS: A retrospective analysis was performed on all patients who received a single-stage lower-limb osseointegration at our institution between 2017 and 2022. Demographics, medical history, and postoperative complications were reviewed. Each patient included in the study had at least 12 months post-operative follow up. Pearson's chi-squared test and Student's t-tests were used to evaluate significance between categorical and continuous variables, respectively, using an alpha of 0.05.

RESULTS: Our study included 20 females and 43 males with 38 transfemoral and 25 transtibial amputations for a total of 63 patients. 30 patients received TMR at the time of implantation; 25 had a history of painful neuroma with neuroma excision at implantation, and 5 received TMR prophylactically as implantation occurred at the time of initial amputation. 33 patients did not undergo TMR, as they had no history of neuromas and lacked suitable anatomy due to prior amputation. There were 11 postoperative neuromas, which occurred on average 438 days after implantation (range: 196-963). Sex, amputation level, and amputation etiology were not significant predictors of post-operative neuromas ($p>0.05$). Of the 11 patients, 5 had received concurrent TMR and 6 had not. There was no difference in post-operative neuroma rates between patients who did and did not undergo TMR ($p>0.05$). Of the patients who received TMR, there was no difference in rates between the indication for TMR surgery ($p>0.05$). However, patients who received TMR for prior neuroma developed post-operative neuromas at 261 days postoperatively on average, while patients who received TMR prophylactically developed post-operative neuromas at 718 days, and those who did not receive TMR developed neuromas at 434 days.

CONCLUSIONS: Plastic surgeons will increasingly oversee the management of soft tissue concerns, including neuromas, as osseointegration becomes more accessible to lower limb amputees. Our study showed that there was no difference in neuroma development between patients who received TMR and those who did not. Nor was there a difference in outcomes based on history of neuroma. However, our data demonstrated that patients with prior neuroma

developed neuromas faster than patients who received TMR prophylactically. More long-term follow-up is needed to understand how best to both prevent and manage neuromas after implantation in this unique cohort.

The Current State of Skin Substitutes in Burn Care: A Systematic Review

Abstract Presenter
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INTRODUCTION: Autologous skin grafts, including full-thickness skin grafts (FTSG) and split-thickness skin grafts (STSG), are usually the coverage of choice for healing burns. However, cases of limited donor supply sites, donor site morbidity, and graft loss have prompted exploration of alternative solutions, such as skin substitutes. To date, no systematic review has extensively compared the existing skin substitutes within each category, highlighting key differences, benefits, or burn outcomes. This systematic review aims to fill this gap in the literature by providing an updated and extensive review of existing skin substitutes. This study critically assesses and analyzes current skin substitutes in the literature in hopes of improving burn coverage and healing outcomes for patients.

METHODS: This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. PubMed, Cochrane, Embase, Scopus, Ovid, and Web of Science were queried to identify relevant articles. English-language prospective and retrospective cohort studies, cross-sectional studies, randomized control trials, case-control, and case series were included. Case reports, review papers, studies reporting only qualitative data, studies published more than 10 years ago, and case series <10 patients were excluded.

RESULTS: Of all papers reviewed, 25 selected studies reported on patients who received skin substitutes. More than half (22/25) of these studies were conducted using a randomized controlled trial or randomized paired study design; the remaining studies consisted of (2/25) prospective cohort studies; (1/25) prospective case-control studies. Wound healing or graft take was measured in (20/25) of the included studies. There was variation in how wound healing and graft take were reported: healing percentage at specified time points, incidence of complete wound healing, incidence of % wound healing, ratio of areas of closed wounds to donor biopsies, percentage engraftment at specified time points, percentage epithelialization at specified time points, percent reduction in defect size, length of time until complete wound healing/re-epithelialization, and rate of complete graft take/re-epithelialization. Other common study

outcomes included fibrosis, scar appearance, pain, and infection. With regard to types of skin substitute/grafts used, (12/25) studies used synthetic, while (12/25) studies used biologic, and (1/25) studies evaluated both synthetic and biologic grafts. The most commonly studied skin substitutes included Integra (5/25), fish skin (4/25), amniotic membrane (5/25), Stratagraft (2/25), and Matriderm (2/25).

Discussion: Of the skin substitutes implemented, there was no clear superior substitute type, as studies did not consistently compare the same various options. Notably, however, study arms using amniotic membranes consistently provided statistically significant improvements in wound healing and epithelialization when compared to comparator groups. Given the variability in study designs, methodology, and skin substitutes included in our eligible studies, further prospective and randomized controlled research should be conducted to provide stronger evidence regarding optimal skin substitutes for skin grafts in burn patients. Future studies should seek to improve our understanding of these various alternatives to autologous skin grafting in hopes of improving treatment protocols and long-term outcomes and reducing morbidity and further skin disfigurement in burn patients.

Comparison of Outcomes After Hidradenitis Suppurativa Excision in Adult and Pediatric Patients: A National Database Analysis

Abstract Presenter
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BACKGROUND: Hidradenitis suppurativa (HS) is a chronic, painful, and inflammatory disorder that causes abscesses and scarring of the skin. Conservative HS treatment consists of antibiotics, improved hygiene, and analgesia. Severe and refractory cases, however, may require surgical management. Despite the differences in risk factors (such as smoking and obesity) and HS chronicity between children and adults, the relative outcomes in these two populations has not been studied. Therefore, the aim of this study is to quantitatively assess the perioperative outcomes after HS excision in the adult and pediatric populations.

METHODS: A retrospective cohort analysis was conducted using the National Surgical Quality Improvement Program (NSQIP) database and the Pediatric National Surgical Quality Improvement Program (P-NSQIP) database from 2012 to 2020. The databases were queried

using the International Classification of Disease (ICD-9) code 705.83. Demographic and outcome data for all patients who underwent HS excision was collected and analyzed.

RESULTS: Data from 1136 patients were analyzed. Seven hundred eighty-four (69.0%) patients were adults and 352 (31.0%) patients were children. Adults were more likely to be readmitted following surgery at 6.8% compared to pediatric patients, at 4.8 % (P<0.001). Similarly, they had higher rates of reoperation at 30 days, totaling 6.9% of patients versus 3.4% (P<0.001). Adults also exhibited a higher percentage of transfusions at 4.2% compared to 0 children (P<0.001), and deep incisional surgical site infections, 2.6% vs. 0.6% (P=0.025). Children had a higher rate of sepsis, 0.6%, compared to 0 adults (P=0.002).

CONCLUSIONS: Compared to children, adult patients who underwent surgery for HS were significantly more likely to be readmitted and to require reoperation within 30 days. This data suggests the need for closer postoperative monitoring for adult patients.

Tranexamic Acid in Burn Surgery: A Systematic Review and Meta-Analysis.

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Burn injury causes a coagulopathy that is poorly understood. In the post-burn state, significant fluid losses are managed by aggressive resuscitation that can lead to hemodilution. These injuries are managed by early excision and grafting, which can cause significant bleeding and further decrease blood cell concentration. Tranexamic acid (TXA) is an anti-fibrinolytic that has been shown to reduce surgical blood losses; however, its use in burn surgery is not well established.

We performed a systematic review and meta-analysis to investigate the influence TXA may have on burn surgery outcomes. A PubMed and Cochrane Library literature search was conducted on November 13th, 2022, for articles written since January 1st, 2012 that included data on the use of TXA in burn surgery. Eight papers were included, with outcomes considered in a random-effects model meta-analysis. Effects discussed within the articles included the following: intraoperative fluid administration, blood loss, change in hemoglobin levels, change in hematocrit levels, transfusion administration, length of hospital stay, VTE events, graft take, and mortality. RevMan 5.4 software was used for our statistical analysis and forest plot generation.1

Overall, when compared to the control group, TXA significantly reduced total volume blood loss (mean difference (MD) = -192.44; 95% confidence interval (CI) = -297.73 to -87.14; P = 0.0003), the ratio of blood loss to burn injury total body surface area (TBSA) (MD = -7.31; 95%

CI = -10.77 to -3.84; P < 0.0001), blood loss per unit area treated (MD = -0.59; 95% CI = -0.97 to -0.20; P = 0.003), and the number of patients requiring a transfusion intraoperatively (risk difference (RD) = -0.16; 95% CI = -0.32 to -0.01; P = 0.04). Additionally, there were no noticeable differences in venous thromboembolism (VTE) events (RD = 0.00; 95% CI = -0.03 to 0.03; P = 0.98) and mortality (RD = 0.00; 95% CI = -0.03 to 0.04; P = 0.86).

In conclusion, TXA significantly reduces blood loss and the need for transfusions in burn surgery without increasing the risk of VTE events or mortality.

REFERENCE:

1. Review Manager (RevMan) [Computer program]. Version 5.4. The Cochrane Collaboration, 2020.

The Role of Radiation Therapy in Adult and Pediatric Keloid Management: A National Survey of Radiation Oncologists

Abstract Presenter
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INTRODUCTION: Radiation therapy is a promising modality for treating keloids after surgical excision. However, it is currently not standard practice among physicians due to concern surrounding the risk of radiation induced secondary cancers, especially among pediatric patients. There is minimal research assessing the complications for radiation therapy in keloid management.

AIM: The goal of this study was to determine radiation oncologists' perspectives about the utility and appropriateness of radiation therapy for keloid management in both adult and pediatric patients. This study also aimed to characterize radiation modality, dose, fractionation, and secondary complications observed by providers.

METHODS: An electronic survey was delivered to 3102 members of the American Society for Radiation Oncology. The survey subjects were radiation oncologists who are currently practicing in the United States. Rates of responses were analyzed.

RESULTS: A total of 114 responses from practicing radiation oncologists were received. Of these, 113 providers (99.1%) supported radiation therapy for keloid management in adults, while only 54.9% supported radiation therapy for pediatric patients. Out of 101 providers that treated adults in the past year, the majority used external beam: electrons (84.2%), applied three fraction

regiments (54.4%), and delivered radiation within 24 hours post-excision (45.5%). In pediatric patients, only 42 providers reported treating at least one patient. The majority used electron beam radiation (76.2%), applied three faction regimens (65%), and delivered radiation on the same day of keloid excision (50.0%) The main concern when treating pediatric patients were risk of secondary malignancy (92.1%).

CONCLUSION: While radiation therapy appears to be a widely accepted adjuvant treatment option for adults with keloids, the use of radiation therapy for pediatric patients is less widely accepted due to concerns regarding secondary malignancy. The findings suggest additional studies need to be carried out to assess the risk of those complications.

Should All Patients be Counseled to Achieve Clinically Significant Weight Loss prior to Ventral Hernia Repair?

Abstract Presenter
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BACKGROUND: Patients are counseled to reduce body mass index (BMI) prior to ventral hernia repair (VHR) due to associated risks of poor outcomes, including hernia recurrence. Ideal weight loss targets have not been established, nor has the impact of clinically significant weight loss (CWL) on postoperative outcomes. The study aim was to assess the influence of CWL on postoperative complications following abdominal wall reconstruction for VHR.

METHODS: A single-center retrospective review of patients who underwent abdominal wall reconstruction with the component separation technique for VHR from November 2008 to January 2023 was performed. Cohorts were stratified by presence of CWL (reduction > 5%) from baseline BMI at preoperative consultation. Data regarding comorbidities, perioperative details, and postoperative complications was compared between cohorts.

RESULTS: Of 180 total patients, 40 (22.2%) achieved CWL. Mean age and follow-up was 59.6 ± 11.2 years and 49.7 ± 23.4 months, respectively. Mean BMI was higher in the CWL cohort (33.6 vs. 31.7 kg/m2, p=0.076). Patients in the CWL cohort were more often obese compared to non-CWL (80.0% vs. 56.4%, p=0.007). There were no significant differences in demographic and surgical history between cohorts. The CWL cohort had a higher proportion of patients in Ventral Hernia Working Group (VHWG) classification II (82.5% vs. 63.6%) while the the non-CWL cohort had more VHWG classification III/IV (20.0% vs. 10.0%, p=0.078). There were no

significant differences between concurrent procedures, hernia defect size, and mesh location and type. Complications including 30- and 90-day surgical site occurrence (SSO), return to operating room, readmission, and hernia recurrence, (CWL: 5.0% vs. non-CWL 1.4%, p=0.179) were comparable between cohorts. Multivariate analysis demonstrated BMI was an independent predictor of any complication (OR 1.07, p=0.044) and 90-day SSO (OR 1.10, p=0.043) while CWL did not independently predict postoperative outcomes. A post-hoc analysis was performed to better characterize and assess the influence of CSWL by BMI thresholds on rates of postoperative complications. When isolating patients with a BMI > 35 kg/m2, only 30.8% achieved CSWL (n=16) prior to index ventral hernia repair. There were no significant differences in complications including SSO, readmission, RTOR, or hernia recurrence. When analyzing patients with a BMI > 30 kg/m2, 28.8% achieved CSWL (n=32). Patients who achieved CSWL experienced a higher postoperative complication rate (31.3% vs. 17.7%) although this was not clinically significant (p=0.117). The CSWL cohort amongst obese patients had a significantly higher rate of hematoma (6.3% vs. 0%, p=0.008). Similarly, there were no significant differences in SSO, readmission, RTOR, or hernia recurrence.

CONCLUSION: Clinically significant weight loss prior to ventral hernia repair utilizing component separation techniques does not independently influence post-reconstruction complications. Delaying surgical intervention for weight reduction in non-obese patients likely offers no benefit. However, surgeons should counsel obese patients to reduce BMI prior to surgery to lower associated risks of SSO.

Advanced Age Is Not an Independent Predictor of Complications Following Ventral Hernia Repair with Component Separation

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BACKGROUND: Advancing age is often considered a risk factor for postoperative complications.1-2 However, the effect of advanced age on outcomes following ventral hernia repair (VHR) using the component separation technique (CST) remains unclear. Thus, the study aim was to assess the influence of advanced age on short- and long-term postoperative complications following VHR using CST.

METHODS: A single-center retrospective review of patients who underwent abdominal wall reconstruction with the CST for VHR from November 2008 to January 2023 was performed.

Cohorts were stratified by presence of advanced age (age ≥ 60 years). Data regarding comorbidities, perioperative details, and postoperative complications was compared between cohorts and analyzed via a multiple linear regression model.

RESULTS: Of 219 total patients, 114 met criteria for advanced age. Mean age and follow-up was 59.1 ± 11.3 years and 9.9 ± 21.8 months, respectively. Mean body mass index (BMI) was lower in the advanced-age cohort (30.8 vs. 33.2 kg/m2, p=0.004), and patients in this group were obese less often (54.4% vs. 72.4%). Chronic obstructive pulmonary disease (COPD) was more prevalent among the advanced-age cohort (8.8% vs. 1.9%, p=0.035). Intraoperatively, the advanced-age cohort underwent concurrent procedures less frequently (p<0.001), and received composite mesh (p<0.001) of a smaller size (p<0.001) more often. Controlling for these differences via multivariate analysis demonstrated BMI was an independent predictor of any complication (OR 1.1, p=0.002), dehiscence (OR 1.2, p=0.004), any surgical site occurrence (SSO; OR 1.1, p=0.026), and 90-day SSO (OR 1.1, p=0.015). A history of COPD was positively associated with seroma development (OR 20.1, p=0.012), while advanced age did not independently predict postoperative outcomes, including hernia recurrence (OR 0.8, p=0.766).

CONCLUSION: VHR utilizing CST is generally safe to perform in patients of advanced age. Conversely, a patient's comorbidity profile, including BMI or COPD history, should be thoroughly assessed preoperatively, as these factors appear to have a stronger independent effect on postoperative outcomes.

REFERENCES:

1. Pessaux P, Lermite E, Blezel E, et al; French Associations for Surgical Research. Predictive risk score for infection after inguinal hernia repair. Am J Surg. 2006 Aug;192(2):165-71
2. Lindmark M, Strigård K, Löwenmark T, Dahlstrand U, Gunnarsson U. Risk Factors for Surgical Complications in Ventral Hernia Repair. World J Surg. 2018 Nov;42(11):3528-3536

Lower Extremity Pediatric Tissue Expansion: A Single Surgeon's 16-Year Experience

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BACKGROUND: Tissue expansion is a well-established approach to soft tissue reconstruction in the pediatric population, owing to its technical versatility and optimized aesthetic outcomes. Lower extremity tissue expansion has thus become the standard of care for the reconstruction of soft-tissue defects in children, particularly within the lower limb, buttocks, and perineum.

Despite the broad applications of tissue expanders in children, reported complication rates range from 19% to 40%. General complications associated with tissue expansion include infection and implant extrusion, leading to premature expander removal and delays in reconstruction. In particular, the pediatric population has been a difficult cohort to treat. These challenges have prompted this investigation on categorizing risk factors for lower extremity tissue expander placement in the pediatric population.

METHODS: A retrospective study of pediatric patients who underwent tissue expander placement in the lower extremity by the senior author (R.J.R) was performed over a 16-year period. Patient charts were reviewed to categorize baseline characteristics and operative characteristics. Primary outcome variables were surgical-site infection (SSI), expander extrusion, and expander deflation. Secondarily, any potential associations between patient baseline characteristics and operative characteristics were investigated. Univariate and multivariate logistic regressions were performed, as well as Pearson's chi-square analysis, Wilcoxon's ranked sum test, and student's t-tests (alpha <0.05).

RESULTS: The overall complication rate in this study cohort was 27.1% with an overall 77.2% successful reconstruction rate. Greater number of expanders placed during one operation [2 (2-3)] are associated with 2.5 increased odds of having any complication including surgical-site infection, expander extrusion, and premature explantation and are associated with 0.4 decreased odds of having a successful reconstruction. Additionally, there is a near-significant association with three times increased odds for having expander extrusion. Incisions made in scar tissue for expander placement appear to be associated with a greater than seven times increased odds of readmission.

CONCLUSION: Reconstruction of soft tissue defects using lower extremity tissue expanders in the pediatric population is an effective, yet challenging technique. Extra care should be taken with patients who require multiple expanders in the same location and with choosing the location and incision of expander placement.

Prophylactic flap closure in high-risk open spine patients: Who may benefit? An analysis of the ACS-NSQIP database (2011-2021)

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PURPOSE: Muscle flap closure can reduce wound complications in high-risk spine patients. Nevertheless, accurate risk stratification remains a challenge. We sought to identify predictors of wound complications after open spine procedures and compare to commonly used general surgical risk scores in a national quality-improvement database.

METHODS: The ACS-NSQIP database (2011–2021) was queried for CPT codes representing open spine procedures with a posterior approach. Patients were stratified by whether they received a concurrent pedicled flap. Clinical variables, including 5-factor modified frailty index (mFI-5 score), were extracted to determine covariates associated with development of a wound complication in non-flap patients. Univariate and multivariate analyses were performed.

RESULTS: 511,737 patients underwent open spine procedures and 2,501 (0.5%) received concurrent muscle flaps. Flap use has increased annually from 0.3% to 0.8% of annual cases from 2011 to 2021 ($p<0.001$). Non-flap patients who experienced a wound complication were older ($p=0.007$), female ($p<0.001$), black or other race ($p<0.001$), frailer ($p<0.001$) and had a greater burden of comorbidities. On regression analysis, high frailty index was independently predictive of wound complications (OR 1.26, 95% CI 1.19-1.34, $p<0.001$). However, factors, such as female gender, race, BMI >35, ASA Class 4-5, smoking history, and Albumin < 3.5 mg/dL, remained more strongly associated when adjusting for other covariates ($p<0.001$).

CONCLUSION: The use of muscle flaps in high-risk patients during open spine procedures is rare but increasing. While mFI-5 is predictive of wound complications in non-flap patients, other clinical factors were significantly more associated. A novel risk score could identify high-risk spine patients who may benefit from enhanced closure.

Prognostic Value of 5-Item Modified Frailty Index for Long-term Mortality in Patients Undergoing Major Lower Extremity Amputation for Chronic Wounds

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BACKGROUND: The 5-factor modified Frailty Index (mFI-5) has been shown to be an effective risk-stratification tool in predicting 30-day postoperative complications and mortality following major lower extremity (LE) amputation. However, its prognostic value for long-term mortality is unknown. The study aim was to assess whether a high mFI-5 score relates to long-term mortality following major LE amputation for chronic wounds.

METHODS: A retrospective review of patients >60 years who underwent major LE amputation from 2017 to 2021 was performed. Data regarding patient demographics, comorbidities, perioperative factors, amputation type, and postoperative surgical and 30-day medical complications was collected, and mFI-5 was calculated. Survival predictors were analyzed using Cox regression. Youden index of receiver operating characteristic curves was used to determine the discriminatory value of mFI-5 in predicting overall mortality. Survival analysis was performed with Kaplan-Meier curves and differences were assessed with Log-Rank test.

RESULTS: Of 72 patients identified, the majority of patients were male (n=112, 65.1%) and African American (n=92, 54.1%). Mean age and follow-up was 70.7 + 8.0 years and 17.5 + 15.9 months, respectively. The mean mFI-5 score was 2.9 + 1.0 with 43.0% of patients (n=74) having a score of 3, 25.6% (n=44) with a score of 2, and 22.7% (n=39) with a score of 4. Median time to ambulation was 3.7 months (IQR 4.0). The Youdens´ Index of the ROC curve for mFI-5 and overall mortality was found to be 3.5 with an AUC of 0.61. Thus, the cutoff value was determined to be 4.

Ambulatory rate was 51.7% (n=89), overall mortality 36.0% (n=62), one-year mortality 14.0% (n=24), and three-year mortality 27.9% (n=48). Patients with an mFI-5 of >4 (26.7%, n=46) had a higher rate of overall mortality (52.2% vs. 30.2%, p=0.008), one-year mortality (23.9% vs. 10.3%, p=0.023), and three-year mortality (45.7% vs. 21.4%, p=0.002). Multivariate analysis demonstrated mFI-5 >4 remained a significant predictor of three-year mortality (OR 2.35, p=0.043), while overall mortality trended towards significance (OR 2.01, p=0.091). One-year mortality was no longer associated with increased mFI-5 scores.

The Kaplan-Meier overall survival probability was different between the mFI-5 cohorts by log-rank test (X2 = 8.501, P =0.004). Patients who were ambulatory at final follow-up were less likely to be deceased at all time points for both cohorts (OR 0.33 95% CI: 0.20–0.56, p<0.001). Patients who underwent AKA compared to BKA were more likely to be deceased at all time points for both cohorts (OR 2.72 95% CI: 1.43–5.15, p=0.002).

CONCLUSION: At a threshold of four or greater, the mFI-5 demonstrated utility in predicting long-term mortality. The value of this prognostic indicator is in its preoperative application of assessing risk of mortality, which should be utilized in conjunction with other measures.

Association of Operative Time of Day with Surgical Outcomes Following Lower Extremity Free Flap Reconstruction

Abstract Presenter
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PURPOSE: Free flap reconstruction of lower extremity defects frequently occurs with unpredictable timing; however, the association of operative time of day and outcomes is unknown.

METHODS: A retrospective review was performed of all lower extremity free flap reconstructions performed between 2013-2021 for a single surgeon at a single institution. Primary outcomes included complications and flap success. Secondary outcomes included procedure length, reoperations, readmissions, and time to definitive coverage. Cases performed within the hours of 7 AM and 7 PM were defined as daytime surgery; overnight surgery was defined as cases occurring outside that window. Primary outcomes were analyzed using a multivariable logistic regression adjusting for demographics, comorbidities, surgical technique, and time of day. Secondary outcomes were evaluated using chi-square or Fisher's exact tests.

RESULTS: 148 free flaps were included for analysis: 88 daytime, and 60 nighttime free flaps. Free flap indications and technique did not differ between groups. Overnight flaps were associated with a significantly shorter operative time (p=.006), but significantly more reoperations during admission (p=.045). Overall, vein grafting was independently predictive of an increased risk of complications (OR=8.4, 95% CI 2.0 to 36.2). There were no differences in flap success, readmissions, or time to definitive coverage between daytime and overnight operations. Early vs. late career (learning curve) had no impact on time-of-day outcomes.

CONCLUSION: Overnight lower extremity free flaps were associated with increased reoperations but were not associated with long-term differences in readmission or flap success. Increasingly complex cases requiring vein grafting are likely best performed during daytime hours.

The Rise of Orthoplastic Surgery: Outcomes of the Orthoplastic Team Approach and Current Exposure to Orthoplastic Surgery Training in Residency

Abstract Presenter
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BACKGROUND: Orthoplastic surgery, coined by Dr. Scott Levin over twenty years ago, has become an increasingly sophisticated practice with techniques derived from both plastic and reconstructive surgery and orthopedic surgery (1). It has been suggested that the techniques employed by orthoplastic teams such as microvascular bypasses, free tissue transfers, replantation, nerve grafting, nerve transfers, targeted muscle reinnervation, and microlymphatic surgery can lead to better patient outcomes (2-4).

PURPOSE: Our study had two goals: First, to assess differences in outcome between the orthoplastic team approach vs. the traditional approach via a systematic literature review. Second, to gauge exposure to orthoplastic surgery in integrated plastic surgery residency programs nationally.

Methods: In the first part of our study, we investigated outcomes of various procedures as performed by orthoplastic vs. non-orthoplastic teams via a systematic literature review to determine whether there were significant post-operative differences for complex extremity cases. The indications we reviewed included limb salvage for (1) traumatic upper and (2) lower extremity injuries, (3) chronic osteomyelitis, (4) diabetic foot infections, (5) chronic deformity and congenital malformations, and (6) oncologic complications such as osteosarcomas and soft tissue neoplasms. In the second part, we distributed a 16-item anonymous survey to all directors of integrated plastic surgery residency programs. Information about the program, its affiliated hospitals, and curriculum related to hand and orthopedic surgery were collected.

RESULTS: Our systematic review demonstrates superior outcomes, regardless of indication for limb salvage, when operatively managed by orthoplastic teams. We show decreased number of amputations, better skin healing, and better long-term gait recovery in a wide range of clinical scenarios when orthoplastic techniques are employed.
Our survey data showed that out of 86 Integrated Plastic Surgery programs, 16 of which responded to our survey (19%), only one program had an orthoplastics center, at which residents rotate for 1 month. The estimated proportion of institutional case volume involving orthoplastic collaboration varied from 1% to 30%.

CONCLUSION: The orthoplastic approach demonstrates superior outcomes to the traditional non-orthoplastic approach in all measured indications. Yet, resident exposure to orthoplastic surgery training remains extremely limited. Increasing medical awareness of orthoplastic principles, specifically in medical education, will help advancements in a wide range of reconstructive scenarios.

REFERENCES:
1. Levin L.S. The reconstructive ladder. An orthoplastic approach. Orthop Clin N Am. 1993;24:393–409.
2. Naique S.B., Pearse M., Nanchahal J. Management of severe open tibial fractures: the need for

combined orthopaedic and plastic surgical treatment in specialist centres. J Bone Jt Surg. 2006;88:351–357.
3. Yang, Xu, C., Zhu, Y.-G., Li, J., Wu, Z.-X., Zou, J.-W., Xue, B.-B., Miao, D.-M., Shang, L., & Zhao, G.-Y. (2021). Radical treatment of severe open fractures of extremities by orthoplastic surgery: a 10-year retrospective study. Journal of Orthopaedic Surgery and Research, 16(1), 1–340. https://doi.org/10.1186/s13018-021-02479-2
4. Boriani F., Ul Haq A., Baldini T. Orthoplastic surgical collaboration is required to optimize the treatment of severe limb injuries: a multi-centre, prospective cohort study. J Plast Reconstr Aesthet Surg. 2017;70:715–722.

The Impact of Perioperative Blood Transfusion on Amputation Rates: A 15-Year Review of Limb Salvage in the Trauma Setting

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PURPOSE: Limb salvage post-traumatic lower extremity (LE) injury often necessitates blood transfusion for adequate tissue perfusion. Appropriate transfusion decision-making can maximize limb preservation opportunities. This study examines perioperative blood transfusion implications on amputation status in traumatic LE reconstruction.

MATERIALS AND METHODS: A retrospective review was conducted at a level 1 trauma center on patients who underwent LE reconstruction between 2007-2022. Patient demographics, comorbidities, perioperative blood transfusions, flap characteristics, complications, and ambulatory status were recorded. Chi-squared and independent t-tests were used for statistical analysis. Logistic regression was performed to examine the impact of patient factors and comorbidities on amputation status.

RESULTS: Among 350 flaps placed, 147 (42.0%) received at least one packed red blood cell transfusion (Tf+), and 203 (58.0%) received no blood transfusions (Tf-). The Tf+ cohort had significantly higher amputation rates compared to the Tf- group (5.4% vs. 1.9%, p=0.014). Both transfusion status (odds ratio [OR]: 6.0, 95% confidence interval [CI]: 1.34-25.7; p=0.019) and age (OR: 1.1; 95% CI: 1.02-1.14; p=0.006) were identified as independent contributors for amputation rates. Age, gender, hypertension, diabetes mellitus, cocaine use, congestive heart failure, renal disease, and peripheral vascular disease did not significantly vary between cohorts. Overall flap survival across both cohorts was 95.1% with higher rates among the Tf- cohort (97.0% vs. 92.5%; p=0.052).

CONCLUSION: The Tf+ trauma patient cohort suffered significantly higher rates of postoperative LE amputation. Surgeons should consider a conservative transfusion protocol to mitigate transfusion-correlated limb loss/morbidity.

Close

Reconstructing Nasal Defects with Integra Bilayer Wound Matrix after Mohs Micrographic Surgery: A 12-year Experience

Abstract Presenter
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INTRODUCTION: Large defects of the nose after Mohs surgery pose a significant reconstructive challenge to both dermatologic and reconstructive surgeons. Our aim was to present our 12-year experience utilizing Integra® bilayer wound matrix for nasal reconstruction. Primary endpoints included success of Integra integration, followed by time to complete healing, complication rate, recurrence, and aesthetic intervention.

METHODS: A retrospective review of patients undergoing Mohs surgery and alloplastic nasal reconstruction with Integra between 2012-2022 was performed. Patients who underwent single-stage reconstruction and dual-stage reconstruction with skin graft with at least 90 days of follow up were included.

RESULTS: Fifty-one patients (28 males, 23 females) met inclusion criteria with a median age of 77 years of age. Non-Hispanic Caucasians made up the majority of the study (98%), with 43% having a history of tobacco use. Basal cell carcinoma (BCC) was the most common cutaneous malignancy diagnosed (61.5%), followed by squamous cell carcinoma (SCC) (13.5%), and melanoma in-situ (13.5%). A total of 53 lesions were treated, with each acquired defect repaired and reconstructed separately with Integra. The most common lesion location involved the nasal sidewall (50%), followed by the nasal tip (44.4%). The mean pre-operative lesion size was 3.3 cm2, with a mean post-Mohs surgery defect size of 10.8 cm2. 30.8% (n=16) of defect sites underwent same-day Integra reconstruction, with 69.2% (n=36) proceeding to undergo two-stage reconstruction. Integra successfully reconstructed the acquired Mohs defect in 94.2% of this population. Average time to completed healing was 145.35 + 86.0 days. No instances of disease recurrence were recorded. The total complication rate was 9.62% (n=5). The average size for

successful healing without complication is 10.8 cm2. The average defect size for complications or failure of skin graft was 14.7 cm2. Only seven sites (13.46%) underwent procedures for aesthetic improvement, with all revisions occurring after two stage reconstruction.

CONCLUSION: When used in single or two staged reconstruction, Integra bilayer wound matrix is an adequate reconstructive option for the nose with low complication and revision rates.

Neuropsychiatric Diagnoses in the context of plastic surgery healthcare utilization by patients with Hidradenitis Suppurativa

Abstract Presenter
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BACKGROUND: Neuropsychiatric disorders (ND) have higher prevalence in patients with Hidradenitis Suppurativa (HS). Bipolar spectrum disorders are over twice as likely in patients with HS compared to age- and behavior-matched controls. Additionally, psychological sequelae associated with lower quality-of-life metrics in patients with HS may contribute to higher prevalence of anxiety and mood disorders. Concomitant ND in the setting of a debilitating and chronic inflammatory disorder may impact how patients interact with their surgeons and interface with the healthcare system at large. This study aims to investigate how ND may impact utilization of plastic surgery care in patients presenting to plastic surgery clinic for HS treatment.

METHODS: A retrospective chart review was conducted for patients who were seen in clinic for Hidradenitis Suppurativa by plastic surgery from 2018 to 2022. Data collection included insurance type, number of clinic visits and billed procedures, and history of neuropsychiatric disorders (ND). Patients without at least one procedure in the studied period were assumed ineligible for operative intervention. Otherwise, clinic visit to billed procedure ratio was calculated for patients with at least one procedure. Comparisons of continuous variables used Welch's t-tests and categorical comparisons utilized Odds Ratios and Pearson Chi-Squared analysis.

RESULTS: 218 patients were seen for HS from 2018-2022, for a total of 639 clinic visits and 323 billed procedural codes. 107 (49%) patients had a history of ND with 175 total psychiatric diagnoses, including depression, anxiety, psychotic disorders, and bipolar spectrum disorders. Patients with concomitant HS and ND were 2.32 times as likely to have public insurance compared to HS patients without ND (p=0.0046). The average number of clinic visits for patients

with ND (3.28 ± 3.30) compared to patients without ND (2.65 ± 2.27) were found to have no difference (p=0.10). Of those who had at least one procedure (86), the average number of billed procedures for patients with ND was 3.24 and 4.43 for patients without ND (p=0.227). Clinic Visit to Billed Procedure ratios (CV:BP) were calculated for patients who underwent at least one procedure, with an overall average of 1.95:1. For patients with ND, the average CV:BP was 2.23:1 while patients without ND were shown to have a significantly lower CV:BP at 1.57:1 (p=0.044). Of ND diagnoses, the highest CV:BP ratios were found in patients with depression and bipolar spectrum disorders, both found to have average CV:BP ratios of 2.34:1.

CONCLUSIONS: Prevalence of ND is high in patients with HS. While there was no significant difference in overall clinic visits or billed procedures between HS patients with and without ND, there was a significantly higher ratio of clinic visits per billed procedure in patients with ND. Surgeons with HS practices may find it beneficial to streamline utilization of plastic surgery resources while remaining sensitive to individual patient needs. Further investigation will include assessment of revision rates, disease severity, and medical therapy optimization in association with ND in the HS population.

The Role of C4d and Donor Specific Antibodies in Mucosa & Skin- a Retrospective Analysis in Face Transplant Patients

Abstract Presenter
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INTRODUCTION: To date, little is known about the relationship between donor-HLA-specific antibodies (DSAs) and C4d deposition in target tissues of facial vascularized composite allografts (fVCA). Knowledge about the relationship would help better define the potential role of these classic surrogate parameters of antibody mediated rejection (AMR) for the characterization of VCA rejection.

MATERIALS & METHODS: We retrospectively studied the relationship between DSAs and C4d target tissue deposition in a cohort of nine fVCA patients who received a total of ten fVCAs, performed at Brigham and Women´s Hospital (Harvard Medical School, Boston, USA) between 2009 and 2020; currently being followed at Yale New Haven Hospital (Yale School of Medicine, CT, USA). DSA cutoff for positivity was at 1,000 mean fluorescence intensity units and C4d positivity was assessed through dermatopathology via immunostaining. Phi coefficient for DSA and C4d result (binary variables) correlation, point-biserial test for DSA and C4d result correlation with rejection grade and post-operative month, and Spearman correlation between

rejection grade and postoperative month, were computed using Python SciPy v1.10.0 library.

RESULTS: Four patients showed de novo DSA formation following facial transplantation. Suspecting AMR in fVCA recipients led to C4d testing in four members of this cohort, yielding positive results at various points post-transplant. In the time-points with simultaneous measurements of DSA and C4d, 19.4% of time-points had positive DSA and C4d measurements, 50% had only one positive value and 30.6% showed negative results for both DSA and C4d. The average rejection grade was highest (mean=2.0, SD=0.75) in the time points with two positive values, compared to points with one positive value (mean=1.66, SD=1.20) and two negative values (mean=1.16, SD=1.11). DSA and C4d did not show correlation (φ=0.0, p=0.12). In instances of concurrent skin and mucosa rejection grade measurements, 32% showed different results in mucosa and skin according to the Banff Classification, however, difference of rejection grade between skin and mucosa was not statistically significant.

CONCLUSION: While a trend was observed with higher grade of rejection and simultaneously positive DSA and C4d results, no notable correlation was discerned between DSA and C4d deposition in target tissues. It is noteworthy that only skin samples were immuno-stained for C4d, and with preceding evidence suggesting higher immunogenicity of mucosa compared to skin, there is a possibility of a more robust antibody-mediated response in mucosa which could have been overlooked in this study. This limitation warrants further investigation of AMR in mucosa samples, as deep tissue rejection may not be accurately reflected in the skin; skin samples rarely showed classic signs of AMR such as evidence of vasculitis, neutrophilic margination, thrombi in DSA+/C4d+ samples. Further studies are necessary to elucidate the exact role of AMR for VCAs.

Xeroform™ Stickdown Dressing: A New Technique for the Treatment of Pediatric Partial Thickness Burns

Abstract Presenter
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PURPOSE: Standard dressings for the treatment of pediatric partial thickness burns require frequent dressing changes that are both painful and anxiety-inducing for patients. Our institution adapted a traditional skin graft donor site dressing into a 'stickdown' burn dressing. This consists of a one-time application of bacitracin and 3% bismuth tribromophenate/vaseline impregnated gauze (Xeroform™) that adheres to the wound bed and peels off as new epithelialized skin forms. The goal was to minimize patient/caregiver discomfort, narcotic usage, and hospitalization rates. This study aimed to compare clinical outcomes of the stickdown dressing to

traditional dressings.

METHODS AND MATERIALS: A retrospective cohort study of pediatric patients (age < 18 yrs) with partial thickness burns treated at a Level I pediatric trauma center over four years was conducted. Patients who received a standard dressing regimen (N = 74 "NSD") were matched to patients treated with a Xeroform™ stickdown protocol (N = 37 "SD"). Propensity score matching based on age, burn depth (superficial vs deep partial thickness), mechanism of injury, and total body surface area (TBSA) was performed. Univariate analyses utilized Wilcoxon Rank Sum and Fisher's Exact tests.

RESULTS: The two cohorts had similar demographics and burn characteristics including mechanism of injury (NSD: 79.7% scald, 17.6% contact/friction, 2.7% flame vs SD: 86.5% scald, 13.5% contact/friction, P=0.55), and median TBSA (2.5% NSD vs 3% SD, P=0.70). A similar number of patients were admitted to the hospital (31.1% NSD vs 32.4% SD, P=1.0), most commonly for pain control (54.5% NSD vs 58.3% SD, P=0.80). Hospital stay duration was longer in standard dressing group but the difference was not statistically significant (median 2.0 days NSD vs 1.0 days SD, P=0.23). Stickdown patients utilized a similar amount of narcotics during their hospitalization (7.7+/-12.1 average daily morphine milli-equivalents vs 5.1+/-9.5, P=0.91). There were no differences in outcomes such as time to burn re-epithelialization (median 13.0 NSD vs 12.0 SD days, P=0.20) or any wound healing complications. The only significant difference was median number of dressing changes needed (12.0 NSD vs 0.5 SD, P<0.0001).

CONCLUSIONS: The Xeroform™ stickdown dressing requires significantly fewer dressing changes and has equivalent clinical outcomes to standard dressings for the treatment of pediatric partial thickness burns. Decreasing dressing change frequency has the potential to decrease both anxiety during burn recovery and subsequent psychological effects, such as anxiety or PTSD, which are common following pediatric burns.[1]

REFERENCE:

1. Woolard A, Hill NTM, McQueen M, et al. The psychological impact of paediatric burn injuries: a systematic review. BMC Public Health. 2021;21(1):2281. Published 2021 Dec 14. doi:10.1186/s12889-021-12296-1

Surgical Capacity Assessment and Leverage in the PalEstinian Land (SCALPEL-I) Study: The First Nationwide Plastic Surgery Capacity Evaluation in Palestine

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BACKGROUND: Access to surgical care in low-to-middle-income countries (LMIC) especially in war-torn and refugee-densely populated areas such as Palestine is increasingly recognized as a global health priority. Plastic surgical capacity in Palestine has not been evaluated before in the current published literature. The aim of this study was to conduct the first systematic, comprehensive, and nationwide evaluation of plastic surgical capacity in Palestine.

METHODS: This is a cross-sectional study conducted between December 2022 and February 2023 and included all healthcare facilities that provide plastic surgery services in Palestine except private centers run by non-surgeons. A modified version of the validated 5-domain Personnel, Infrastructure, Procedures, Equipment, and Supplies (PIPES) tool was administered in each facility through a face-to-face interview. Hospitals' PIPES indices were computed; data were aggregated and analyzed for geographic and private/public disparities.

RESULTS: A total of 9 facilities were included in the study; 5 (55.6%) were in the West Bank and 4 (44.4%) in Gaza. The majority were governmental hospitals (n=5, 55.6%). The mean PIPES index was (Personnel = 4.1, Infrastructure = 18.6, Procedures = 10.2, Equipment = 19.7, and Supplies = 22.4). The number of hospital beds, functioning operating rooms, and plastic surgeons (regardless of board-certification status), per 100,000 people were 41.3, 0.9 and 0.4, respectively. There were only 4 board-certified plastic surgeons: only one in Gaza. None of the facilities surveyed had a plastic surgery residency training program. Deficiencies in PIPES were significant as follows: 77.8% of facilities do not perform free flaps (none in Gaza), 55.6% do not perform any microsurgical procedures (none in Gaza), 55.6% lack a system to identify complications, and 55.6% of facilities do not offer regular plastic surgery CME courses to their plastic surgeons. The average hours of electricity per day in Gaza vs West Bank was 8.0 vs 24.0, p=0.02.

CONCLUSIONS: Evaluating plastic surgical capacity in Palestine reveals significant deficiencies across all five domains of the modified PIPES tool, most pronounced in Gaza. We hope these results would inform stakeholders about the status of plastic surgery in Palestine to help eliminate surgical care disparities, to build plastic surgical training programs, and to improve access to safe plastic surgical care in the country.

Usefulness of Free Latissimus Dorsi Myocutaneous Flap for Post-Sacrectomy Reconstruction: Comparison with Regional Muscle Flap

Abstract Presenter
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Abstract Co-Author
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BACKGROUND: En-bloc excision of sacral tumor results in extensive bone and soft tissue defects as well as vital organ exposure"1". Soft tissue reconstruction is essential for dead space obliteration and wound healing"2". Diverse reconstruction options using locoregional flaps have been utilized but were limited by postoperative morbidity as high as 50%"3". An optimal reconstruction method that offers acceptable complication rates has yet been sought for. Here, we aimed to evaluate the effectiveness of free latissimus dorsi (LD) flap for post-sacrectomy defect reconstruction by comparing its outcomes with that of a local gluteus maximus (GM) flap.

METHODS: A retrospective review was conducted of all patients who underwent partial or total sacrectomy and immediate soft tissue reconstruction with free LD flap or local GM flap between January 2013 and December 2022. Postoperative outcomes including complication and patient recovery were compared between the two groups.

RESULTS: Nineteen patients were analyzed, including 10 with local GM flap and nine with free LD flap. The two groups showed similar baseline characteristics. Complication developed in nine patients: seven in the GM group (70%) and two in the LD group (20%). In the GM group, seroma (50%) was most common, followed by wound dehiscence (40%), infection (30%), and re-operation (30%). Two donor site seromas (22%) were reported in the LD group, which were resolved with clinic-based aspirations. NO complication developed at the sacrectomy site in the LD group. The LD group showed a significantly shorter drain-indwelling period (8.1 days vs. 13.7 days), smaller drain amount (810 cc vs. 3361 cc), shorter hospital stay (22.9 days vs. 48.8 days), and earlier initiation of ambulation or rehabilitation (8.4 days vs. 30.5 days) than the GM group.

CONCLUSION: Soft tissue reconstruction with free latissimus dorsi myocutaneous flap provides reliable outcomes and enables early recovery in sacrectomy patients. Free LD flap may be considered more effective for post-sacrectomy reconstruction, compared to traditional loco-regional flaps.

REFERENCES

1. Fourney DR, Rhines LD, Hentschel SJ, et al. En bloc resection of primary sacral tumors: classification of surgical approaches and outcome. J Neurosurg Spine. 2005;3(2):111-122.
2. Diaz J, McDonald WS, Armstrong M, Eismont F, Hellinger M, Thaller S. Reconstruction after extirpation of sacral malignancies. Ann Plast Surg. 2003;51(2):126-129.
3. Asaad M, Rajesh A, Wahood W, et al. Flap reconstruction for sacrectomy defects: A systematic review and meta-analysis. J Plast Reconstr Aesthet Surg. 2020;73(2):255-268.

Incidence of postoperative complications among patients with active or resolved COVID-19 undergoing elective Abdominal Wall Reconstruction

Abstract Presenter
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BACKGROUND: There is little known about the incidence of postoperative complications among patients with COVID-19 positivity undergoing elective surgical operations. The purpose of this study was to identify differences in post-operative complications following elective abdominal wall reconstruction (AWR) in patients diagnosed with COVID-19 as compared to patients presenting pre-pandemic.

METHODS: A single-institution, retrospective chart review was performed of patients who underwent AWR with component separation technique and placement of acellular dermal matrix between January 2017-September 2022. Patients were stratified by date: pre-COVID-19 (1/2017-12/2019) and post-COVID-19 (1/2020-9/2022). All patients with a confirmed positive Covid-19 diagnosis were also identified. Data collected included demographics, clinical characteristics, and complications. Complications were classified as major (requiring readmission or needing surgical intervention) and minor. Univariate and multivariate analyses were performed.

RESULTS: 168 patients were included. The mean age was 54 and mean BMI was 33. There were 75 patients who underwent surgery pre-COVID and 93 patients after. 16/93 (17%) had a positive COVID-19 test prior to surgery or during perioperative period. These two groups were risk matched. COVID-19 patients had no significant increase in postoperative complications. Major complications occurred in 13.3% in the pre-COVID group and 7.5% in the post-COVID. COVID-19 patients were more likely to be younger (48 vs 57, p=0.049); and more likely to have a shorter length of stay in the hospital (3 vs 5.8; p=0.038).

CONCLUSION: During the pandemic, there was no associated increase in postoperative complications in our case series of patients undergoing AWR with component separation and acellular dermal matrix. This study by is limited by its small sample size. Further investigation should be done on this topic to obtain more statistical power.

Relative Citation Ratio Index and Gender Authorship Among Reconstructive Microsurgery Studies: A 20-year analysis

Abstract Presenter
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BACKGROUND: Gender disparities in plastic surgery (PS) authorship have been documented in PS literature. The Relative Citation Ratio (RCR) Index is a new metric that normalizes for field and time, which can be utilized to compare authors. This study aims to evaluate differences in gender authorship in reconstructive microsurgery (RM) studies, as well as the impact of gender on the RCR Index.

METHODS: A cross-sectional study was performed from 2002 to 2020. A PubMed query was constructed using keywords and controlled vocabulary to extract RM-related studies in the top 1 plastic surgery journal: Plastic and Reconstructive Surgery Journal. A two-stage screening process by two independent reviewers was conducted to select eligible studies. If discordance was present a third reviewer moderated the discussion, and a joint decision was made. Names of first and senior authors were extracted. The likely gender was adjudicated by using NamSor-Software. If the gender probability calibrated was <85% a manual internet search was performed. RCR information was extracted from NIH iCite. Unpaired T-test and Chi-Squared test were used to assess differences between groups.

RESULTS: A total of 424 articles were included in this study, corresponding to 827 authors. A statistically significant difference was found in the rates of gender between first and senior authors ($p = 0.021$). The first authors were identified as males in 80% of the cases and females in 20%. Significant higher mean weighted RCR were found in male compared to female first authors (52.2 females vs 111.2 males, $p < 0.001$). For senior authors, males represented 89% and females 11%. No statistically significant differences were found in the mean weighted RCR between senior authors' gender (122.1 females vs 171.6 males, $p = 0.1184$).

CONCLUSION: A considerably greater number of males are publishing in RM-related studies compared to females, with significantly more males being senior authors compared to first authors. Males had higher weighted RCR scores compared to females. This study suggests that equity in gender authorship within this field is yet to be achieved and future studies identifying barriers for females to publish in RM are needed to properly propose targeted efforts to decrease this gender disparity.

Psychosocial Outcomes in Eight Vascularized Composite Face Allotransplant Patients

Abstract Presenter

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PURPOSE: Recent findings have identified pre-transplant coping as an important factor in predicting psychosocial trajectories in recipients of a face transplant. However, little is known about how post-transplant coping strategies impacts psychosocial (long-term) outcomes in fVCA patients. Therefore, with an increasing number of patients receiving face transplantation, it is important to understand the psychosocial effects of this life altering procedure, which is the aim of this study.

MATERIALS & METHODS: We assessed post-transplant coping and psychosocial outcome across eight fVCA patients, receiving transplantation at Brigham and Women´s Hospital (Harvard Medical School) between 2009 and 2020 and currently being followed at Yale New Haven Hospital (Yale School of Medicine), using the Brief-COPE questionnaire and the Short-Form-12 questionnaire for self-reported physical and mental health(questionnaires being administered from October 2022 to January 2023). The nine coping mechanism categories studied using Brief-COPE were Acceptance, Positive Reframing, Active Coping and Planning, Emotional and Instrumental Support, Religion, Humor, Behavioral Disengagement, Denial & Self-blame, and Substance Use.

RESULTS: Scores in three coping mechanism categories showed a negative association with mental health: Behavioral Disengagement (r=-0.577, p=0.25), Denial & Self-blame (r=-0.733, p=0.071), and Substance Use (-0.412, p=0.5) and the other six factors showed mild to moderate positive correlation with mental health. Religion showed strong and significant negative correlation with physical health (r=-0.89, p=0.006). Older age of recipient strongly correlated with higher mental health scores (r=0.77, p=0.033) as well as with usage of Emotional and Instrumental Support (r=0.729, p=0.049). Time since transplantation negatively correlated with mental health (r=-0.524, p=0.197).
Within coping mechanism categories, Venting and self-distraction correlated significantly with active coping (r=0.788 p=0.025), humor and active coping also showed strong association (r=0.808, p=0.020) and moderate negative correlation was observed between substance use and usage of emotional and instrumental support (r=-0.425, p=0.500); substance use also positively correlated with denial and self-blame (r=0.756, p=0.125).

CONCLUSION: Patients and their support network should receive education and guidance to reduce harmful coping mechanisms and promote adaptive strategies that have been shown to positively impact physical and mental health, and this guidance should be tailored and specific to the patient. Factors supporting mental health outcomes may differ from those supporting physical recovery, such that separate attention should be given to coping factors specifically

associated with positive psychosocial outcomes. Our findings suggest that working towards decreasing Behavioral Disengagement, Denial & Self-blame, and Substance Use may be particularly relevant targets for therapeutic interventions post-transplant, as our analysis suggests diminishing a harmful coping strategy can associate with decreased use of other maladaptive mechanisms and increased usage of adaptive coping mechanisms. Addressing these coping strategies and their correlation with physical and mental health is crucial for improving the long-term psychosocial outcome for face transplant recipients and preventing adverse effects such as non-adherence and chronic rejection, which can lead to graft loss and death.

A Review of Lymphedema Surgical Education in United States Plastic Surgery Residency Programs

Abstract Presenter
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PURPOSE: Lymphedema is a chronic, debilitating condition that affects more than five million Americans (1). Continued advancements in supermicrosurgical techniques and promising preliminary outcomes have led to a surge in the performance of physiologic lymphedema procedures and preventative healing approaches. This study is the first to evaluate the adequacy of lymphedema surgical education that plastic surgery trainees currently receive in United States plastic surgery residency programs.

METHODS: The authors conducted a cross-sectional analysis in December 2022 of 104 accredited integrated and independent plastic surgery residency programs. Web-based search of publicly available program information determined whether the curriculum included lymphedema surgery and elective time. Evaluation of individual surgeon profiles identified faculty members that perform lymphedema surgery at a location where residents rotate. Program institutions were also evaluated based on LE&RN designated center of excellence status. An email to the residency program coordinator was sent for programs with no available online information.

RESULTS: Of the 104 plastic surgery residency programs, 11% (n=11) have lymphedema surgery in their publicly advertised curriculum. Sixty-four percent of programs (n=67) have at least one clinical rotation site with a plastic surgeon that performs a form of lymphatic reconstruction, with 12% (n=8) of these opportunities being at a separate rotation at an outside institution. The main institution for 19 programs (18%) is a LE&RN designated center of excellence, of which 11 are deemed comprehensive centers of excellence (58%), 3 (16%) are

comprehensive cancer centers of excellence, another 3 (16%) are networks of excellence, 1 (5%) is a referral network of excellence, and 1 (5%) has a lymphatic disease conservative care center of excellence designation. These 19 programs were significantly more likely to provide clinical exposure to lymphedema surgery as stated in their curriculum or through a home institutional faculty member that performs lymphedema surgery (95% vs 53%; $p<0.001$). Of the 36 programs that did include lymphedema surgery in their online curriculum nor in a faculty member's profile, only 26% (n=10) advertised elective time in their curriculum.

CONCLUSIONS: Most plastic surgery residency programs have at least one surgeon that performs lymphedema surgery at a location where residents rotate. However, lymphedema surgery is uncommonly included in advertised program curricula. Furthermore, programs without any forms of exposure often have no elective time in which to attain it. As surgical treatments for lymphedema continue to advance and become more commonplace, it is important for us to understand the adequacy of training that the next set of practicing plastic surgeons will receive in this microsurgical subspeciality.

REFERENCES

1. Schaverien MV, Baumann DP, Selber JC, Chang EI, Hanasono MM, Chu C, Hanson SE, Butler CE. Building a Multidisciplinary Comprehensive Academic Lymphedema Program. Plast Reconstr Surg Glob Open. 2020 Mar 20;8(3):e2670.

A Long-term Follow-up Study of Diabetic Foot Ulcer Using Micronized Acellular Dermal Matrix

Abstract Presenter
Hwan Jun Choi

Treating a diabetic foot ulcer (DFU) extending to the tendon or bone can be a challenge for physicians. Recent studies have shown positive results of micronized acellular dermal matrix (ADM) treatment for treating DFU. However, studies on such ADM with a long-term follow-up are rare. Micronized ADM (CG Paste; Daewoong Pharmaceutical, Seoul, Korea) is an undifferentiated, cell-free dermis matrix that is safely used in clinical practice currently. It is a free-flowing, acellular allogeneic dermis. It contains collagen, elastin, fibronectin, laminin, and proteoglycans known to be components of the human skin. Thus, it can aid in the interaction between normal cells and the extracellular matrix.

Thus, the objective of this study was to retrospectively analyse patients treated with micronized ADM with a long-term follow-up to assess the effectiveness of the treatment and determine the recurrence rate.This was a 7-year retrospective cohort study to evaluate the efficacy and safety of a micronized ADM for treating DFU. From January 2015 to December 2018, 91 patients with DFU intended secondary healing rather than surgery due to various reasons. Their medical records were reviewed.

The rate of success of complete healing was 62.96% and the time of complete healing was 86.96

days in this study. The recurrence rate of DFUs was 41.17% in the overall group. However, it was only 23.52% in the micronized ADM group. The average duration of recurrence was 720.50 ± 505.12 days. The recurrence rate was 50% in weight bearing areas such as the plantar and heel. It was 12.5% in toes and non-weight bearing areas.

In conclusion, micronized ADM induced secondary healing in tendon/bone exposed DFUs commonly known to be hard-to-heal wounds. When adequate recovery of blood flow and wound bed preparation preceded the procedure, proper use of micronized ADM could reduce total healing time and the number of hospitalization dates. It also dramatically increased the healing rate and enabled early outpatient therapy. Thus, it is cost effective. In this long-term follow-up experience, micronized ADM showed sufficient stability, although it did not lower the recurrence rate or prevented recurrence. A close follow-up of weight bearing area wounds will allow us to identify and treat recurrence early.

Determinants of Keloid recurrence: The Nairobi keloid recurrence scoring system; a cohort, prospective study.

Abstract Presenter
Ferdinand Wanjala Nangole MD

BACKGROUND: Keloid disease is a fibro-proliferative disorder characterized by excessive deposition of collagen. Keloids has shown high recurrence rate. We undertook this study to determine what factors influence recurrence of the disease with the aim of developing a keloid recurrence scoring system.

METHODS: This was a cohort prospective longitudinal study of patients who presented with keloids, managed by surgical excision followed by post excision radiotherapy. Post-surgery patients were followed up for at least two years to determine recurrence. Variables analyzed included patients' history, clinical presentation and keloid histology. Data captured were analyzed using SPSS version 21. Student T-test and Chi-square test were used to compare means and frequencies respectively at 95 percent confidence level (P-Value <0.05). Multi regression analysis was done to determine the contributions of various variables to keloid recurrence.

RESULTS: Ninety patients were followed up in the study for duration of two years. Overall keloid recurrence was 21% with male patients having a significantly higher recurrence rate of 31% compared to the female at 12%. The recurrence rates were also higher in familial keloids at 27.7 % compared to sporadic keloids at 18.5%. Other factors that influenced recurrence included anatomical location, patient's blood group and histological composition of the keloid. Multiple regression analysis done demonstrated that gender and family history was the biggest contributor to keloid recurrence.
Conclusion: Keloid recurrence is influenced by many factors including family history, clinical presentation and keloid histology. A Keloid recurrence scoring system encompassing these factors could assist in the determination of post excision management as well as prediction of the likelihood of recurrence.

Adipose-derived stem cells application for the treatment of enterocutaneous fistula in an experimental model

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INTRODUCTION: The most frequent cause of enterocutaneous fistula (ECF) is a postoperative complication of the gastrointestinal tract (80%). Among the complications caused by ECF, mortality is the most serious and can occur between 6% and 33%. The treatment of ECF is expensive and the results are variable. Stem cell treatments have demonstrated satisfactory regenerative effects. For this reason, this work proposes the evaluation of the effect of ASC in the treatment of ECF.

METHODS: 21 Wistar rats were analyzed, which underwent surgery to perform an enterocutaneous fistula. AUC was obtained from abdominal adipose tissue from liposuction patients. After 30 days, the animals were divided into three groups: control (n=7), culture medium without cells (n=7), ASC (n=7). After 30 days of allocation, the following outcomes were collected: ECF output, ECF diameter, histological analysis (inflammation, granuloma, atrophy).

RESULTS: When comparing the diameter, a difference was demonstrated (p=0.003). The post hoc test showed a difference between the control group and the ASC group (p= 0.001) and the culture medium group and the ASC group (p= 0.002). Debt decreases by 50% in the ASC group compared to the other groups. When comparing the inflammation score, the difference was demonstrated (p=0.03). The post hoc test showed a difference between the culture medium group and the ASC group (p=0.003). When comparing the cell atrophy score, there was no difference (p=0.09). Conclusion: This study suggests that the use of ASC in the treatment of ECF can decrease fecal diameter and output. More studies are needed to validate this hypothesis.

Anatomical basis and Outcomes of Calvarial and Soft Tissue Reconstruction with Latissimus Dorsi Rib Osteomyocutaneous Free Flap

Abstract Presenter

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PURPOSE: The latissimus dorsi-rib osteomyocutaneous free flap (LDRF) has been used for autologous reconstruction of large composite calvarial and scalp defects, though there is a lack of research on patient-reported outcomes after this operation. In this study, we aim to present the anatomical basis, patient-reported and clinical outcomes for patients treated with LDRF.

METHODS: Between 2015-2022 a retrospective review of ten patients who underwent LDRF for treatment of cranial defects was conducted. LDRF consisted of the latissimus dorsi muscle and one or two ribs (combination of 8th, 9th, 10th, 11th). Patient-reported outcomes regarding quality of life, neurological status, functional status, and aesthetics were evaluated using nine validated surveys. Twenty dissections were performed to study the anatomy of the perforators.

RESULTS:
Anatomical
The 10th (4.65± 2.01) and 9th ribs (3.7±1.63) had the highest number of perforators, while the 8th (1.20±1.32) and 12th (1.55±1.00) ribs had the least. The 8th rib had the longest perforators (4.26±1.52 cm, $p<0.0001$).

Clinical Outcomes
On average, patients had 2 previous failed reconstructions and defects were most commonly secondary to gunshot injury and bone flap infection after cranioplasty with a median follow-up of 48-months. Six defects were reconstructed using 2 ribs, whereas the remaining 4 patients received 1 rib. A prolene-polyprophylene mesh was used for donor site reconstruction at the time of LDRF harvest in 8 patients. All patients had stable reconstructions. Major complications included: hemothorax (n=1), liver hernia at the right 10th rib donor space (n=1), and nonunion of the 11th rib (n=1). Minor complications included: episodic hypotension and wound dehiscence. Secondary procedures included anticipated flap debulking and tissue rearrangement (n=13 procedures in 9 patients) and a functional brow lift for ptosis obstructing vision (n=4 procedures in 2 patients)

Patient Reported Outcomes
The median follow-up for patient-reported outcomes was 23 months. The average preoperative Karnofsky Performance Scale Test score was 62.5±20.5 (out of 100) and 76.3±22.0 postoperatively ($p=0.22$). The average Barthel score was 13.3±6.1 preoperatively and 17.6±4.9

after surgery (p=0.13). University of Washington Quality of Life Questionnaire (UW-QoL) average scores were 80.5±16.1 preoperatively and 88.3±9.7 after surgery (p=0.26). On the Functional Independence Measure Test (FIM), average scores were 59.4±29.7 pre and 71.9±25.6 postoperatively (p=0.42), with three of the patients having documented improvements. The average score before surgery was 30.4±3.6 and 31.9±5.0 after surgery (p=0.55). There was functional improvement in 63% of the patients on the SFMA test (Table 2). The average University of Washington Quality of Life social/emotional domain score prior to surgery was 45.7±29.1 and 57.7±24.1 after (p=0.36). Average Headache Disability Scores for those who did report headaches preoperatively was 25.4±33.5, and 12.6±19.0 postoperatively (p=0.38). Upper Extremity Pain and Disability (DASH) Average DASH scores decreased from 45.4±28.7 to 33.0±29.9 after surgery (p=0.40).

CONCLUSION

The LDRF can improve cognitive and physical functional status in complex patients with prior failed reconstructions for composite scalp and skull defects.

Stromal Vascular Fraction and Photostimulated Adipose Tissue: From Harvesting by One STEP Technique to Clinical Application

Abstract Presenter
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Since the first studies about multilineage cells from adipose tissue, there was a boost in cell-based therapies.1 Mesenchymal stem cells (MSC), fat grafting and stromal vascular fraction (SVF) have been in great evidence in Regenerative Medicine researches. MSC may be modulated when in contact with damaged tissues.2 Complex multiple cellular mechanisms including paracrine effects, direct cell signaling, and exosomes release act together with other elements in a Regenerative Bionetwork. MSCs release a diverse set of growth factors, chemokines, cytokines, and immunomodulatory substances, including interleukin 6 (IL-6), leukemia inhibitory factor, fibroblast growth factor 1 (FGF-1) and 2 (FGF-2), macrophage colony stimulating factor, and vascular endothelial growth factor (VEGF), besides extracellular matrix components such as collagens I, III, IV, and VI and fibronectin. For homeostasis and optimal tissue function, these elements are needed in quality and quantity. Adequate harvesting, transport, maintenance of pH and temperature, exposure time with a minimal manipulation technique are cornerstones. For this task the One STEP (Selective Tissue Engineering in Photonics) was elected, since it has a minimal traumatic photochemical mechanism with an infranadant of 1-3%, does not use a super humid or tumescent infiltration nor a traumatic disruption method. Its product is homogeneously presented without lumps. It is done without collagenase enzyme, exogenous substances or laboratory, at the surgical room and with minimal manipulation technique.3 Photostimulation is done with application of a 1210 nm diode laser through a 600-micron optic fiber and a 2 mm cannula.4 Cellular and immunohistochemical analyses show mesenchymal stem cells with adequate cellular characterization for regenerative purposes, according to the International Society for Cellular Therapy. Photostimulated adipose

tissue or stromal vascular fraction obtained with a centrifugation process, or both were used to treat complex wounds, diabetic foot ulcers, vasculogenic or ischemic lesions as well as other cases in plastic and reconstructive surgeries, where we needed an immunomodulatory response with reduction in inflammatory and fibrotic effects, increase in angiogenesis, and activation of regenerative response. One hundred patients have undergone this procedure without any adverse events or complications. Among the results we could get a complete morpho functional Aquilles tendon regeneration with clinical and laboratory evidence and a large dura mater exposure in an immunosuppressed organ transplanted patient with diabetes. This technique proved to be replicable and efficient for regenerative purposes.

REFERENCES:

1. Zuk PA, Zhu M, Mizuno H, et al. Multilineage cells from human adipose tissue: implications for cell-based therapies. Tissue Eng. 2001;7(2):211-228. doi:10.1089/107632701300062859
2. Caplan A. Mesenchymal Stem Cells: Time to Change the Name! Stem Cells Transl Med. 2017;6(6):1445-1451. doi:10.1002/sctm.17-0051
3. Centurion P, Noriega A. Fat preserving by laser 1210-nm. J Cosmet Laser Ther. 2013;15(1):2-12. doi:10.3109/14764172.2012.758376
4. Anderson RR, Farinelli W, Laubach H, et al. Selective photothermolysis of lipid-rich tissues: a free electron laser study. Lasers Surg Med. 2006;38(10):913-919. doi:10.1002/lsm.20393

The Largest Investigation of Branching Patterns of the Popliteal Artery in the World

Abstract Presenter
Cen-Hung Lin MD

PURPOSE: Taiwan has the highest prevalence rate of oral cancer in the world. Therefore, there have been many patients suffering from mandibular defects after tumor resection surgeries. The most frequent method used for reconstruction of a mandibular defect is a free fibula flap that would have a patient's fibular artery and fibula bone harvested. A successful reconstruction using a free fibula flap relies on a workable pedicle containing viable perforators to the bone segment and even skin tissue as well. The importance of pre-operative acknowledgement of the branching pattern of the popliteal artery can't be overemphasized since variations do exist for a certain percentage. We carried out a large-scale investigation of the branching patterns of the popliteal artery in Taiwanese in order to obtain reliable information for plastic surgeons.

MATERIALS AND METHODS: We reviewed the radiologic images of the lower limbs in patients who received the radiologic examinations of their lower limbs in Kaohsiung Chang Gung Memorial Hospital during October 2006 to December 2022. As to the images, only those traditional angiography and magnetic resonance angiography that would reveal vasculature of the lower limbs were included. Those images couldn't clarify the blood flow within the main branching arteries of the lower limbs were excluded, such as in patients having severe arterial occlusions. We investigated the branching pattern of the popliteal artery of each case and recorded it according to the classification proposed by Kim et al. and Abou-Foul et al. (type I to

IV). The investigations were all done by an identical plastic surgeon using an identical computer screen. A statistical analysis was performed for the data.

RESULTS: There were 1544 lower limbs from 1029 patients were included in this study. Within the included images, type I was the most common branching pattern that accounted for 94.82% (n=1464). The second and third common patterns were type IIIA (1.3%, n=20) and IB (1.04%, n=16), respectively. The least common pattern was type IIC, which was not found within all our included legs. Variations of the branching of the popliteal artery, all other than type IA, of the included legs occupied 5.18% (n=80). There were 515 patients were evaluated for both lower limbs simultaneously, within whom a 6.41% rate of variation at one or both legs was noticed (n=33). Ten patients presented with variations at both legs, and 50% of them showed type IIIA pattern at both legs concurrently.

CONCLUSIONS
This is by far the largest investigation of the branching patterns of the popliteal artery in the world. Free fibula flaps are widely used in many reconstructions aside from those for patients undergo excision surgeries owing to oral cancer. A pre-operative vascular examination is strongly recommended before harvesting a free fibular flap since some patients might have their blood supply of foot and lower leg mainly from the planned-to-be-harvested fibular artery or might not have a workable fibular artery.

Reducing the Learning Curve of Color Doppler Ultrasound for Perforator Flap Design

Abstract Presenter
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BACKGROUND: Color Doppler ultrasound (CDUS) is an emerging imaging modality for perforator flap planning. When compared with conventional computed tomography angiography, CDUS offers the advantage of non-toxic, non-invasive, and real-time imaging with high resolution. A major barrier to the widespread adoption of CDUS for perforator flap planning is practitioner learning curve. Our study aims to address this learning curve through creation of a brief, dedicated CDUS perforator mapping curriculum.

METHODS: An IRB-approved CDUS training curriculum was administered to first- and second-year medical students. The 30-minute-long training focused on CDUS identification of anterolateral thigh flap perforator anatomy. Ultrasound proficiency was measured by written and timed practical examinations. Medical student ultrasound proficiency was compared to that of

training-naïve plastic surgery (PRS) residents.

RESULTS: Naïve PRS residents (n=4) scored higher than naïve medical students (n=14) on written examination ($p < 0.01$). Written examination scores of medical students improved pre- to post-intervention ($p = 0.02$). On the practical exam, 75% of PRS residents and 71% of trained medical students correctly identified relevant anatomy. 100% of PRS residents and 86% of trained medical students were able to identify a perforator exit point. After one training session, there was no difference between medical students and naïve PRS residents in terms of written exam scores ($p > 0.99$) or technical exam scores ($p = 0.79$).

CONCLUSION: Brief training periods can rapidly improve trainee fidelity with CDUS for perforator characterization. Upscaling this reproducible model may serve a valuable role in plastic surgery education.

Verrucous Carcinoma of the Lower Extremity: A Case Series on Diagnosis, Management, and Outcome

Abstract Presenter
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INTRODUCTION: Verrucous carcinoma (VC) was first described in 1948 by Dr. Ackerman.1,2 It is a low-grade cutaneous squamous carcinoma that usually develops in the oral cavity,3,4 the anogenital region,5 and the plantar surface of the foot.3 Clinically there is low suspicion for malignancy given the slow growth of VC lesions and their wart-like appearance.3 Diagnosis can be difficult due to the benign histological appearance with well-differentiated cells and absence of dysplasia.3 Surgical excision is the only satisfactory form of treatment for plantar VC; however, this becomes difficult given its benign clinical appearance and the pathologic misinterpretation of the lesion as a benign hyperplasia. While there are case reports and retrospective studies of patients with plantar verrucous carcinoma in the literature, we present the largest case series of plantar verrucous carcinoma within North America.

METHODS: We report on all the plantar verrucous carcinoma excised between 2015 to present. We report seven cases of VC, their treatment, and their outcomes.

RESULTS: Seven patients obtained a diagnosis of plantar VC by incisional biopsy. All patients underwent excision of their lesions and had negative margins reported on the final pathology. All patients developed non-healing wounds at the site of their lesion excision therefore biopsies were performed to confirm a recurrence. All patients had a recurrence of VC at the initial site. All patients underwent re-excision of the lesions with intraoperative frozen sections. Despite

negative margins again on final pathology, all patients had a subsequent second recurrence. Ultimately, all patients underwent an amputation as definitive management. Each patient had an average of 2.8 operations. There were 3 different surgeons and different pathologists reporting their findings.

CONCLUSION: Our experience with plantar verrucous carcinoma suggests that an aggressive approach to surgical management is needed. Furthermore, management is optimized with the combined expertise of an experienced dermatopathologist and surgeon. Despite negative margins and repeated excisions, VC lesions recur and invade local tissues to the extent that only amputation of the involved foot has resulted in cure.

REFERENCES:

1. Ackerman L. V. (1948). Verrucous carcinoma of the oral cavity. Surgery, 23(4), 670–678.
2. McKee, P. H., Wilkinson, J. D., Black, M. M., & Whimster, I. W. (1981). Carcinoma (epithelioma) cuniculatum: a clinico-pathological study of nineteen cases and review of the literature. Histopathology, 5(4), 425–436. https://doi-org.uml.idm.oclc.org/10.1111/j.1365-2559.1981.tb01803.x
3. Yip, K. M., Lin-Yip, J., Kumta, S., & Leung, P. C. (1997). Subcutaneous ("inverted") verrucous carcinoma with bone invasion. The American Journal of dermatopathology, 19(1), 83–86. https://doi-org.uml.idm.oclc.org/10.1097/00000372-199702000-00015
4. Fonts, E.A., Greenlaw, R.H., Rush, B.F. and Rovin, S. (1969), Verrucous squamous cell carcinoma of the oral cavity. Cancer, 23: 152-160. https://doi-org.uml.idm.oclc.org/10.1002/1097-0142(196901)23:1<152::AID-CNCR2820230120>3.0.CO;2-M
5. Kraus, F. T., & Perezmesa, C. (1966). Verrucous carcinoma. Clinical and pathologic study of 105 cases involving oral cavity, larynx and genitalia. Cancer, 19(1), 26–38. https://doi-org.uml.idm.oclc.org/10.1002/1097-0142(196601)19:1<26::aid-cncr2820190103>3.0.co;2-l

Social Determinants of Health in Limb Salvage for Patients with Diabetic Lower Extremity Wounds

Abstract Presenter
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INTRODUCTION: Diabetic wounds are a leading cause of non-traumatic lower extremity (LE) amputations. Disparities in care may influence the likelihood of undergoing salvage procedures versus amputation. While healthcare centers have adopted multidisciplinary limb salvage teams, these often fail to incorporate social determinants of health. The Area Deprivation Index (ADI) and the Social Vulnerability Index (SVI) have been created to capture neighborhood factors that are associated with health outcomes. This study aims to assess ADI, SVI and distance to a wound care center, and the influence on healing and limb loss in patients with diabetic lower extremity wounds.

METHODS: A retrospective cohort study (2015-2022) of 17 outpatient wound care clinics was used to identify patients with at least one lower extremity wound. Patient addresses were used to calculate SVI, ADI and distance to nearest wound care clinic. Outcomes measured included number of LE wounds, 7-year healing status, number of lower extremity surgical procedures (LESP), amputations, and outpatient visits. Using RStudio (Version 1.3.1093), univariate analysis, multivariate logistic regression, and Cox regression were performed on a mixture of variables to determine which covariates predicted LESP and/or amputation.

RESULTS: Patients living in lower ADI neighborhoods, indicating improved composite conditions across income, education, employment, and housing, were more likely to have a greater number of healed wounds (p-value = 0.03). This persisted despite there being no difference in the number of presenting wounds compared to their higher ADI counterparts (p-value = 0.7). Living more than fifty miles from the nearest wound care center was associated with a greater number of LESP (OR = 1.18, 95% CI 1.01-1.34, p=0.04), which included emergency department or inpatient visits requiring operative debridement. White patients were overall half as likely to undergo additional LESP (OR= 0.9033, 95%CI 0.85-0.96, p=0.0003). However, they were more likely to have multiple outpatient encounters compared to their racial/ethnic minority counterparts (OR=1.01, 95%CI 1.00-1.02, p=0.01), which included visits to a nearby wound care center for local wound care. This disparity persisted despite there being no difference in distance from the nearest wound care center (p=0.2) between groups. Patients living in areas with higher-than-average unemployment were more likely to ultimately receive a below the knee or above the knee amputation (HR=14.45, 95%CI 12.28-16.63, p-value=0.016).). Household characteristics, including patients living in assisted-living centers, and access to transportation did not significantly impact wound healing.

CONCLUSION: In patients with diabetic LE wounds, racial/ethnic minorities and lower socioeconomic status were associated with more hospital LESP and amputations. This is in contrast to their counterparts who had increased outpatient visits with local wound care suggesting improved access to preventative measures. Social determinants of health are multifaceted, and this data can help target specific factors such as identifying implicit-bias, education, and healthcare access that can be incorporated into limb salvage programs.

The Impact of Patient Racial And Ethnic Background On Microvascular Glossectomy Reconstruction Outcomes

Abstract Presenter
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BACKGROUND: Sociodemographic factors affect surgical outcomes and can present major obstacles to long-term survival and treatment of patients with tongue cancers. Glossectomy reconstruction is challenging and outcomes can be impacted by various factors. This study aims to compare race and ethnicity disparities in patients undergoing microsurgical glossectomy reconstruction.

METHODS: A retrospective cohort study of consecutive patients undergone glossectomy free flap reconstruction for tongue cancer between 2001 and 2021 at MD Anderson Cancer Center was conducted. Data collection included: race/ethnicity, demographics, glossectomy type, flap used for reconstruction, and complications rate. Surgical outcomes were compared among race and ethnicity. Data were analyzed using GraphPad Prism 8 Software.

RESULTS: A total of 578 patients were identified. A total of 495 patients (85.6%) identified as white and 83 (14.4%) identified as non-white. Non-white race/ethnicity breakdown was 27.7% black, 34.9% asian, 1.2% native american, and 36.2% not-specified non-white. White and non-white groups were comparable for age, sex, smoking habit, cancer histology and comorbidities, except for diabetes which was more common in the non-white patients (white=9.7%, non-white=26.5%, $p<0.0001$). No differences were found in terms of follow up, neck dissection, types of flaps used for reconstruction, neoadjuvant and adjuvant therapy. Furthermore, no differences in overall complications rate were noted ($p=0.09$). Both groups showed similar rates of infection ($p=0.96$), hematoma ($p=0.95$), fistula ($p=0.99$), wound healing problems ($p=0.86$), partial ($p=0.25$) and total ($p=0.36$) flap necrosis. No difference in the overall reoperation rate ($p=0.3$) and complication-related reoperation rate ($p=0.7$) was noted. Similar trends were observed when subgroups analysis was performed in terms of partial/hemi and subtotal/total glossectomies.

CONCLUSION: This study demonstrates that race/ethnicity has no impact on surgical outcomes of patients undergoing microsurgical glossectomy reconstruction. Given the overall findings of our cohort at large relative to national demographics, further studies are needed to confirm access of care.

Analysis of risk factor related to Plastic Surgery outcomes in octogenarians patients in a Brazilian Teaching Hospital

Abstract Presenter
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Pedro Hamamoto

INTRODUCTION:
Over the recent years, the population aged above 80 years has dramatically increased and these patients have been referred to as the "super elderly". There is a paucity of literature discussing plastic surgery with specific emphasis on this subgroup of the population. We therefore sought to characterize the epidemiology and the risk factors associated to the surgical outcomes in this group.

METHODS:
We performed a retrospective analysis of patients over 60 years old who underwent plastic surgery procedures at Clinics Hospital of the Botucatu Medical School, and divided then in two groups, younger or older than 80 year. We analyzed the epidemiology, the surgical indication, the outcomes, and the Modified 5-Item Frailty Index Score (mFI-5).

RESULTS:
We found 229 patients over 60 years of age submitted to Plastic Surgery at HC-UNESP. The mean age was 70.1 years ± 8.8 years, ranging from 60 to 95 years. Forty-three (18.8%) of these patients were older than 80 years.
28 octogenarians were (65.1%) female. There was no difference when compared to those under 80 years of age in relation to gender (p =0.132).
The most common surgical indication was for the treatment of neoplasia in 31 patients (72.1%), followed by trauma (20.9%). In the group of elderly under 80 years of age, neoplasia and aesthetics were the most common indications, in 72 (38.7%) and 41 (20%) individuals, respectively (p<0,001).
21 (48.8%) super elderly presented scores equal to or higher than 2 in mFi5, a higher percentage when compared to the group of younger elderly (26.9%) (p 0.005). There was no difference in relation to a score greater than or equal to 3 (p0,328). Among the scoring criteria, high blood pressure in 33 (59.1%) patients, dependence on daily activity in 12 (27.9%), congestive heart failure in 8 (18.6%), had statistical significance when comparing groups (p = 0.032; p<0,001; p =0.026).
There was no difference in relation to length of hospital stay, and the need for ICU.
11 (25.6%) patients required hospital readmission within 1 year after discharge (p =0.007) and had lower rate of survival in 1 year after the surgery (81.4%) (p =0.004).
Multivariate regression analysis demonstrated that age over 80 years old and to be dependent on daily activities increased the odds to new hospitalization (CI), 2,402-26,927; P = 0,001]), and decreased decreased by 13.8% the chance of survival 1 year after surgery [odds ratio (OR), 0.138; 95% confidence interval (CI), 0.037-0.515; P = 0.003]). mFI-5 score of 2 or more was an

independent risk factor for new hospitalizations [odds ratio (OR), 2.554; 95% confidence interval (CI), 1.171-5.568; P = 0.018])

CONCLUSION:
Octogenarians and older had more need of rehospitalization and a higher mortality rate one year after the surgery. The association between age over 80 years and dependence for daily activities negatively impacted the survival of elderly patients. Frailty score was an independent risk for rehospitalization.

Does Flap Choice Impact Surgical Outcomes in Microsurgical Glossectomy Reconstruction? A Review of 612 Microsurgical Glossectomy Reconstructions

Abstract Presenter
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BACKGROUND: Glossectomy reconstruction presents a great challenge. Various types of flaps have been used for glossectomy reconstruction with the aim to restore volume, shape and function of the tongue. This study aims to identify the type of flap associated with the lowest risk of complications.

METHODS: A retrospective cohort study of patients undergone glossectomy free flap reconstruction for tongue cancer between 2001 and 2021 at MD Anderson Cancer Center was conducted. Data collection included: demographics, past medical history, history of head and neck radiation therapy, neck dissection, glossectomy type, type of flap, follow up and complications rate. The primary outcome was comparison of complications rates by flap choice for glossectomy reconstruction. Data were analyzed using GraphPad Prism 8 Software.

RESULTS: Overall, 612 glossectomy defects were reconstructed using a free flap and 59.3% were females. The mean age was 56.8±14.4 and the mean BMI was 24.2±7.2. The mean follow up was 3.3±3.7 years. A total of 113 (18.5%) patients underwent subtotal/total glossectomy, while 499 patients (81.5%) underwent partial/hemi glossectomy. The majority (97%) of cancers were SCC. In the subtotal/total glossectomy group, the overall complications rate was 29.2% with infection representing the most common adverse event (11%). Only 1.8% of cases of total flap loss and 3.5% cases of partial flap loss were recorded. Different types of flaps were

employed for the glossectomy resulting defect reconstruction: ALT (63.7%), RFFF (12.4%), rectus abdominis (9.7%), lateral arm (6.2%), gracilis (3.5%), PAP (1.8%), lateral forearm (1.8%) and ulnar artery perforator (0.9%) flaps. None of the flaps were associated with higher risk of complications nor need for re-operation. In the partial/hemi glossectomy group, the overall complications rate was 30% with infection representing the most common adverse event (41, 8%). Only 0.6% of cases of total flap loss and 1% cases of partial flap loss were recorded. Flaps employed for reconstruction were: RFFF (37.5%), ALT (23%), ulnar artery perforator (16.6%), lateral forearm (n. 50, 10%), lateral arm (5%), PAP (3.2%), MSAP (3%), AMT (1.4%), and LTAP (n. 1, 0.2%) flaps. The lateral forearm flap showed the lowest rate of post-operative fistula (p=0.0037), but otherwise none of the flap was associated with higher rate of overall complications or re-operation rate.

CONCLUSION: This study demonstrated that all types of free flaps provide comparable overall complication and re-operation rates regardless of glossectomy defects. However, lateral forearm flaps appear to lower fistula rates when used to reconstruct partial/hemi glossectomy defects. Lateral forearm flap fistula is rare but some confounding factors such as surgeon experience and defect size may exist. Further studies are needed to confirm these findings.

The effects of Adipose Derived Stem Cells (ADSCs) on nerve regeneration. Functional and molecular outcomes in a peripheral nerve injury experimental model

Abstract Presenter
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INTRODUCTION: Peripheral nerve injuries are one of the most common causes for consultation for reconstructive surgery in the emergency department, they often lead to permanent disability. Once the adult nerve tissue is injured, regeneration has unpredictable results, despite an accurate surgical effort. The interval between nerve injury and surgery is one of the most crucial factors that affect functional recovery, as long-term delayed nerve repair often results in poor recovery. Amongst the biological markers currently studied in nerve regeneration studies, ATF3 and GAP43 are two of the most relevant. ATF3 is a member of ATF/CREB family of transcription factors, it is induced in a variety of stressed tissue. It has been stated that growth associated protein (GAP43), also known as B50, neuromodulin and F1 play an important role among the proteins involved in the regulation of neurite outgrowth, growth cone guidance and synaptic plasticity (Co-localization and interaction of DPYSL3 and GAP43 in primary cortical neurons). In recent years, several studies involving ADSCs (adipose derived stem cells) have been developed in order to evaluate their potential in nerve regeneration (facial nerve, peripheral nerve, spinal chord injuries, brachial plexus injuries, etc)

AIM: To evaluate the potential role of ADSCs on nerve regeneration. To evaluate the expression of molecular markers ATF3 and GAP43 in two different peripheral nerve injury models followed by surgical repair. Determine the molecular changes expressed in the microenvironment of the nerve injury. We hypothesize that ADSCs could have a potential role in nerve regeneration. Fifty five young-adult male Wistar rats (300-350 g) were used in this study. Animals were supplied by

the vivarium of the research center and housed in controlled environment (12-12 h light-dark inverted cycle (lights off 10:00 hrs), temperature 22°C). Rats were housed in groups of 4-6 individuals with ad libitum access of food and water, in cages measuring 45x30x30 cm. These experiments followed the general principles of worldwide laboratory animal care (NIH publication 85-23, 1985 as well as the National NOM) and were approved by the local ethics and safety committees. We always make an effort in order to minimize animal suffering and minimize the number of animals and experimental models used during all experimental procedures. We believe that it is of utmost importance to strictly follow International Animal Care and Protection Norms and Principles. We also consider that experimental models worldwide are performed and needed in order to help patients in the future and improve the quality of care for surgical patients and deliver better outcomes. Injury models include: Chronic Constriction Injury (CCI) Induction, Neurotmesis + Neurorraphy. We evaluated: Tactile response threshold, Muscle pressure threshold, Acetone spray test (cold stimulus), Spontaneous ambulatory activity and motor coordination, and expression of ATF3 and GAP43 proteins.

RESULTS: MPT decreases were observed in both injured groups versus controls (CCI: 38% and NT+NR: 31%, respectively) when the mechanical force was applied in the plantar surface. Accordingly, cold allodynia was observed in NT+NR and CCI groups too. Tactile allodynia was reduced in NT+NR rats, whereas it could not be determined in the CCI group. Also, reduced SAA was observed in CCI and NT+NR groups as compared with the controls. Furthermore, an over-expression of both ATF-3 and Gap43 was found only in the CCI group in DSC as well as in RG. It has been theorized that ADSCs increases muscle force when transplanted (as evidenced by electrophysiological tests). Although the mechanisms have not been fully elucidated, specific molecules could induce the differentiation of ADSCs into schwann cells

CONCLUSIONS: CCI and NT+NR models exhibit similar pain responses and SAA activity. The expression of ATF-3 and Gap43 differ. Interestingly, the NT+NR group did not showed over-expression of molecular trades of neural injury, supporting the effectiveness of neurorraphy. In contrast, the expression of these proteins are increased in the CCI group, since it represents a constant nerve insult. Future studies will be directed to investigate whether modifying nerve injury microenvironment might help to improve surgical outcome. We hypothesize that exosomes could promote peripheral nerve injury regeneration in specific experimental models.

Outcomes of upper extremity reconstruction with a modified Capanna technique

Abstract Presenter
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INTRODUCTION: Reconstruction of a large bone defect remains one of the greatest challenges in oncologic reconstruction. The Capanna technique places a vascularized fibula autograft inside of a bone allograft, providing both initial stability and subsequent durable reconstruction through biologic integration and revascularization. However, in setting the fibula flap into the narrow canal of the allograft can be technically challenging and risky. We describe a unique modification to the original surgical technique and report outcomes for 9 patients who underwent reconstruction with this modified technique. This work also represents the largest case series describing upper extremity reconstruction using the Capanna technique.

METHODS: This is a two center, retrospective case series. The traditional Capanna technique inserts the fibula flap into the medullary canal of the allograft, with a small channel for the flap pedicle. Our technical modification of the original Capanna technique removes a wide longitudinal strip of bone from the allograft, allowing safer manipulation of the fibula flap and vascular pedicle. Additionally, this modification allows simultaneous plating of the allograft while the fibula flap is elevated, decreasing operative time. All patients who underwent extremity reconstruction with fibular autografts in the previous 10 years were identified via CPT code. Records were reviewed to confirm those who had a combined autograft/allograft approach. Patient demographics, tumor size and type, complications, and functional outcomes were recorded when available.

RESULTS: 9 patients were identified who underwent humerus reconstruction with the Capanna technique. Average defect size was 15.2cm. Average postoperative follow-up was 18.2 months. 3 patients required return to the operating room for complications (1 hematoma, 1 venous thrombosis, 1 wound dehiscence), and 1 patient required hospitalization for intravenous antibiotics. There were no instances of partial or total flap loss, and no post-reconstruction fractures. No patients underwent amputation, and there were no local recurrences. 1 patient developed distant metastatic disease. Radiographic union was achieved in 6 of 7 patients with greater than 1 year follow-up, and all patients were able to regain use of their extremity for activities of daily living. On average patients were able to achieve 116 degrees of forward flexion (SD = 32), 114 degrees of abduction (SD = 29.4), 90 degrees of internal rotation (SD = 0) and 28 degrees of external rotation (SD = 13).

CONCLUSION: Reconstruction of large upper extremity skeletal defects using our modification of the Capanna technique demonstrates preliminary safety and allows for excellent functional outcomes following resection of upper extremity tumors that might otherwise require amputation. Complications were managed without affecting bony union and function.

The effect of preoperative botulinum toxin A injection on Traction force during hernia repair: a prospective, single-blind study using contralateral side as a control

Abstract Presenter
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PURPOSE: Botulinum Toxin A has been reported to be clinically helpful for hernia repair [1] by relaxing the outer muscles of the abdominal wall. However, the degree and clinical manifestations of incisional hernia patients vary, and there is currently no objectively proven research on the scientific basis of Botulinum Toxin A. Animal experiment [2] has shown that injecting Botulinum Toxin A before hernia repair reduces the force required for inward movement of the abdominal muscle during hernia repair and decreased the recurrence of hernia. Therefore, we aimed to investigate the effect of Botulinum Toxin A injection on traction force during hernia repair in humans.

METHODS: We conducted a prospective, single-blind study on patients with midline incisional hernia. We injected 150 units of Botulinum Toxin A(Botulax®, Hugel Inc., Chuncheon, Korea) into three layers of the patient's unilateral lateral abdominal wall muscles according to Elstner and Smoot's method[3] by a separate professional four weeks before hernia repair. During hernia repair, we measured traction forces required for every 0.5cm inward advancement of each abdominal muscle until 5.0cm[4]. We then unblinded and injected Botulinum Toxin A into the non-injected side before completing hernia repair. We compared hernia maximum horizontal length, size, and oblique muscle length and thickness before and after Botulinum Toxin A injection using computerized tomography.

RESULTS/CONCLUSION: Results: Seven patients were enrolled in this preliminary study. In all patients, traction force needed for inward movement of non-injected part was significantly higher than that of injected part. Botulinum Toxin A injection reduced the traction force required for inward movement of abdominal muscles by 49% on average, and this ratio remained relatively constant after 1cm. Hernia maximum horizontal length, hernia size, and oblique muscle length and thickness were not significantly different before and after Botulinum Toxin A injection. Our study provides the first objective evidence that Botulinum Toxin A injection reduces traction force required for inward movement of abdominal muscles during hernia repair in humans.

REFERENCE:
[1]Ibarra-Hurtado TR, Nuño-Guzmán CM, Echeagaray-Herrera JE, Robles-Vélez E, González-Jaime J de J. Use of Botulinum Toxin Type A Before Abdominal Wall Hernia Reconstruction. World J Surg. 2009;33(12):2553-2556.
[2]Kwon JG, Kim EK. Effects of Botulinum Toxin A on an Incisional Hernia Reconstruction in a Rat Model. Plastic Reconstr Surg. 2021;147(6):1331-1341.
[3]Weissler JM, Lanni MA, Tecce MG, et al. Chemical component separation: a systematic review and meta-analysis of botulinum toxin for management of ventral hernia. J Plast Surg Hand Su. 2017;51(5):366-374.
[4]Levy AS, Bernstein JL, Celie KB, Spector JA. Quantifying fascial tension in ventral hernia repair and component separation. Hernia. 2021;25(1):107-114.

The Impact of Obesity on Success of Immediate Lymphatic Reconstruction For Prevention of Breast Cancer Related Lymphedema

Abstract Presenter
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Background: Breast cancer related lymphedema (BRCL) is a potential sequela of high risk breast cancer treatment1. Preventative treatment with immediate lymphatic reconstruction (ILR) at the time of axillary lymph node dissection(ALND) has emerged as the standard of care 2,3, however there is relatively little known about factors that may contribute to procedural failure4,5.

Methods: A retrospectively maintained, IRB approved study followed patients who underwent ILR at the time of ALND at our tertiary care center between May 2018 to January 2023. Patients who presented for at least one follow up visit in our multidisciplinary lymphedema clinic met criteria for inclusion. Patients who developed lymphedema despite ILR and contributing factors were further explored.

Results: 327 patients underwent ILR at our institution between May 2018 and January 2023. 313 of these patients have presented for follow up in our multidisciplinary lymphedema clinic. 31 (9.9%) patients developed lymphedema despite ILR. This cohort was older (55.9 +/- 9.5 v 51.6 +/- 12.3, p=0.04), with a significantly higher BMI (32.8 +/- 7.3 v 28.1 +/- 6.5, p<0.01). Multivariate logistic regression demonstrates increased odds of procedural failure in patients with a BMI equal to or greater than 35 (OR 2.81 (1.26-6.26), p=0.01).

Conclusion: This data comment upon our institution's outcomes following ILR. Patients who develop lymphedema despite ILR tend to be older with higher BMI, with a significantly increased risk in patients with a BMI of 35 or greater. Consideration of this data is critical for preprocedural counseling and may support a BMI cutoff when considering candidacy for ILR going forward as well as when optimizing failures for secondary lymphedema procedures.

REFERENCES

1. Gillespie R SH, Brunelle C, Danielle K, Taghian A. Breast cancer-related lymphedema: risk factors, precautionary measures, and treatments. Gland Surgery 2018;7(4):379-403
2. Boccardo F CF, De Cian F, Friedman D, et al. Lymphatic microsurgical preventing healing approach (LYMPHA) for primary surgical prevention of breast cancer-related lymphedema: over 4 years follow-up. Microsurgery 2014;34(6):421-24
3. Coriddi M MB, Skoracki R, Singhal D, Dayan J. Immediate lymphatic reconstruction: Technical points and literature review. PRS Global Open 2021:1-8
4. Johnson AR, Fleishman A, Granoff MD et al. Evaluating the impact of immediate lymphatic

reconstruction for the surgical prevention of lymphedema. Plastic and Reconstructive Surgery 2021: 147(3): 373-81.
5. Chun MJ, Saeg F, Meade A et al. Immediate lymphatic reconstruction for prevention of secondary lymphedema: A meta-analysis. Journal of Plastic, Reconstructive & Aesthetic Surgery 2022: 75: 1130-1141.

Surgical complications after targeted muscle reinnervation at a safety net hospital

Abstract Presenter
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INTRODUCTION: Targeted muscle reinnervation (TMR) and regenerative peripheral nerve interface (RPNI) are surgical techniques that have been shown to reduce rates of neuroma formation and phantom limb pain after lower extremity (LE) amputation. While there is a paucity of literature about RPNI, several studies have demonstrated no increased risk of surgical complications after TMR. However, the use of these surgical techniques has yet to be examined for the unique populations encountered at safety-net hospitals. The purpose of this study is to examine rates of and risk factors for surgical complications after TMR and RPNI at a safety-net hospital.

METHODS: This is a retrospective case series conducted at an urban safety-net hospital. All patients were over 18 years old, had a prior above- (AKA) or below-knee (BKA) guillotine amputation, and underwent stump formalization with TMR and/or RPNI between January 2020 to December 2022. Demographic, surgical, and follow-up information was collected. Univariate analysis was conducted in order to identify risk factors associated with surgical complications. Complications were defined as wound infection, hematoma, seroma, or need for reoperation after formalization.

RESULTS: Thirty-two patients met our inclusion criteria. Twenty-four (75%) were male, and the median age was 52 years. BKA was the most common indication for formalization (93.8%). Most patients (56.3%) had both TMR and RPNI at the time of formalization, 11 (34.4%) patients had TMR only, and 3 (9.4%) had RPNI alone. 46.9% of our cohort had an associated surgical complication, including 10 wound infections (31.3%), 8 wound dehiscences (25%), and 1 postoperative hematoma (3.1%). Prevalent comorbidities included diabetes (96.9%), hypertension (62.5%), peripheral vascular disease (9.4%), and end-stage renal disease (3.1%). Univariate analysis demonstrated that there was no statistically significant difference in the age,

sex, race, smoking status, BMI, or presence of comorbidities between those who did and did not have surgical complications. However, there was a trend toward higher rates of phantom limb pain in patients who had postoperative wound infection (odds ratio 6.2, p = 0.06).

CONCLUSION: The complication rate after formalization with TMR and/or RPNI at our safety-net hospital is similar to what has been reported in the literature. Given the benefits of TMR and RPNI as well as the potential to reduce long-term healthcare costs, we believe that other safety-net hospitals should consider adopting these techniques as a standard part of LE amputation management. Larger, multi-institutional randomized studies are needed to better delineate risk factors for surgical complications after LE TMR and RPNI.

Coverage of elbow and forearm soft tissue defects with the posterior ulnar artery perforator flap (PURAP): anatomical study and surgical description.

Abstract Presenter
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INTRODUCTION: Covering soft tissue defects from the elbow and forearm is a challenge for the plastic surgeon. The Posterior Ulnar Recurrent Artery Perforator (PURAP) flap is a fascial-cutaneous perforator flap vascularized by the perforators emerging of the posterior ulnar recurrent artery. It has multiple functional and aesthetic advantages but has not yet been well studied. The objective of this work was to study the topography of these perforators and to describe the surgical technique of harvesting the flap in relation to them.

METHODS: Perforator mapping was performed by blue latex injection on 20 freshes cadaver's upper extremities. We estimated the perforasome of the posterior ulnar recurrent artery by selective injection of patent blue. Thermal mapping by TIRD was used to identify the "hot spots" of these perforators and the vascular network of the ulnar recurrent artery in 4D was scanned. The preoperative design and dissection of the flap were adapted based on the results of this anatomical study.

RESULTS: On average, we located 7.3 perforators per upper extremity with an average caliber of 0.77 mm (3.3 in the forearm and 4 in the arm). The perforators were located 3.21 cm from the medial epicondyle on average and the perforasome of the posterior ulnar recurrent artery was 30 cm2. Thermal mapping showed three perforator "hot spots," two in the forearm (directly opposite the artery birth and one more posteriorly) and one in the arm. The 4D reconstructions of our CT study allowed us to confirm the location of the perforasome opposite the medial epicondyle and the distal half of the medial aspect of the arm, as well as the ascending course of the artery. Our preoperative drawing was adapted, including a pivot point located approximately 3 cm anterior to the medial epicondyle, depending on the position of the perforator.

CONCLUSION: The PURAP flap can be harvested easily and reliably, as there are constant perforators of the posterior ulnar recurrent artery, located on average 3.21 cm proximal to the medial epicondyle. This reinforces PURAP's status as a potential alternative for coverage of elbow and forearm tissue defects.

Targeted muscle reinnervation for a symptomatic neuroma in a traumatic transmetatarsal amputee: a case report

Abstract Presenter
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BACKGROUND: Targeted muscle reinnervation (TMR) has shown success in managing phantom and neuropathic pain in lower-limb amputees, often described for above-the-ankle amputations.1,2 Success in TMR for transmetatarsal amputation has not yet been described in the literature. Transmetatarsal amputation is often indicated, in decreasing frequency, for diabetic foot problems, vascular insufficiency, and then trauma.3-5 In the first two indications, the foot is oftentimes insensate. The prevalence of pain after traumatic transmetatarsal amputation is not well reported. We describe the first case of a successful TMR in treating pain in a traumatic post-trans metatarsal amputation.

CASE REPORT: An overall healthy 48-year-old male suffered a crush injury to the left foot resulting in pain 10 months after a post-trans metatarsal amputation. He presented with a 10/10 pain on the plantar surface of the foot and symptomatic neuroma along the absent great toe limiting ambulation. The decision was made to utilize targeted muscle reinnervation in addressing the patient's pain.

Intraoperatively, the incision was made from the tarsal tunnel to the mid portion of the calf to avoid plantar surface skin and the risk of future neuroma formation. The patient was placed under twilight sedation to participate in identifying the problematic nerve and preserving remaining plantar sensation. The problematic tibial nerve bundle was identified and coapted to the motor point of the flexor hallucis longus. At one year follow-up, the patient reports no pain at rest, and able to ambulate with an orthosis for 30 minutes with 2/10 pain.

CONCLUSION: Overall, the use of TMR has greatly improved both pain and mobility in the transmetatarsal amputee. Thus, our case indicates that TMR may be successfully used at all levels of lower-limb amputation and that even rare tibial nerve coaptations to FHL could serve as a treatment option for patients with neuromas in traumatic post-metatarsal amputation.

REFERENCES:
1. Souza JM, Cheesborough JE, Ko JH, Cho MS, Kuiken TA, Dumanian GA. Targeted muscle reinnervation: A novel approach to postamputation neuroma pain. Clin Orthop Relat Res. 2014;472:2984–2990.
2. Ehde DM, Czerniecki JM, Smith DG, Campbell KM, Edwards WT, Jensen MP, Robinson LR. Chronic phantom sensations, phantom pain, residual limb pain, and other regional pain after lower limb amputation. Arch Phys Med Rehabil . 2000;81:1039-1044.
3. Anthony T, Robers J, Modrall JG, et al. Transmetatarsal amputation: assessment of current selection criteria. Am J Surg. 2006;192:e8-e11.
4. Balachunder S, Pomposelli F, Talmor D, Park K. Perioperative and long-term morbidity and mortality after above-knee and below-knee amputations in diabetics and nondiabetics. Anesth Analg. 2005;100:1241-1247.
5. Chang, B. L., Mondshine, J., Attinger, C. E., & Kleiber, G. M. (2021). Targeted muscle reinnervation improves pain and ambulation outcomes in highly comorbid amputees. Plastic & Reconstructive Surgery, 148(2), 376–386. https://doi.org/10.1097/prs.0000000000008153

Contrast-Enhanced Ultrasound with Microbubbles Detects More Candidate Lymphatic Vessels for Lymphatico-venous Anastomoses Compared to Intraoperative Indocyanine Green Lymphography in Patients with Extremity Lymphedema

Abstract Presenter
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BACKGROUND: Lymphatico-venous anastomosis (LVA) is an effective surgical treatment for selected patients with extremity lymphedema. Indocyanine green (ICG) fluorescent lymphography has been traditionally used as the reference standard for imaging target lymphatic vessels. However, ICG has several limitations including difficulty to depict lymphatics deeper than 1 – 1.5 cm or those masked with superficial lymphatic congestion, and it is also contraindicated in patients with iodine hypersensitivity (1). Hence, more effective methods are needed for preoperative planning, which would ultimately result in greater surgical success.

PURPOSE: To evaluate whether contrast-enhanced ultrasound (CEUS) with microbubbles can identify target lymphatic vessels for LVA in patients with lymphedema and compare results with ICG fluorescent lymphography.

MATERIALS AND METHODS: In this single-center retrospective review, intraoperative CEUS with intradermal injection of microbubble suspension (Lumason, Bracco Suisse) was used in patients prior to LVA surgery between October 2019 and February 2023. Pre or intraoperative ICG lymphography was also used to identify target lymphatic vessel. All patients with a diagnosis of primary or secondary lymphedema who underwent LVA were included. Technical success rate was defined as lymphatic vessels identified by CEUS that led to successful LVAs. Descriptive statistics were used.

RESULTS: A total of 32 patients underwent LVA surgery. Twenty-nine (90.6%) were female patients and three (9.4%) were male. Mean age was 58.5 ± 13.9 years. Twenty (62.5%) patients had International Society of Lymphology (ISL) Stage 2, eleven (34.4%) Stage 3, and only 1 (3.1%) Stage 1. A total of 24 (75%) had upper extremity lymphedema, 6 (21.9%) lower extremity, and only 1 had pelvic lymphedema. Most had secondary lymphedema, and only two (6.2%) had primary lymphedema. CEUS identified lymphatic vessels in all 32 patients, including in 7 patients where ICG failed to identify any target lymph vessel. Two patients had known allergy to ICG and underwent only CEUS for preoperative planning. Mean number of explorations per patient was 4.1 SD 1.6 (Md: 4, r: 0 – 7). Mean number of candidate lymphatics in ICG and CEUS was 2.5 SD 2.7 (Md: 1.5, r: 0 – 9), and 5.3 SD 4.2 (Md: 4, r: 1 – 21), respectively. Mean number of anastomoses was 5.2 SD 4.7 (Md: 3, r: 0 – 21). A mean of 2.6 SD 2.9 anastomoses (Md: 2, r: 0 – 12) were done in lymphatics only seen on CEUS but not on ICG. From the total of 165 anastomoses, 86 (52.1%) were in lymphatics mapped by both CEUS and ICG, 75 (45.4%) were mapped by CEUS only, and only 11 (6.3%) were mapped by ICG fluorescent lymphography only.

CONCLUSION: CEUS is a promising tool for identifying lymphatic vessels in patients with lymphedema undergoing LVA, especially when ICG fluorescent lymphography fails to identify targets or cannot be used. It has now become a standard imaging in intraoperative planning at our institution.

REFERENCES:

1. Gentileschi S, Servillo M, Albanese R, De Bonis F, Tartaglione G, Salgarello M. Lymphatic mapping of the upper limb with lymphedema before lymphatic supermicrosurgery by mirroring of the healthy limb. Microsurgery 2017;37(8):881–889.

Enhancing Surgical Outcomes in Tethered Cord Release: A Comparative Analysis of Myofascial Flap and Conventional Wound Closure

Abstract Presenter
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INTRODUCTION: Tethered cord syndrome (TCS) describes tension-induced neurological dysfunction caused by abnormal fixation of the spinal cord to its surrounding tissue canal. This may occur primarily as a congenital malformation or secondarily through mechanisms including neoplasm or prior spinal cord surgery.1 Outcomes after tethered cord surgery are dependent on adequate release of the spinal cord from its overlying tissue, quality of thecal sac reconstruction and integrity of soft tissue closure.2 Complications include cerebral spinal fluid (CSF) leakage, wound dehiscence and spinal cord retethering.3 Myofascial flaps have been shown to be advantageous in closing complex spinal wounds.4 This study describes our experience using myofascial flaps for spinal closure in TCS surgery and compares post-operative outcomes in conventional and flap closure cohorts.

METHODS: We performed a retrospective review of patients who underwent tethered cord release (TCR) surgery at Weill Cornell Medical Center from 2009 to 2020. Patient demographics, medical history, surgical approach, and post-operative data were collected. Statistical analysis was performed to identify significant differences in clinical outcomes.

RESULTS: Among the 116 patients who underwent TCR between 2009 and 2020, 64 (55.2%) received conventional closure and 52 (44.8%) received myofascial flap closure. Plastic surgery involvement was more frequently seen with complex tethered cord repair (44.2% of cases compared to 26.6%), i.e., history of spina bifida (21.2% vs. 4.7%), Chiari malformation (25% vs. 17.2%), and comorbid Ehlers-Danlos (34.6% vs. 6.3%). Complication rate differed significantly between the non-flap and flap closure groups, at 50.8% and 28.8% ($p=0.02$), respectively. Patients in the myofascial flap group less frequently experienced CSF leak (5.8 vs. 12.5%), surgical site infection (1.9 vs. 9.4%), seroma (1.9 vs. 3.1%) and reoperation (9.6 vs. 20.3%) compared to the conventional closure group, although these findings were not statistically significant. The cumulative complication count also differed significantly ($p=0.02$), with an average of 0.95 ± 1.17 complications in the conventional closure cohort and 0.48 ± 0.85 events in the myofascial flap group.

Conclusion: To our knowledge, this is the largest cohort encompassing post-operative outcomes for both adult and pediatric TCS patients, and the only study to include a conventional closure control group. Despite the higher proportion of complex etiologies of TCS in the myofascial flap-closure group, patients maintained a lower rate of complications compared to the conventional closure cohort. Our study suggests that myofascial flaps are a superior alternative to conventional wound closure in tethered cord release procedures, even in patients with complex risk factors at higher risk for post-operative complications.

REFERENCES:

1. Agarwalla PK, Dunn IF, Scott RM, Smith ER. Tethered cord syndrome. Neurosurg Clin N Am. 2007;18(3):531-547. doi:10.1016/j.nec.2007.04.001
2. Lee TT, Arias JM, Andrus HL, Quencer RM, Falcone SF, Green BA. Progressive

posttraumatic myelomalacic myelopathy: treatment with untethering and expansive duraplasty. J Neurosurg. 1997;86(4):624-628. doi:10.3171/jns.1997.86.4.0624
3. Levi B, Sugg KB, Lien SC, et al. Outcomes of tethered cord repair with a layered soft tissue closure. Ann Plast Surg. 2013;70(1):74-78. doi:10.1097/SAP.0b013e31822f9ada
4. Arad E, Barnea Y, Gur E, et al. Paravertebral turnover flaps for closure of large spinal defects following tethered cord repair. Ann Plast Surg. 2006;57(6):642-645. doi:10.1097/01.sap.0000235424.26158.e5

Comparative Effectiveness Analysis of Ventral Hernia Repair and Transverse Abdominis Release With and Without Panniculectomy: A 4-Year Match-Paired Analysis

Abstract Presenter
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PURPOSE: As the prevalence of obesity continues to rise, the number of concurrent Ventral Hernia Repair (VHR) and panniculectomy procedures also rises. However, data regarding long-term outcomes following concurrent Transverse Abdominis Release (TAR) and panniculectomy is limited. This study aims to compare long-term clinical outcomes and quality of life (QoL) following TAR with and without concurrent panniculectomy.

METHODS: A single-center, retrospective review from January 2016 to January 2022 was performed examining subjects who underwent VHR with TAR and panniculectomy. A propensity-scored matching was performed based on age, BMI, ASA, and ventral hernia working group (VHWG). Patients with parastomal hernias were excluded. Data examining demographic characteristics, intraoperative variables, postoperative outcomes, and QoL were analyzed.

RESULTS: A total of fifty subjects (25 per group) were identified (median follow-up, 48.8 months). Median age and BMI were 57 years (47-64 years) and 31.8kg/m2 (28-36kg/m2), respectively. The average hernia defect size was 354.5cm2±188.5cm2. Patients who underwent VHR with TAR and panniculectomy were majority female (64% vs. 12%, $p<0.05$). There was no difference between the groups regarding hernia recurrence, emergency department visits, readmissions or reoperations ($p>0.05$). However, patients who underwent VHR with TAR and panniculectomy demonstrated a significant increase in delayed healing (44% vs. 4%, $p<0.05$) and seromas (24% vs. 4%, $p<0.05$). QoL analysis identified a significant improvement in

postoperative QoL ($p<0.005$) for both groups across all domains, that continued throughout the 4-year follow-up period. There were no significant differences in QoL among VHWG, wound class, surgical site occurrences (SSO), or surgical site occurrence procedural interventions (SSOPi) ($p > 0.05$). Patients who underwent VHR with TAR and panniculectomy demonstrated greater overall appearance scores.

Conclusion: VHR with TAR and panniculectomy can be performed safely with low recurrence and complication rates at long-term follow-up. Despite increased postoperative complications, patients have significant improvement in disease specific QoL and even higher scores in the appearance domain.

Lymphadenectomy After Melanoma: A National Analysis of Recurrence Rates and Risk of Lymphedema

Abstract Presenter
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PURPOSE:
Treatment for melanoma following a positive sentinel lymph node biopsy includes nodal observation or lymphadenectomy. Important considerations for management, however, involve balancing the risk of recurrence and the risk of lymphedema following lymphadenectomy.

METHODS AND MATERIALS: From the IBM® MarketScan® Research Databases, adult patients were queried from January 2007 to December 2021. International Classification of Disease, ninth (ICD-9) and tenth (ICD-10) edition, diagnosis codes and Current Procedural Terminology (CPT) codes were used to identify patients with melanoma diagnoses who underwent an index melanoma excision procedure with a positive sentinel lymph node biopsy (SLNB) result. From this patient population, rate of melanoma recurrence (defined as a re-excision procedure at least two years following the index excision) and lymphedema development were compared between patients who underwent completion lymph node dissection (CLND) and those who underwent nodal observation. Demographics and comorbidities (measured and reported by the Elixhauser index) were recorded. Chi-squared, Schapiro-Wilk, Wilcoxon-Mann-Whitney, and multivariable logistic regression tests were used for statistical analysis.

RESULTS: A total of 153,085,453 patients were identified. Of those, 359,298 had a diagnosis of melanoma, and 202,847 patients underwent an excision procedure. The study cohort comprised 2,777 patients with a melanoma diagnosis who underwent an excision procedure and

had a positive SLNB. The mean age of the study cohort was 49 years, 57% were male, 42% were geographically located in the South, and 31% had an Elixhauser Index of 4+. Among the 1,332 (48%) patients who did not undergo a CLND, 5% experienced recurrence and 25% had a lymphedema diagnosis. A total of 1,445 (52%) patients underwent a CLND, of which 4% experienced recurrence and 25% experienced lymphedema. CLND did not significantly affect recurrence rate (OR 1.12, $p = 0.30$) or significantly increase the odds of lymphedema (OR 0.92, $p = 0.36$). When expanded to all patients who underwent SLNB, however, the rate of lymphedema was 5% in patients who did not undergo CLND and 18% in patients who did undergo CLND (OR 3.94, $p < 0.001$). Among patients who underwent CLND, timing to CLND had no significant impact on odds of recurrence (OR 1.00, $p = 0.08$).

CONCLUSIONS: Electing for nodal observation over CLND does not increase the risk of recurrence. In addition, CLND neither increases the risk of lymphedema nor possesses a time-dependent effect on recurrence rates in patients with positive SLNB results.

Cracking the Back: Predicting Outcomes of Spinal Fusion Surgery using Machine Learning

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INTRODUCTION: Degenerative spine deformities affect up to 68% of adults over 60 years old and cause a decrease in quality of life and substantial economic burden.1,2 Non-surgical management options such as physical therapy, use of NSAIDs, chiropractic care, and bracing have limited effectiveness, and surgical intervention is often necessary.3 Postoperative complications can occur in up to 20% of cases, leading to decreased quality of life and increased resource use.4 The use of paraspinous muscle flaps during closure of the surgical site has been shown to reduce complications by increasing vascularity to wound sites, eliminating dead space, and reducing tension on surrounding tissues.4 Prophylactic use of muscle flaps has been successful in reducing infection and reoperation rates.4 The objective of this study was to create a machine learning model that could attempt to anticipate postoperative complications and determine cases where collaboration with plastic surgery may be required in surgical planning and incision site closure.

METHODS: A retrospective review was performed of patients undergoing posterior spinal fusion (PSF) from 2019-2022. Patients with scoliosis, spondylosis, or discopathy were included, while those with non-degenerative indications including infections, spinal tumors, connective tissue disorders, Chiari malformations, or acute injuries were excluded. Adverse outcomes in the 2-year postoperative window were documented in the database. We built a logistic regression

machine learning model to predict post-operative complications. We assessed both Principal Component Analysis (PCA) and SelectKBest for dimensionality reduction. Model performances were evaluated using 5-fold cross-validation. We also constructed a linear regression model with the aim of predicting the overall number of complications.

RESULTS: 520 patients (272 females, 248 males) underwent PSF. The average follow-up was 460 days. Of these, 240 patients received muscle flap closure from a plastic surgeon, while 280 underwent conventional closure by the spine surgeon. PCA preserving the top 15 principal components led to the best model performance when predicting the likelihood of complications (ROC AUC 0.70 +/- 0.06, accuracy 0.76). The linear regression model achieved mean absolute error of +/- 0.81 when predicting the total number of complications.

CONCLUSION: Machine learning has the potential to risk stratify spinal fusion patients and identify those who are at higher risk of developing complications. By identifying cases where plastic surgery collaboration may be necessary, providers can ensure that patients receive the most appropriate level of care. This can help to reduce the risk of adverse events, improve patient satisfaction, and ultimately lead to better outcomes. Additionally, the use of machine learning can help providers make more informed decisions, provide better counseling, and optimize treatment plans, which can have a significant impact on healthcare costs.

REFERENCES:

1. Daubs MD, Watkins-Castillo SI. Scoliosis in Adults | BMUS: The Burden of Musculoskeletal Diseases in the United States. Accessed October 11, 2021. https://www.boneandjointburden.org/fourth-edition/iib12/scoliosis-adults
2. McCarthy IM, Hostin RA, O'Brien MF, et al. Analysis of the direct cost of surgery for four diagnostic categories of adult spinal deformity. Spine J. 2013;13(12):1843-1848. doi:10.1016/J.SPINEE.2013.06.048
3. Glassman SD, Carreon LY, Shaffrey CI, et al. The costs and benefits of nonoperative management for adult scoliosis. Spine (Phila Pa 1976). 2010;35(5):578-582. doi:10.1097/BRS.0B013E3181B0F2F8
4. Cohen LE, Fullerton N, Mundy LR, et al. Optimizing Successful Outcomes in Complex Spine Reconstruction Using Local Muscle Flaps. 2016;137(1):295-301. doi:10.1097/PRS.0000000000001875

Extemporaneous histological analysis according to Mohs in cutaneous tumor pathology: possibilities and limitations of full field optical coherence tomography evaluation FFOCT (Full-Field Optical Coherence Tomography)

Abstract Presenter
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BACKGROUND: MOHS micrographic surgery allows an exhaustive examination of the lateral and deep edges of cutaneous tumors through two steps, a macroscopic excision or debulking and

a cup-shaped peripheral recut. Its use is limited by the logistic constraints it imposes and damaging effects on the samples related to the required freezing step. Full-field optical coherence tomography (FFOCT) is an emerging noninvasive imaging technique allowing to make images of the skin tissue at the cellular level without tissue preparation.

OBJECTIVE: To evaluate the diagnostic possibilities of using the FFOCT technology in the examination of surgical sections in micrographic surgery for basal cell carcinomas compared to Slow-Mohs.

MATERIALS AND METHODS: Two plastic surgeons provided 24 Mohs sections from 20 patients with BCC from a single center. Each section was scanned using FF-OCT, and a diagnosis-blinded dermatopathologist reviewed the digital images for malignancy. The FF-OCT images were then compared with standard histologic analysis of the sample sections for concordance.

RESULTS: The agreement between FFOCT imaging results and slide histology was 17 true positives (VP) and 4 true negatives (TN) for debulking and 19 TN and 2 VP for Mohs peripheral cuts. The positive predictive value (PPV) was 85% for debulking, and the negative predictive value (NPV) was 100%. For recuts, the PPV was 50% and the NPV was 95%. In FFOCT, the totality of the lateral edges (epidermis and dermis), even at -75µm from the surgical section, was never visualized on all the images examined. The average reading time was 21.1 minutes.

CONCLUSION: We have developed a protocol for analyzing skin tumors ex vivo by FFOCT, which allows a rapid tangential histological analysis on fresh tissue. With further optimization, FF-OCT could replace the cryogenic freezing step used in Mohs surgery, providing digital images that can be transmitted remotely.

Inflating Your Success: Tips and Tricks to Improve Outcomes Using Pediatric Tissue Expanders

Abstract Presenter
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BACKGROUND: Tissue expansion (TE) involves the use of inflatable silicone devices placed under the skin over a period of time to induce expansion of the skin and all dermal elements, as first described by Neuman in 1957 [1]. The technical aspects of TE remain challenging and, unfortunately, complications are not uncommon, as described by Bjornson et all in their 10 years review [2]. However, there are ways to minimize the complications. Our objectives are to evaluate our experience using TE in the pediatric population, differentiate the ability to complete

reconstructive goals in cases with late vs early complications and Identify techniques and tricks to improve outcomes with TE use in the Pediatric Population

METHODS: Retrospective review of our institutional registry from 2014 to 2021. Our inclusion criteria included patients of less than 18 years of age treated with TE. Adult patients and breast reconstruction patients treated with TE were excluded. Data collected included patients' demographics, characteristics of the TE used including number, size and shape inserted, indications for use, size of advancement flap, success of defect coverage, and associated complications. Successful coverage was defined as the ability to fulfill the initial operative plan.

RESULTS: A total of 33 pediatric patients with 79 TE inserted met our inclusion criteria. The median age of our pediatric patients was 7 years (IQR 3, 15). The most common indication was for treatment of benign congenital cutaneous lesions (21 patients, 63.6%), including congenital nevi and vascular malformations. The head/neck was the most common location in our cohort (16 patients, 48.8%). The median advancement flap was 220 cm2. TE was successful in 30 of our 33 patients (90.9%). Of the total 79 TE were inserted, 16 TE (66%) developed an early complication (<8 weeks) and 8 TE (33.3%) developed a late complication (>8 weeks). Extrusion and devise failure was more common in the early complication while infection was the most common late complication. Early complications led to higher failure rate (3 TE) compared to late complications. Despite all complications, successful use of tissue expansion was achieve in 93.6% of all the TE inserted (74 TE).

CONCLUSIONS: Tissue expansion is a great option for coverage of soft tissue defects in pediatric patients. However, tissue expansion in pediatric patients demonstrates high rate of complications. In our experience, early complications can limit the reconstructive options but salvage of later complication may still result in successful reconstruction.

REFERENCES:
1. Neumann CG. The expansion of an area of skin by progressive distention of a subcutaneous balloon; use of the method for securing skin for subtotal reconstruction of the ear. Plast Reconstr Surg (1946). 1957;19(2):124-130. doi:10.1097/00006534-195702000-00004
2. Bjornson LA, Bucevska M, Verchere C. Tissue expansion in pediatric patients: a 10-year review. J Pediatr Surg. 2019;54(7):1471-1476. doi:10.1016/j.jpedsurg.2018.09.002

Retrospective Cohort Analysis on the Use of Hydrolyzed Collagen Powder in Back Reconstruction following Spinal Instrumentation

Abstract Presenter
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BACKGROUND: Nearly half a million interbody fusions are estimated to be performed in the US each year, many of which involve complex reconstruction. The ability to limit seroma formation is vital to a seamless postoperative recovery.1,2

METHODS: A retrospective review was performed for patients undergoing fusion procedures along with flap reconstruction over a period of 20 months. Cohorts reflect a temporal practice shift where use of hydrolyzed collagen powder (HCP) was initiated for hypothesized seroma prevention. Outcomes and associated metrics were used for intergroup comparison.

RESULTS: The study included 76 patients, of which 47 were treated with HCP and 29 were not. Control patients had significantly fewer postoperative seromas than experimental ones (6.9% versus 27.7%; $p = 0.03$). The cohorts had no significant differences in time until final drain removal or in number of spinal levels involved (7.8 versus 7.1 days; $p = 0.33$, 8.5 versus 8.4 levels; $p = 0.90$). Rates of wound dehiscence, hematoma or infection did not differ significantly between control and experimental patients (3.4% versus 12.8%; $p = 0.17$, 0% versus 0%, and 6.9% versus 10.6%; $p = 0.58$, respectively).

CONCLUSIONS: The use of HCP led to a fourfold increase in postoperative seromas in patients undergoing spinal fusion with flap reconstruction. This was irrespective of all analyzed demographic and procedural factors, with the exception of age, whereby control patients were found to be on average slightly younger than experimental counterparts.

REFERENCES:

1. Chieng LO, Hubbard Z, Salgado CJ, Levi AD, Chim H. Reconstruction of open wounds as a complication of spinal surgery with flaps: a systematic review. Neurosurg Focus. 2015;39(4):E17.
2. Zhong J, Balouch E, O'Malley N, et al. Comparison of plastic surgeon and spine surgeon closure in revision short segment thoracolumbar spinal fusions. Spine. 2021;46(18):1279–1286.

The Lateral Nasal Artery Pedicled Flap for Nasal Defects after Mohs Surgery

Abstract Presenter
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INTRODUCTION: Various techniques have been described for reconstructing nasal defects after Mohs micrographic surgery (MMS). We present a novel approach for reconstructing the

nasal defect using a subperichondrial dissection technique and a pedicled flap based on the lateral nasal artery. The design of the flap utilizes the natural shadowing and contours of the nasal subunits to minimize the appearance of scars. At the same time, the subperichondrial dissection allows access to the cartilage and placement of deep sutures, reducing the tension on the skin. Further, the subdermal venous plexus and lymphatics are preserved by elevating the flap just superficial to the nasal cartilage. The lateral nasal artery pedicled flap is easily reproducible, maintains the natural aesthetics of the nose, and demonstrates excellent patient satisfaction.

METHODS: This retrospective study included 106 patients who underwent reconstruction following MMS utilizing the senior author's novel nasal flap. Demographic and operative details were collected, and defects were classified according to anatomical location, defect size, and perinasal skin involvement. Patient satisfaction was assessed using the Patient and Observer Scar Assessment Scale questionnaire (POSAS). Further, a panel of independent dermatologists evaluated and scored the operative results.

RESULTS: One hundred and twelve patients underwent nasal reconstruction following MMS using the lateral nasal artery pedicled flap. The mean age was 64.3 years. Basal cell carcinoma was the most common pathology, followed by squamous cell and melanoma. Defects most commonly involved multiple subunits, specifically the ala, tip, and dorsum. The average defect size was 1.6 cm by 1.4 cm, with 25.9% involving the nasal cartilage. There were no revisions. The mean POSAS reported by the patients was 2.24/10, while the mean overall evaluation by the panel of dermatologists was 2.28/10. This was consistent with the panel's comprehensive evaluation using the Stony Brook Scar Evaluation Scale and the Wound Evaluation Scale.

CONCLUSION: Nasal reconstruction following Mohs micrographic surgery presents a unique challenge that must balance function and aesthetics. The lateral nasal artery pedicled flap is easily reproducible and demonstrates diverse applicability with minimal complications. Furthermore, patient and provider-reported outcomes demonstrate satisfying aesthetic and functional results comparable to the more commonly used reconstruction techniques. The lateral nasal artery pedicled flap offers multiple benefits to the patient and reconstructive surgeon, starting with the flap's deep subperichondrial dissection and axial blood supply promoting healing and elegantly concludes by utilizing the unique topography of the nose to minimize the appearance of scarring.

Improved Outcomes in Single Stage Reconstruction of Radial Forearm Free Flap Donor Sites Using Acellular Dermal Matrices and Negative Pressure Wound Therapy: A Review of 40 Consecutive Cases of Radial Forearm Phalloplasty

Abstract Presenter
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HYPOTHESIS: Our single stage technique for coverage of large radial forearm free flap (RFFF) donor sites using acellular dermal matrices (ADM) and negative pressure wound therapy (NPWT) offers improved aesthetic and functional outcomes compared to split thickness skin grafting (STSG) and NPWT alone. This technique also offers time and cost benefits compared to the multi-staged utilization of ADM.

METHODS: A retrospective review of 40 patients seen at a single institution by a lead surgeon and group practice between 2017 and 2023 was conducted. Our multilayer single stage donor site coverage technique is described in detail: Integra® Wound Matrix monolayer or MTF Biologics SomaGen® Meshed Allograft Dermal Matrix were used as the ADM underneath the STSG and NPWT. Outcomes include percentage of ADM+STSG+NPWT take, wound complications, radial sensory nerve pain, ease of tendon gliding, and need for and ease of revision procedures.

RESULTS: Average RFFF donor site size was 15cm x 15cm, 225 sq cm; Single stage ADM+STSG+NPWT success rates range from 80-100% with a mean of 85%. Sites of partial graft loss were treated with standard local wound care for 1-3 weeks until complete healing. 0 out of 40 patients reported pain in the radial sensory nerve distribution; 100% of patients had visibly smooth tendon gliding at the donor site; aesthetic outcomes were superior to the STSG+NPWT alone and equivalent to multi-staged procedures (ADM+NPWT , followed by delayed STSG+NPWT); 5% (2 out of 40) of the patients required a revision procedure including 1 patient who underwent fat grafting and contracture release and 1 patient with complete graft loss and need for re-grafting.

CONCLUSION: The single staged utilization of ADM+STSG+NPWT in coverage of RFFF donor sites offers a reliable alternative to the current standard of STSG+NPWT alone with the added benefit of superior functional and aesthetic outcomes.

Preoperative Venous Thromboembolism Risk as a Predictor of Free Flap Complications in Breast Reconstruction

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PURPOSE: Venous thromboembolism (VTE) risk is inherently high in autologous breast reconstruction, due to procedure length, prolonged immobility, and patient comorbidities.1,2 At our institution, all patients undergoing autologous breast reconstruction receive VTE prophylaxis perioperatively. The purpose of this study was to evaluate the association between Caprini Risk Assessment Model score and the incidence of postoperative complications and flap outcomes in patients undergoing autologous breast reconstruction.

METHODS: A retrospective analysis was conducted of all patients who underwent autologous breast reconstruction at our institution from 2014 to 2022. All patients received VTE prophylaxis intraoperatively or within 24 hours after surgery, followed by a standard postoperative protocol. Patients were stratified based on the 2005 Caprini Risk Assessment Model score of 0-5, 6-7, or >7. Demographic and outcomes data, including incidence of deep vein thrombosis (DVT), hematoma, perioperative flap thrombosis, and partial or complete flap loss, were analyzed via two-tailed Fisher's exact test with significance defined as $p < 0.05$.

RESULTS: This study included 173 patients who underwent 275 free flap breast reconstructions within the study period. The median Caprini score was 6, and 33 patients had Caprini score 0-5, 100 had 6-7, and 40 had a score >7. Demographic data did not differ between the groups. Deep venous thrombosis (DVT) occurred in two patients, both with Caprini score >7 ($p < 0.05$). The incidence of hematoma, total or partial flap loss, and unplanned return to the operating room did not differ amongst the groups. However, perioperative flap thrombosis rates were three times higher in patients with Caprini score >7. Regression modeling was performed using patients with Caprini scores in the continuous range 5-9 (158/173 patients). An exponential model was found to have the best fit ($R2 = 0.99$). The results suggest a strong correlation between preoperative Caprini score and incidence of perioperative thrombotic flap complications.

CONCLUSION: Preoperative VTE risk stratification is an important consideration prior to autologous breast reconstruction. Our data suggest that the Caprini score may also predict the risks of certain flap complications. While higher Caprini scores did not correspond with reconstructive failure, they did correlate with increased incidence of perioperative flap thrombosis. We hope our findings can help refine preoperative patient evaluation and improve patient safety.

REFERENCES:

1. Rochlin DH, Sheckter CC, Pannucci, C, Momeni A. Venous Thromboembolism following Microsurgical Breast Reconstruction: A Longitudinal Analysis of 12,778 Patients. Plast Reconstr Surg. 2020;146(3):465-473
2. Kim JY, Khavanin N, Rambachan A, McCarthy RJ, Mlodinow AS, De Oliveria GS Jr, Stock MC, Gust MJ, Mahvi DM. Surgical duration and risk of venous thromboembolism. JAMA Surg. 2015 Feb;150(2):110-7.

Impact of immediate lymphatic reconstruction anastomotic technique on prevention of breast cancer related lymphedema

Abstract Presenter
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INTRODUCTION: Immediate lymphatic reconstruction (ILR) is an emerging technique for the prevention of breast cancer related lymphedema (BCRL). We've demonstrated the use of end-to-end and arborized anastomoses for ILR in prior studies. However, no studies have investigated the difference between the type of anastomoses in efficacy for reduction in BCRL rates. We aimed to compare the incidence of BCRL between end-to-end and multi-lymphatic anastomoses.

METHODS: A prospective cohort study was conducted including patients who underwent ILR between 2018-2020 with at least 2 years of follow up. Patients either had end-to-end anastomoses (1 lymphatic vessel intussuscepted into 1 venule), arborized anastomosis (multiple lymphatics intussuscepted into 1 venule), or a combination or both. Descriptive statistics, t tests, and Pearson's chi-square test were used. Multivariable logistic regressions were performed to assess the association between BCRL and type of anastomosis used. A loose age-matched subsample was created for sub-analysis.

RESULTS: 172 patients were included in this study (28 patients had end-to-end anastomoses, 122 had arborized anastomoses, and 22 had both). Patients had an average age of 52 ± 12 years and mean BMI of 28.4 ± 6.9 kg/m2. The incidence of BCRL was higher in the end-to-end cohort than the arborized cohort, 28.6% vs. 10.7%, respectively ($p = 0.01$). The arborized anastomosis was associated with lower odds of developing BCRL (OR 0.3 [0.1 – 0.8], $p = 0.02$).

C**ONCLUSIONS**: Arborized anastomoses were associated with a lower incidence of BCRL.

Expanded Indications of the Dorsal Nasal Flap: Redefining the Nasal Reconstruction Algorithm

Abstract Presenter
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The incidence of nonmelanoma skin cancer in the U.S. is one million cases per year, and 20 percent of these occur on the nose.1 Nasal defects following tumor extirpation present reconstructive challenges given the paucity of local tissue and intricate subunits. An ideal reconstruction provides adequate match in tissue quality and is performed in a single stage.

Historically, the paramedian forehead flap (PFF) has been considered the gold standard.2 It is indicated for defects that are larger than two centimeters and is known to provide an aesthetic reconstruction.3 However, this flap introduces considerable morbidity and necessitates staging, which can pose limitations to its routine use. Additionally, this patient population frequently develops recurrences that require re-excision. Therefore, it may be prudent to preserve the PFF until necessary.

The dorsal nasal flap (DNF) utilizes local tissue to reconstruct defects in a single stage. It is classically described as a rotation-advancement flap.4 We present our experience with utilizing this versatile and robust flap to reconstruct defects that may otherwise require a PFF based on size criteria.

A retrospective chart review of patients who had undergone reconstruction by DNF following Mohs resection from 2015 to present was conducted.

The cases were categorized by six flap modifications: limited, standard, extended, double, combined, and readvanced. The defect location, defect diameter, use of cartilage graft, secondary flap, revisions, complications, and recurrences were recorded. The means and ranges of defect sizes were calculated by flap type. We present our reconstructive algorithm based on this data.

From 2015 to present, 51 patients have undergone reconstruction with a DNF. The longest follow up period was about 3 years. There is a general trend of larger defect sizes with increasingly complex flap types, consistent with our reconstructive philosophy.

Complications included minor dehiscence, delayed wound healing, donor site hematoma, and hypertrophic scarring. Note that there were no flap losses. While revision rates were low, the senior author prefers to err on preserving vascularity of the flap at the first stage, and therefore has a low threshold to debulk at a second stage. These revisions are generally performed under local anesthesia.

The present study expands the use of the DNF and redefines the nasal reconstruction algorithm. Plastic surgeons faced with complex nasal defects can utilize our principles to reconstruct larger defects which would have traditionally necessitated a PFF. We believe that our approach lowers morbidity, provides cosmetic and durable coverage, while preserving the PFF in a population at risk for recurrence and needing further reconstruction.

REFERENCES:
1. Ciążyńska M, Kamińska-Winciorek G, Lange D, et al. The incidence and clinical analysis of non-melanoma skin cancer. Scientific Reports. 2021;11(1).
2. Eren E, Beden V. Beyond Rieger's original indication; the dorsal nasal flap revisited. Journal of Cranio-Maxillofacial Surgery. 2014;42(5):412-416.
3. Khan SI, Lim AA. Sparing the paramedian forehead flap for reconstruction of large nasal and cheek defects. Dermatologic Surgery. 2020;47(8):1099-1101.
4. Redondo P, Bernad I, Moreno E, Ivars M. Elongated dorsal nasal flap to reconstruct large defects of the nose. Dermatologic Surgery. 2017;43(8):1036-1041.

Technical Considerations for Vascularized Omental Lymph Node Transfer for Advanced Stage Breast Cancer-Related Lymphedema

Abstract Presenter
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BACKGROUND: Vascularized Lymph Node Transfer (VLNT) is a surgical treatment that has shown promising results in treating advanced-stage cancer related lymphedema. However, it is important to consider the morbidity associated with the donor site. In our study, we have demonstrated that using the omentum for VLNT can be an effective and less invasive surgical approach, leading to favorable outcomes.

METHODS: All patients in our study presented with breast cancer-related lymphedema at stage IIb or higher and were therefore scheduled to undergo VLNT surgery. A single-port laparoscopic approach was employed to harvest the omental lymph node flap based on the right gastroepiploic artery. The flap was then inset in the direction of lymphatic flow, with additional lymphatic connections made to the recipient vein.

RESULTS: No major operative complications were observed in any of the patients, and there were no cases of reoperation due to surgical site issues. Twelve months after surgery, the mean limb volume difference decreased from 25% to 17% compared to preoperative measurements, while the difference of interlimb impedance ration measured by bioimpedance analysis decreased from an average of 1.63 to 1.25. The Lymph Q questionnaire revealed a significant reduction in patients' discomfort related to lymphedema.

Conclusions: The use of omental lymph node flap for VLNT surgery is a promising approach that can provide patients with effective results while minimizing the risk associated with the procedure. This method can be particularly beneficial for patients with advanced-stage lymphedema who have limited treatment options.

REFERENCES:
1. Scaglioni, M.F., et al., Comprehensive review of vascularized lymph node transfers for lymphedema: outcomes and complications. Microsurgery, 2018. 38(2): p. 222-229.
2. Pappalardo, M., K. Patel, and M.H. Cheng, Vascularized lymph node transfer for treatment of extremity lymphedema: an overview of current controversies regarding donor sites, recipient sites and outcomes. Journal of surgical oncology, 2018. 117(7): p. 1420-1431.
3. Ciudad, P., et al., Comparison of long-term clinical outcomes among different vascularized lymph node transfers: 6-year experience of a single center's approach to the treatment of lymphedema. Journal of surgical oncology, 2017. 116(6): p. 671-682.
4. Agko, M. and H.-C. Chen, Histo-anatomical basis of the gastroepiploic vascularized lymph node flap: the overlooked "micro" lymph nodes. Journal of Plastic, Reconstructive & Aesthetic Surgery, 2018. 71(1): p. 118-120.
5. Park, J.K.-H., et al., Association of lymphatic flow velocity with surgical outcomes in patients undergoing lymphovenous anastomosis for breast cancer-related lymphedema. Breast Cancer, 2022. 29(5): p. 835-843.

Surgical Management of Severe Gunshot Wounds to the Face

Abstract Presenter
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BACKGROUND: Gunshot wounds (GSWs) to the face are destructive injuries with potentially debilitating functional and aesthetic outcomes. Management is often challenging due to the complexity of the craniofacial skeleton and the overlying soft tissue structures and surgical intervention is often required. The purpose of this study is to characterize injury patterns and operative management of the most extensive GSWs to the face that have progressed to surgical closure.

METHODS: We conducted a retrospective chart review from a Level 1 metropolitan trauma registry from January 1, 2009 to December 21, 2020. Inclusion criteria were patients sustaining a GSW to the face that required four or more surgical procedures or required regional or free flap reconstruction. Data collected included demographic and injury information, airway management techniques, specific structures injured, and surgical management details including timing and the specific procedures and techniques.

RESULTS: From 2009 to 2020, a total of 432 patients sustained a GSW to the face and 40 patients met our inclusion criteria for severe GSW to the face. The average age at presentation

was 34 (range 16-68) and the majority of patients were male (85%). The primary mechanism of injury was self-inflicted (50%) followed by assault (37.5%). A total of 37 patients (95%) required tracheostomy. The average number of facial bones fractured was 3.3 (SD 1.49) and the average number of surgeries was 5.4 (range 4-11). Specific bones injured included the mandible (95%), maxilla (77.5%), orbit (52.5%), nasal bone (42.5%), zygoma (37.5%), and frontal (12.5%). 74% of the mandibles had operative repair. The average number of surgical procedures varied on the type of primary procedure used for repair. The subgroups evaluated were i) external fixation (11 patients) – 4.81 procedures; ii) open reduction/internal fixation (ORIF) (28 patients) – 5.6 procedures; iii) regional/free flap (7 patients) – 6.88 procedures. On average, patients were taken to the operating room for an irrigation and debridement 2.8 times before ORIF. Almost half (18/40) of these patients experienced an infection. The pectoralis muscle flap was the most common regional flap utilized (67%). Different free flaps (radial forearm, rectus abdominis, fibula, and latissimus dorsi) were utilized equally (25%).

CONCLUSIONS: Severe GSWs to the face have a multi-injury pattern that require complex management and are most often a result of close range, high caliber, or shotgun injuries. It is paramount to secure the airway in this patient population, not only as a life saving measure, but also to facilitate subsequent operative repair. Multiple washouts are often necessary to remove foreign debris and measure presence of necrotic tissue. The mandible was the most common facial bone involved in this severe injury group, which may reflect the likelihood of comminution, instability, and contamination from associated intraoral extension. Patients managed with regional or free flap required the greatest number of procedures, perhaps as indicative of the preparatory steps required for a technique of this complexity.

Utilizing Integra for Reconstruction of Facial Defects after Mohs Micrographic Surgery

Abstract Presenter
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INTRODUCTION: Large defects of the nose after Mohs surgery pose a significant reconstructive challenge to both dermatologic and reconstructive surgeons. Our aim was to present our 12-year experience utilizing Integra® bilayer wound matrix for nasal reconstruction. Primary endpoints included success of Integra integration, followed by time to complete healing, complication rate, recurrence, and aesthetic intervention.

METHODS: A retrospective review of patients undergoing Mohs surgery and alloplastic nasal reconstruction with Integra between 2012-2022 was performed. Patients who underwent single-stage reconstruction and dual-stage reconstruction with skin graft with at least 90 days of follow up were included.

RESULTS: Fifty-one patients (28 males, 23 females) met inclusion criteria with a median age of 77 years of age. Non-Hispanic Caucasians made up the majority of the study (98%), with 43% having a history of tobacco use. Basal cell carcinoma (BCC) was the most common cutaneous malignancy diagnosed (61.5%), followed by squamous cell carcinoma (SCC) (13.5%), and melanoma in-situ (13.5%). A total of 53 lesions were treated, with each acquired defect repaired and reconstructed separately with Integra. The most common lesion location involved the nasal sidewall (50%), followed by the nasal tip (44.4%). The mean pre-operative lesion size was 3.3 cm2, with a mean post-Mohs surgery defect size of 10.8 cm2. 30.8% (n=16) of defect sites underwent same-day Integra reconstruction, with 69.2% (n=36) proceeding to undergo two-stage reconstruction. Integra successfully reconstructed the acquired Mohs defect in 94.2% of this population. Average time to completed healing was 145.35 + 86.0 days. No instances of disease recurrence were recorded. The total complication rate was 9.62% (n=5). The average size for successful healing without complication is 10.8 cm2. The average defect size for complications or failure of skin graft was 14.7 cm2. Only seven sites (13.46%) underwent procedures for aesthetic improvement, with all revisions occurring after two stage reconstruction.

CONCLUSION: When used in single or two staged reconstruction, Integra bilayer wound matrix is an adequate reconstructive option for the nose with low complication and revision rates.

Alloderm versus Dermacell: A Prospective, Clinical Trial

Abstract Presenter
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Steven Davison MD

BACKGROUND: Since the early 2000s, Acellular Dermal Matrix has been adopted as a popular
addition to prepectoral breast reconstruction to enhance aesthetic outcomes of the procedure. The objective of this study was to investigate the differences in the postoperative course of two common acellular dermal matrix companies- AlloDerm SELECT Ready To Use (Allergen, Dublin, Ireland) and DermACELL (Stryker, Kalamazoo, Michigan).

METHODS: Prospective study of patients undergoing bilateral nipple and/or skin sparing mastectomies to either Tissue Expander or Silicone Implant insertion between the years 2019 to 2023 were selected for this study. The study design was to use patients as their own controls

between different products used in the left or right breast. Of these patients, both Acellular Dermal Matrix companies were used, with AlloDerm randomly placed into one breast, and DermACELL into the other. Outcomes compared between the two brands included average time for drain removal, infection rate, seroma rate, incorporation rate, and average time for Tissue Expander fill. Statistical analysis was performed in order to determine the presence of significant differences, with independent clinical variables recorded to rule out confounding factors.

RESULTS: Clinical data of 54 patients (108 breasts) was recorded for 90 days, with 51 patients undergoing tissue expander insertion and and 3 patients with direct to silicone implant surgery. There were no significant differences between time drain removal, average drain output, and time for tissue expander fill. Additionally, there were no significant differences in outcomes based on personal factors such as age, BMI, and other comorbidities. There was a higher percentage of seromas recorded in the breasts with AlloDerm (\27.78%) compared to breasts containing DermACELL (14.81%, $p < 0.05$). Incorporation rates of Alloderm and DermACELL were not statistically significant as they were 95.4% and 99.8%, respectively.

CONCLUSION: irrespective of patient demographic disparities, both AlloDerm and DermACELL
have equal infection rates and drain comparisons. AlloDerm was determined to have a higher incidence of seromas as a postoperative complication, which is an important factor to be considered when choosing between the acellular dermal matrices companies.

Missed Lymphatic Dysfunction in Patients Diagnosed with May Thurner Syndrome

Abstract Presenter
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BACKGROUND: Phlebolymphedema can result from venous outflow insufficiency related lymph stasis.(1) In patients presenting with isolated left lower extremity edema, left iliac vein compression or May Thurner syndrome (MTS) is a differential diagnoses.(2, 3) As venous and lymphatic pathologies are treated by different specialties, biased recognition of one entity over the other is possible and can delay appropriate intervention. We investigated the management of patients diagnosed with both May Thurner syndrome and lymphedema at our institute.

METHODS: An IRB-approved chart review was performed on all adult patients who presented with lower extremity lymphedema at our clinic between February 2020 and April 2022. Demographics, comorbidities, symptoms, duration of symptoms and treatment data was collected. Patients with concomitant diagnosis of MTS were included in this study. The study group was subcategorized based on whether the MTS was surgically managed (stented) or not.

Stented patients were further grouped based on patient reported improvement at minimum 1-year post stenting. In the group with no improvement after iliac vein stenting, patients who subsequently underwent lymphedema surgery were identified. The pre- and post-lymphedema surgery outcomes in these patients were compared at the latest follow up. Patient reported symptoms, physical examination findings and ICG lymphography reports were used as the outcome measures.

RESULTS: A total of 16 patients were included in the study. 81% were female, average BMI was 27.1 and median age at consult was 53.7 years. The average duration of symptoms was 15.3 months and included unilateral lymphedema on the lower left extremity (75%) and bilateral swelling of the lower extremities (25%), with one patient experiencing testicular swelling as well. 12 (75%) patients had stenting of the iliac vein and 3 (18%) had stenting planned but could not be performed due to logistic and technical reasons. All 12 patients who underwent stenting reported little or no improvement after 1 year of follow-up. The ICG lymphography showed dermal backflow patterns in 11 patients, one patient was allergic to ICG. Of these patients, 2 underwent lymphaticovenous anastomosis (LVA), and 4 had debulking surgery. All 6 patients who underwent lymphatic surgery reported improvement at mean latest follow-up of 13.6 months (8.2 – 22.5 months), with favorable symptoms reduction and improved physical examination and ICG lymphography findings.

CONCLUSION: The diagnosis of 'lymphatic insufficiency' can be missed when iliac vein compression (May Thurner syndrome) is incidentally detected in patients with lower extremity swelling. Patients who do not respond to iliac vein stent placement should have lymphatic system evaluation with ICG lymphography and be considered for lymphatic surgery when indicated.

REFERENCES:

1. Lurie F, Malgor RD, Carman T et al. The American Venous Forum, American Vein and Lymphatic Society and the Society for Vascular Medicine expert opinion consensus on lymphedema diagnosis and treatment.Phlebology.2022;37(4):252-66.
2. Sachanandani NS, Chu SY, Ho OA et al. Lymphedema and concomitant venous comorbidity in the extremity: comprehensive evaluation, management strategy, and outcomes. Journal of Surgical Oncology. 2018;118(6):941-52.
3. Gupta R, Mathijs E, Hart J et al. May-Thurner Syndrome and Lymphedema Reconstruction. Plastic and Reconstructive Surgery Global Open. 2022;10(6).

"Flying Squirrel" Liposuction In Treating Solid-Predominant Lymphedema - 2-year Experience:

Abstract Presenter
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BACKGROUND: Liposuction is a time-tested treatment for solid-predominant lymphedema. However, its technical execution, physiological effects, and impacts on the pathophysiology remain debated. In this study, we report our 2-year experience of treating solid-predominant lymphedema with tumescent liposuction with simultaneous skin excision.

METHODS: All patients with solid-predominant extremity lymphedema who underwent liposuction between February 2020 and April 2022 were included. Following liposuction, those with a positive "flying squirrel" sign, which is more than 4-cm skin excess under maximal traction, underwent simultaneous skin excision. Standardized outcome tracking protocol of symptoms report, physical examination, volumetric reduction, and indocyanine green (ICG) lymphography were administered preoperatively and at predetermined intervals postoperatively.

RESULTS: 82 patients underwent liposuction with skin excision in one extremity, totaling 34 upper extremities (UE) and 48 lower extremities (LE). Liposuction was carried out using tumescence. Tourniquet was used when operating forearms and lower legs. All extremities demonstrated a positive "flying squirrel" sign and underwent immediate skin excision. Average operative time was 147 minutes for upper extremities and 174 minutes for lower extremities. Post-operative complications were seen in the lower extremities only and consisted of infection (n=3), pressure injury (n=3) and wound dehiscence/skin necrosis (n=3). The average lipoaspirate volume and percentage of adipose tissues was 2,100 cc (71%) for UEs and 3,560 cc (71%) for LEs. The average skin excised was 175 cm2 for UEs and 344 cm2 for LEs. The follow-up period averaged 10.1 ± 6.7 months for upper extremity patients and 11.5 ± 6.9 months for lower extremity patients. At the latest follow-up, volume data was available for 22/34 UE patients and 29/48 LE patients showing an average volume reduction of 28.9±11.1% (UE) and 16.39±8.49 % (LE). All patients 82/82 (100%) subjectively reported notable relief of symptoms and functional improvement, with corresponding physical examination findings. ICG lymphography showed progressive improvement in lymphatic function in all UEs 34/34 (100%) and 44/48 (92%) of the LEs. 53% (18/34) of the upper extremity patients and 50% (24/48) of lower extremity patients reported improved responsiveness to compression therapy post-operatively. All expressed satisfaction with the procedure.

CONCLUSION: "Flying squirrel" liposuction is safe and effective in treating solid-predominant lymphedema and is associated with high patient satisfaction.

Flap Outcomes Following Protocolled Management of Open Pilon Fractures in an Underserved Population

Abstract Presenter

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BACKGROUND: Lower extremity traumatic wounds pose significant challenge for management, requiring timely and aggressive debridement, a multi-specialty approach, and optimal timing of flap coverage. Pilon fractures involve an impaction injury to the ankle which results in significant soft tissue damage and poor outcomes. Our study directly compares outcomes following management with free flap coverage in patients with open pilon versus non-pilon fracture injuries to assess the efficacy of an orthoplastic protocol at a tertiary hospital, which emphasizes early joint assessment and debridement of open fractures.

METHODS: A single-surgeon retrospective chart review of lower extremity reconstruction was performed from September 2017 through October 2022. Inclusion criteria selected for patients that sustained open fractures of the tibia and received treatment according to our county hospital's Orthoplastic Protocol (Figure 1). Data on demographics, wounds characteristics, and flap outcomes were collected and analyzed by wound type. Fluid collections, infection requiring hardware removal, and osteomyelitis were categorized as deep infection. Data was analyzed using independent sample T test for continuous variables and Fisher's exact test for categorical data.

RESULTS: Forty-five patients were identified; 32 patients sustained pilon fractures and 13 patients sustained other lower leg fractures (i.e. plateau, shaft, malleolar). Patient demographics were similar in both groups. There was a higher proportion of Gustilo-Anderson grade II and IIIC fractures in the pilon group compared to the non-pilon group. Mechanisms of injury included falls, gunshot wounds, and motor vehicle or motorcycle collisions. There were 2 total flap losses in the pilon fracture cohort, with one patient required below-the-knee amputation. In the non-pilon cohort, there were 2 total and 2 partial flap losses in the non-pilon fracture cohort; two patients ultimately required amputation. The anterolateral thigh (ALT) flap was the most common free flap used for both pilon and non-pilon groups. The average follow-up time was 7 months. There was no significant difference in rates of unplanned reoperation, deep and superficial infection, malunion, non-union, need for additional flap, long term antibiotics, and other complications between the two groups.

CONCLUSION: While pilon and non-pilon fractures had significantly different distributions of open fracture types, outcomes following flap coverage of open pilon fractures are comparable to that of their non-pilon counterparts. The historically worse outcomes documented in the literature for pilon fractures appear to be mitigated with the new orthoplastic protocol in our hospital. Future directions include comparing outcomes of pilon fractures managed without free flaps with those requiring free flap coverage.

Scalp reconstruction with free tissue transfer as a palliative surgical intervention in a high-risk population

Abstract Presenter
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BACKGROUND: A palliative operation can be defined as one that is "largely intended for symptom relief or avoidance of symptoms or conditions anticipated secondary to progressive local disease and is unlikely to alter the ultimate progression of disease in his patient or significantly impact patient survival."1 Scalp defects requiring free tissue transfer often present as a result of advanced oncologic or complex traumatic etiology affecting a relatively high-risk patient population. The challenge of reconstructing large scalp defects coupled with the fact that many scalp tumors present as locally advanced disease often only leaves free tissue coverage as the only option. 2 We propose the use of free tissue transfer for scalp reconstruction to be viewed as a palliative operation to facilitate resection of the underlying pathology.

METHODS: A retrospective analysis was performed on patients undergoing scalp reconstruction with free tissue transfer at Emory University Hospital and Grady Memorial Hospital between 2011-2021. Patient demographics, wound characteristics, operative details, and complications were recorded. Statistical analysis using univariate and multivariate models were performed.

RESULTS: 45 patients underwent free flap scalp reconstruction during the study time period. The average patient age was 58.8 years. Wound etiology was predominantly oncologic in nature (n=38, 84.4%), followed by trauma (n=5, 11.1%), infection (n=1, 2.2%), and stroke (n=1, 2.2%). 38 patients (84.4%) had calvarial involvement and 17 patients (37.8%) had involvement of the dura. The median follow-up was 350 days. There were 33 patients (73.3%) with healed flaps, 9 patients (20.0%) who had wound healing issues, and 3 patients (6.7%) with flap failures. The average hospital length of stay was 17.7 days with 35 patients (77.8%) being discharged to either home or a rehabilitation facility. The remaining 10 patients (22.2%) were discharged to hospice or died. The 30-day mortality was 6 patients (13.3%) and the 6-month mortality was 8 patients (20.5%). On univariate analysis, there was a statistically significant difference in 30-day (p=0.0001) and 6-month (p=0.003) mortality for patients >70 years in age. On multivariate analysis, there was a statistically significant difference in 6-month mortality for patients >70 years in age. No other risks factors (including patient comorbidities, smoking status, defect size, free flap type, calvarial involvement or reconstruction) contributed to rates of complications or mortality.

CONCLUSION: While age >70 years is a significant risk factor for mortality in patients

undergoing free flap scalp reconstruction, this is likely related to underlying disease process. Free flap reconstruction for scalp defects have a high success rate and can be considered a palliative procedure for patients with locally-advanced disease.

REFERENCES:

1 Hofmann B, Haheim LL, Soreide JA. Ethics of palliative surgery in patients with cancer. Br J Surg 2005; 92(7): 802-9.
2 Desai SC, Sand JP, Sharon JD, Branham G, Nussenbaum B. Scalp reconstruction: an algorithmic approach and systematic review. JAMA Facial Plast Surg. 2015;17(1):56-66.

Ultra-thin Split-thickness Skin Grafts for Management of Full-thickness and Deep Partial-thickness Burns

Abstract Presenter
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INTRODUCTION: Burn surgery teachings have long held that thicker grafts including full-thickness or thick STSG (0.025 inch) have better functional and cosmetic outcomes than standard (0.012 – 0.020 inch) and thin (0.008 – 0.011 inch) STSG, due to concern for contraction and poor color matching. This is thought to be due to the higher ratio of dermis to epidermis in thicker grafts which resist secondary contracture. As the thickness of the STSG decreases, the amount of dermis in the graft decreases. Reports in the literature estimate epidermal thickness to be between 5 and 49 micrometers in thickness (about 0.0006 – 0.0015 inch). Recently, Chacon, et al, in the largest single-surgeon experience with thin and ultra-thin STSG (

METHODS: The study includes sampling from excess ultra-thin STSG on ten patients undergoing STSG to reconstruct burn injuries. STSG were harvested via air-powered dermatome at a depth of 0.004 inch (4/1000 inch). Sample thickness were recorded, including average thickness per sample and standard deviation. These samples were then preserved in formalin, formally processed by surgical pathology, and examined by a dermopathologist to determine cellular content, including harvested epidermal and dermal sub-layers and cell-thickness counts for each layer.

RESULTS: The overall mean graft thickness was 117.0 micrometeres with a SD of 21.0 OR 4.6/1000" with a SD of 0.8/1000". Each graft contains the epidermis and a small portion of reticular dermis.

CONCLUSIONS: Our ultra-thin split-thickness skin grafts cut with a dermatome set to 4/1000 " were found to contain mostly epidermis with varying degrees of papillary dermis. The portion

of hair follicle which contains stem cells is not present in our grafts. There is no reticular dermis present in our grafts. Although the dermatome was set to 4/1000" the mean thickness of our grafts was 4.6/1000" with a standard deviation of 0.8/1000".

Prepectoral Pocket Transposition for Exposed Cardiac Pacemaker Salvage

Abstract Presenter
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INTRODUCTION: Cardiac pacemaker systems consist of a battery and electrodes that travel through venous system to the heart. Due to foreign nature of cardiac pacemaker systems, following implantation, pain, infection, and exposure may occur. Many surgical techniques have been defined in literature for cardiac pacemaker salvage1-3. In our study, the results of transposition of exposed cardiac pacemakers beneath pectoral fascia are presented.

PATIENTS AND METHODS: Patients who underwent surgery for cardiac pacemaker transpositions were reviewed retrospectively. 22 patients who were operated and followed for at least 12 months are included in the study. Patients' age, gender, medical and surgical histories, comorbidities, time to exposure, laboratory, radiological and microbiological culture examination results, early and late complications due to salvage surgery were investigated.

Intraoperatively, capsule around the pacemaker battery, all necrotic and infected tissues were debrided. Deep tissue cultures were taken. Pectoral fascia was identified with inferomedial dissection and a new subfascial pocket was created. The pacemaker battery was transposed to the new pocket. Muscle fascia was sutured, and drain was placed in the previous pocket which was later obliterated with subdermal sutures. Subdermal and dermal sutures were placed. Empiric antibiotherapy was later rearranged with accordance to culture results.

All patients were evaluated with ultrasonography. Battery position, pocket thickness and condition were recorded.

RESULTS: 15 patients were male and 7 were female. The mean age of patients was 68.4 ± 12.3 years (54-85). Patients had a history of coronary artery by-pass graft surgery (n=6), diabetes mellitus (n=7), hypertension (n=13), anticoagulant use (n=19), battery loss due to exposure (n=2), smoking (n=14) and chronic kidney disease (n=2). Mean time to cardiac pacemaker exposure was 30.1 ± 18.7 months (8-66), and patients had clinical signs of infection such as high fever (n=2), purulent drainage (n=19), erythema at the pacemaker site and increased temperature (n=15), high WBC count (n=19) and CRP (n=22). No early or late complications, or recurrent

exposure was observed in follow-up. 3 patients were culture negative, the rest had predominantly skin flora growth. Antibiotics were prescribed due to antibiogram results. In radiologic evaluations, no fluid collection or out-of-pocket malposition was observed.

DISCUSSION: Instrumentation with foreign bodies such as cardiac pacemakers carry specific risks. Subcutaneous tissue atrophy with aging, chronic irritation with foreign body, comorbidities, superficial placement of batteries increase the risk of exposure. Numerous flap options have been described for cardiac pacemaker salvage. The prepectoral plane, which is frequently used in breast reconstruction with implants, is a safe are for foreign body placement. Transposition of batteries to prepectoral plane for cardiac pacemaker exposure salvage is a simple and safe procedure compared to classical and complex flap options.

REFERENCES:

1. Çiloğlu NS, Gümüş N, Eraslan T, Çiloğlu U. Salvage of the exposed cardiac pacemakers with pocket change and local flaps. Turkish Journal of Thoracic and Cardiovascular Surgery. 22(1)
2. Bonawitz SC. Management of exposure of cardiac pacemaker systems. Annals of plastic surgery. 2012;69(3):292-295.
3. Aksoy A, Dağdelen D, Sirvan SS. Ekspoze Olmuş Kalp Pillerinin Fasyakütan Lokal Flep Yardımı ile Kurtarılması. 2018;

Lymphovenous anastomosis remains efficacious despite chronic venous insufficiency

Abstract Presenter
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BACKGROUND: Current dogma amongst lymphedema surgeons considers venous insufficiency a contraindication to lymphovenous anastomosis (LVA). The aim of this study is to assess if the efficacy of lymphaticovenular anastomosis (LVA) is mitigated by chronic venous insufficiency (CVI). We hypothesize that objective lymphatic flow improvement will still be seen after LVA in patients who suffer from CVI.

METHODS: A retrospective chart review of consecutive index LVAs performed by the senior author using a previously described "octopus" technique was conducted. Patients with history of CVI who underwent pre- and post-LVA delayed indocyanine green (ICG) lymphography were isolated. All patients had previously failed lymphedema therapy and underwent standardized diagnostic and tracking protocol including patient report, circumference measurements, and indocyanine green (ICG) lymphography preoperatively and at predetermined postoperative intervals.

RESULTS: Twelve patients with history of preoperatively diagnosed CVI underwent LVA procedures for primary or secondary lymphedema during the study period. Over half of patients (n=8, 67%) had been diagnosed with May-Thurner syndrome at mean 27 months pre-LVA; the remainder had developed CVI following ablation of greater saphenous vein. All patients suffered unilateral lower extremity lymphedema. Mean BMI was 26.3 (std. dev. 3.4) and mean duration of clinical symptomology was 17 months. LVA was performed in a single extremity in all cases. Dermal backflow patterns were observed in all patients preoperatively. The meaqn number of LVAs performed in each patient was 6.1 (min.-max. 5-7). Mean follow-up was 9.1 months. No complications were observed. At the time of latest follow-up, all operated limbs showed improvement in pattern of lymph flow (i.e., normalized linear flow or less-severe dermal back flow) and ICG distance traveled (i.e., more proximally-tracking ICG flow).

CONCLUSION: LVA can remain efficacious and yield clinical benefit in s

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elect patients with venous insufficiency. Criteria for patient selection and prognosis prediction remain to be elucidated.

Operative Management of Pectus Arcuatum: a Minimally-Invasive Approach.

Background/Purpose: Pectus arcuatum is a rare chest wall deformity caused by premature obliteration of the ossification centers in the sternum resulting in a unique deformity characterized by a short, z-shaped sternum with a prominent outward protrusion at the angle of Louis [1]. Pectus arcuatum is structurally different from the more common pectus excavatum and carinatum deformities, which are commonly repaired with minimally-invasive placement of a Nuss bar [2]. Placement of Nuss bar for correction of pectus arcuatum does not adequately correct the chest wall deformity and often results in worsening of the prominence at the angle of Louis. Traditional Ravitch repair is most frequently performed for surgical correction of pectus arcuatum and involves a large median sternotomy or clamshell incision and carries a significant risk of morbidity including damage to costal cartilage growth centers leading to iatrogenic deformity of the anterior chest [1]. We report results of a novel minimally-invasive approach combining anterior wedge osteotomy of the sternum and contouring of the prominent costal cartilages with Nuss bar placement for the surgical management of pectus arcuatum.

METHODS: A chart review of all patients with pectus arcuatum managed with a minimally-invasive surgical approach at our institution from 2018 to 2022 was performed. Demographic data, presenting symptoms, surgical treatment, complications and outcomes were collected.

RESULTS: Eight patients, five (62.5%) male, with a mean age of 14 years (8-18) at time of surgery were included in the study with a mean length of follow-up of 8 months. Average pre-operative Haller index was 3.45 (2.8-4.3). Plastic surgery performed sternal osteotomy and

fixation and costal cartilage contouring, with Nuss bar placement by pediatric surgery if indicated. Mean length of hospital stay was 3.0 days, which is similar to length of stay for Nuss bar placement alone at our institution. Post-operative pain scores were not increased over Nuss bar placement alone, but operative times were longer. There were three patients with minor complications (all superficial wound infections) that did not require operative take-back. All patients and parents reported cosmetic improvement.

CONCLUSION: The described minimally invasive surgical procedure performed for correction of pectus arcuatum results in symptomatic and cosmetic improvement and does not increase morbidity in pectus repair.

CITATIONS:

1. Gritsiuta, Andrei I., et al. "Currarino-Silverman Syndrome: Diagnosis and Treatment of Rare Chest Wall DEFORMITY, a Case Series." Journal of Thoracic Disease, vol. 13, no. 5, 2021, pp. 2968–2978., doi:10.21037/jtd-20-3472.
2. Nuss, Donald, et al. "A 10-Year Review of a Minimally Invasive Technique for the Correction of Pectus Excavatum." Journal of Pediatric Surgery, vol. 33, no. 4, 1998, pp. 545–552., doi:10.1016/s0022-3468(98)90314-1.

Characterizing Heterotopic Ossification in Burns: The Role of Hormone Replacement Therapy

Abstract Presenter
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Heterotopic Ossification (HO) is a complex condition resulting in ossification of normal soft tissue such as fascia, muscles, and tendons. It occurs after trauma, injury, and burns resulting in impaired range of motion, joint stiffness, and decreased mobility1,2. Male gender has been shown to be a risk factor for the development of HO3. This study aims to identify the demographic of burn patients that develop HO after injury to further elucidate mechanisms for the development of HO. To determine the protective effect that female sex hormones could have in the development of HO after burns, we compared outcomes of HO in female burn patients that were prescribed hormone replacement therapy (HRT) to those that were not.

We queried the TriNetX database, a federated research network of real-world data, for ICD10 codes encompassing heterotopic ossification (HO) and burn injury. Forming two groups, A) burned patients with first time HO diagnosis on or after the incidence of burn injury, and B) burned patients with no diagnosis of HO we compared the demographic, burn location, and TBSA between groups. We then specifically identified the female burn patient population and further classified that group into female burn patients receiving HRT and female burn patients

not receiving HRT. After propensity matching for age, race, and ethnicity, we investigated the rate of HO for females after burns in both the HRT and non-HRT group.

Of 631,222 patients with burns, 1,158 (0.18%) developed HO showing a right skewed distribution. Group A patients (burn patients with HO) were older (50.5± 19.1 yrs) vs Group B patient (burn patient with no HO (33.4± 23.2 yrs) ($p < 0.001$), primarily male (58%), white (66%), and non-Hispanic (79%) and primarily in the upper extremity and head (67.2%). In investigating the effects of hormone replacement therapy on female burn patients, we found no significant difference between female burn patients taking HRT and female burn patients not taking HRT in the development of HO with odds ratio 1.408, 95% CI [0.725, 2.735].

HO affects only 0.18% of the burn population. Those at higher risk include older age, white males with interquartile range of TBSA <30%. In particular, the use of HRT in female burn patients was not shown to offer a protective mechanism in the development of HO. This study will call for further research into the mechanism for the development of HO. In identifying the demographic information of those that develop HO, we will be able to treat eligible patients prophylactically with NSAIDs, radiotherapy, or bisphosphonates 4.

REFERENCES:

1. Sun Y, Lin Y, Chen Z, Breland A, Lineaweaver WC, Zhang F. Heterotopic Ossification in Burn Patients. Ann Plast Surg. 2022;88(2):S134-S137. doi:10.1097/SAP.0000000000002901
2. Ranganathan K, Loder S, Agarwal S, et al. Heterotopic Ossification: Basic-Science Principles and Clinical Correlates. J Bone Joint Surg Am. 2015;97(13):1101. doi:10.2106/JBJS.N.01056
3. Ranganathan K, Peterson J, Agarwal S, et al. Role of Gender in Burn-Induced Heterotopic Ossification and Mesenchymal Cell Osteogenic Differentiation. Plast Reconstr Surg. 2015;135(6):1631. doi:10.1097/PRS.0000000000001266
4. Shapira J, Yelton MJ, Chen JW, et al. Efficacy of NSAIDs versus radiotherapy for heterotopic ossification prophylaxis following total hip arthroplasty in high-risk patients: a systematic review and meta-analysis. HIP Int. 2022;32(5):576-590. doi:10.1177/1120700021991115/FORMAT/EPUB

Can LVA still be successfully performed in advanced fluid-predominant lymphedema?

Abstract Presenter
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PURPOSE: Historically, supermicrosurgical lymphaticovenular anastomosis (LVA) is regarded technically difficult and unachievable, and therefore contraindicated in advanced lymphedema demonstrating "diffuse" and/or absence of "linear" pattern on indocyanine green (ICG) lymphography. More invasive vascularized lymph node transplants are preferred in these cases. In this study, we describe our experience of attempting LVA in these challenging cases.

METHODS: All patients with fluid-predominant lymphedema who underwent LVA between February 2020 and March 2022 were included. Patients with pre-operative ICG lymphography demonstrating "diffuse" and/or absence of "linear" pattern were included in the study group, while the remainder of LVA patients were assigned to the control group. Surgical time, number of LVAs, patient report, physical examination, and post-operative ICG scans at 3, 6, and 12 months were compared between both groups.

RESULTS: Thirteen limbs showed "diffuse" and/or absent "linear" pattern while 70 limbs showed "linear" pattern on pre-operative immediate ICG scan. Mean follow-up time was 14.18 ± 6.46 months and 14.83 ± 9.12 months for study and control groups, respectively. Surgical times (p=0.31) and number of LVAs (p=0.25) did not vary significantly between groups. Patient-reported symptom relief and reduction in swelling were seen in 11 limbs in the study group and 65 limbs in the control group (p=0.19). Post-operative ICG scans improved in 11 limbs in the study group and 68 limbs in the control group (p=0.22). No significant differences were reported between study and control groups.

CONCLUSION: LVA can be performed in advanced fluid-predominant lymphedema. The technical difficulty and efficacy of LVA in this group is not significantly different from patients with "linear" patterns on ICG lymphography.

Factors Associated Infective Readmissions After Lower Extremity Reconstruction: A Decade Look at the Nationwide Readmission Database

Abstract Presenter
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BACKGROUND: Improvement in orthoplastic and microsurgical techniques has led to an increase in the ability to salvage limbs after high energy trauma. Patients undergoing salvage

procedures with free flaps require more complex wound care regimens than those undergoing amputation. Surgical site infection (SSI) after free flap reconstruction (FFR) has been a feared complication since the infancy of microsurgery, and the true nationwide burden of infection remains elusive. We sought to quantify the rate of surgical site infection (SSI) readmission after FFR and describe the healthcare utilization and characteristics of patients in this cohort.

METHODS: All patients undergoing FFR for lower extremity trauma were identified in the Nationwide Readmission Database (NRD; 2013-2019). Patient, injury, healthcare utilization, and hospital level characteristics were abstracted to compare patients who suffered readmission due to SSI within 6 months compared to those that did not.

RESULTS: A total of 760 patients undergoing FFR after acute trauma were identified. The overall 30- and 60-day SSI readmission rate was 6% and 10% respectively. Readmitted patients did not differ from non-readmitted patients and were mostly male (71.5%), had public insurance (Medicare/Medicaid, 66.8%), were mostly in the top two income quartiles (52.6%), treated at the top quartile of trauma volume (86.9%) with teaching status (84%; all P>0.0%). The mean age of those readmitted was 50.8 years old (SD 16.9) and had an Injury Severity Score of 8.5 (SD 7.8). The two cohorts did not differ in terms of their rate of infection during index admission (6.0% vs 6.6%, P=0.958). The specific comorbidities smoking history, hypertension, diabetes, peripheral vascular disease, and obesity did not differ between the two groups (P all > 0.05). However, patients readmitted with SSI did have a greater overall comorbidity burden (Elixhauser comorbidty index: 2.9 vs 1.8, P=0.027). A majority of patients who were readmitted for SSI had their flaps performed within 72 hours of acute injury (73.7%) which did not differ with those who did not suffer an SSI readmission (84.2%, P=0.462). Patients with SSI readmission had on average a 16 day longer total length of stay (index + readmission; P=0.016) and their total hospital cost was on average $36,519 greater than those not readmitted for SSI (P=0.0124).

CONCLUSIONS: Readmissions due to SSI remains high in patients receiving FFR after acute lower extremity trauma compared to other clean surgical procedures. Further studies will need to quantify the granular impact on patients and efforts should be made to reduce SSI readmission after FFR.

Influence of Free Flap Composition on Chronic Osteomyelitis Recurrence Following Treatment of Chronic Lower Extremity Wounds

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OBJECTIVE: In patients with chronic lower extremity (LE) wounds, chronic osteomyelitis confers additional complexity to achieving adequate treatment.1 Previous systematic reviews demonstrate increased rates of osteomyelitis recurrence in patients who receive muscle flaps compared to fasciocutaneous flaps for LE limb salvage;1,2 however, these studies do not limit populations to atraumatic patients who receive exclusively free flaps. Thus, this study compared rates of recurrence in chronic osteomyelitis patients undergoing LE reconstruction with fasciocutaneous versus muscle free flaps.

METHODS: Chronic osteomyelitis patients undergoing FTT between July 2011 and July 2021 were retrospectively reviewed. Patients were stratified into fasciocutaneous and muscle free flap groups. Primary outcomes included osteomyelitis recurrence, flap complications, limb salvage, and ambulatory status. Each patient was admitted, and wounds were debrided until all necrotic and non-viable tissue was removed, and culture results from bone specimen were negative prior to FTT.

RESULTS: Forty-eight patients with chronic osteomyelitis of the wound bed were identified, of which 58.3% received fasciocutaneous (n=28) and 41.7% received muscle flaps (n =20). The most common comorbidities included diabetes mellitus (n=29, 60.4%), peripheral neuropathy (n=27, 56.3%) and peripheral vascular disease (n=24, 50.0%). Mean BMI was higher in the muscle flap cohort compared to the fasciocutaneous cohort (37.0 + 27.9 kg/m2, p=0.006). Mean hemoglobin A1c level was 6.6. Methicillin-resistant or -sensitive Staphylococcus aureus was the most common isolated pathogen in 18.7% (n=9) of procedures. The majority of the study population underwent a median of three debridements followed by NPWT prior to receiving FTT. There were no significant differences in preoparative anterior tibial, posterior tibial or peroneal artery patency. Post-endovascular LE intervention (i.e., balloon angioplasty) vessel run-off was similar between cohorts. Additionally, wound location, wound area, day-of-FTT tissue cultures, and bone pathogen on initial culture did not significantly differ between cohorts. End-to-side anastomosis was utilized comparably between cohorts with similar rates of recipient arterial vessels anastamosed. Calcified vessels were encountered in 25.0% of both cohorts.

At a median follow-up of 14.6 months, the limb salvage and ambulatory rates were 79.2% (n=38) and 83.3% (n=40), respectively. The overall rate of microsurgical flap success was 93.8% (n=45). Osteomyelitis recurred in 25% of patients (n=12) at a median duration of 4.0 months. There were no significant differences in rates of osteomyelitis recurrence, flap complications, limb salvage, ambulation, and mortality when stratifying by flap composition. On multivariate analysis, flap composition remained a nonsignificant predictor of osteomyelitis recurrence (OR 0.975, p=0.973).

CONCLUSION: This study demonstrates that flap composition does not influence recurrence of osteomyelitis following free flap reconstruction of chronic lower extremity wounds, suggesting that optimal flap selection should be based on wound characteristics and patient goals.

REFERENCES

1. Kovar A, Colakoglu S, Iorio ML. Choosing between Muscle and Fasciocutaneous Free Flap

Reconstruction in the Treatment of Lower Extremity Osteomyelitis: Available Evidence for a Function-Specific Approach. J Reconstr Microsurg. 2020;36(3):197-203. doi:10.1055/S-0039-1698469
2. Shimbo K, Kawamoto H, Koshima I. Muscle/musculocutaneous versus fasciocutaneous free flap reconstruction in the lower extremity: A systematic review and meta-analysis. Microsurgery. 2022;42(8):835-847. doi:10.1002/MICR.30961

Looking Beyond the Scalpel: Assessing Patient Risk Factors for Complications following Surgical Excision of Hidradenitis Suppurativa

Abstract Presenter
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INTRODUCTION: Hidradenitis suppurativa (HS) is a chronic inflammatory disease affecting intertriginous skin-bearing apocrine glands. Severe HS, characterized by chronic inflammation, sinus tracts, and scarring, poses reconstructive challenges and surgical treatment often is accompanied by high complication rates. Despite these findings, risk factors for complications are not extensively studied. The objective of our study was to determine if patient-level risk factors were associated with increased complications and to characterize operative techniques at our institution. We hypothesized that smoking status, body mass index (BMI), and diabetes were associated with increased odds of complications.

METHODS: We performed an IRB-approved retrospective review on patients aged 0-99+ admitted for primary or secondary wide local excision of HS from 12/1/2015 to 06/02/2022. Patients who did not undergo surgical treatment at our institution or who had a follow up period of less than 90 days were excluded. Patient demographic data including age, race, ethnicity, and payer type; intraoperative data; and complications data were extracted. Complications within 90 days included delayed healing, surgical site infection, flap/graft failure, hemorrhage, hematoma, hypertrophic granulation, new disease, seroma, wound dehiscence, and unplanned return to the operating room. Long-term complications included contractures, failed healing, hypertrophic scarring, keloid scarring, neuropathic pain, recurrence at original site, and unplanned revision surgery. Both 90-day and long-term (>90 days) complications were combined into an overall complications category. Data were analyzed with descriptive statistics and Fisher's exact tests.

Multiple logistic regression was used to determine the association between patient demographic factors and occurrence of any 90-day or long-term complications. Significance was set at $p<0.05$. All analyses were performed in RStudio 4.1.2.

RESULTS: Of 347 patients identified, 141 (40.6%) met inclusion criteria. Median age was 35 [interquartile range (IQR) 26, 46] years and median follow-up 12.4 [IQR 5.1, 34.4] months. Of the 241 total admissions, 623 surgeries were performed on 902 total sites. The most common surgery performed was excision and debridement (n=227 surgeries, 36.4%); the most common surgical site was the genital/groin region (n=260 sites, 28.8%). Eighty-four patients (59.6%) experienced 189 overall complications (30.3% of surgeries) of which 74 patients (52.5%) experienced 148 (23.8% of surgeries) 90-day complications and 30 patients (21.3%) experienced 41 (6.6% of surgeries) long-term complications. The most common complication was wound dehiscence (n=47 patients, 33.3%). Unplanned 90-day reoperations occurred at a higher rate in patients aged ≥65 years (n=1, 16.7%) compared to patients aged 30-64 (n=2, 2.4%) and those under 30 (n=0) (p=0.027). Delayed wound healing occurred at a higher rate in patients with diabetes (n=3, 17.6%) versus those without (n=3, 2.4%, p=0.023). Regression controlling for number of admissions and number of surgeries found no sociodemographic factors associated with increased odds of complications.

CONCLUSIONS: Our study found that HS patients with diabetes more often experienced delayed wound healing compared to HS patients without diabetes. However, factors including smoking status and BMI were not associated with increased complications after surgical HS excision. Additional studies with larger sample sizes are needed to fully elucidate risk factors that may predispose HS patients to more post-operative complications.

RESEARCH AND TECHNOLOGY

Enhancing Complex Wound Care by Leveraging Artificial Intelligence: A Chat-GPT Study

Abstract Presenter
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INTRODUCTION: The use of artificial intelligence (AI) in healthcare has the potential to improve patient outcomes and streamline processes, particularly in the field of complex wound care. One specific application of AI in this context is the use of chat-GPT (Generative Pre-trained Transformer) to assist with tasks such as wound diagnosis and treatment recommendations along with whole-person care recommendations.

METHODS: In our study, we evaluated the use of chat-GPT in a sample of 80 patients presenting to our hospital-based advanced wound care center with complex wounds. All patients

were evaluated in a traditional manner by the wound care provider who established both a diagnosis and treatment plan. Next, the chat-GPT system was used to provide personalized treatment and lifestyle recommendations to patients based on their medical history, wound characteristics, and other relevant information. Providers interacted with the chat-GPT system via a natural language interface, and the system provided recommendations based on the patient information provided.

RESULTS: Our results showed that the chat-GPT system was able to accurately identify the most appropriate treatment for most of the patients in our sample with a greater than 90% correlation to the treatment plan proposed in the initial assessment. Furthermore, providers reported high levels of satisfaction with the system, with over 87% stating that they found the recommendations to be helpful in managing their complex wound patients. Additionally, 75% of the providers acknowledged that the chat-GPT whole-person care recommendations favorably augmented their care.

DISCUSSION: Overall, our study demonstrates the potential for AI, specifically chat-GPT, to assist with complex wound care and possibly improve patient outcomes. Further research is needed to fully understand the capabilities and limitations of this technology in this specific context, as well as to determine the most effective methods for implementing and utilizing it. However, the promising results of our study suggest that chat-GPT and similar AI systems have the potential to significantly improve complex wound care.

REFERENCES:

1. Iwaya, T., & Tani, Y. (2018). Artificial intelligence-based wound diagnosis and treatment support system using deep learning. Artificial Intelligence in Medicine, 87, 1-8.
2. Zeng, Z., Mardini, H., & Goertzel, B. (2019). AI-assisted wound diagnosis and treatment: A review. Artificial Intelligence in Medicine, 95, 44-54.
3. van der Meijden, O., & van der Meer, A. D. (2018). Artificial intelligence in wound care: A systematic review. Wound Repair and Regeneration, 26(4), 511-522.
4. Teixeira, F. S., & Mendes, R. D. (2018). Artificial intelligence in wound care: A review. Wound Medicine, 22, 7-12.
5. Zhang, Y., & Zhang, S. (2018). Artificial intelligence in wound care: A review. Artificial Intelligence in Medicine, 82, 38-45.

Deconstructing the Excellent Plastic Surgeon: A SWOT Analysis of the Specialty

Abstract Presenter
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OBJECTIVE: Historically, residency candidates are evaluated through the lens of academic plastic surgeons [1], despite most plastic surgeons not pursuing academic plastic surgery. [2] Considering this, we must question whether the metrics and qualities we select for align with our goal of creating a diverse specialty optimized for treating our diverse patients. This study aims to evaluate the impact of demographic factors on perceived strengths, weaknesses, opportunities, and threats to the specialty with the goal of deconstructing the excellent plastic surgeon.

METHODS: An electronic survey study was created using SurveyMonkey and distributed via the American Council of Academic Plastic Surgeons' official email address on three occasions in the weeks leading up to the 2023 Winter Meeting. All participants responded to demographic questions followed by identification of the top three strengths, weaknesses, opportunities, and threats (SWOT analysis) for the specialty.[3] Subsequently, respondents were asked to identify the five most important qualities of an excellent plastic surgeon from a list generated by literature review and expert opinion. Analyses were conducted using either Chi-Square Goodness of Fit or Fisher's Exact test with adjusted standardized ratios for post-hoc testing.

RESULTS: We received 187 responses, representing a response rate of 89.0% of meeting attendees. Our respondents were majority non-Hispanic (78.6%) white (66.8%) women (59.5%) in the role of faculty/independently practicing physicians (65.8%). Only 12.3% of respondents identified as Hispanic/Latino, followed by 8.6% Black/African American, and <1% each American Indian/Alaskan Native and Native Hawaiian Pacific Islander. Approximately one third of respondents were first-generation low-income (FGLI) and/or LGBTQIA+ identifying (34.2%). Half of respondents were a program Chief/Chair or Program Director, with 71% of respondents working in an academic setting.

Faculty were significantly less likely to deem lack of surgeon diversity as a top 3 weakness ($\chi^2=19.278$, $p<.001$) compared to trainees, yet they did identify it as a top 3 threat to the specialty ($\chi^2=20.639$, $p<.001$). Black/African American, FGLI, and LGTQIA+ respondents were significantly more likely to deem lack of surgeon diversity as a top 3 weakness ($p<.001$ for all) and a top 3 threat ($p<.05$ for all).

When comparing academic and non-academic surgeons, the former were more likely to deem collaboration with other specialists as a strength ($\chi^2=13.276$, $p<.001$) and perception of plastic surgery by other specialties as a threat ($\chi^2=4.546$, $p=.035$), while non-academic surgeons were more likely to identify improvement in patient quality of life ($\chi^2=7.325$, $p=.006$) as a strength and scope of practice creep by non-physicians as a threat ($\chi^2=7.242$, $p=.011$).

All three training levels identified technical ability and collaborative/team player among the top five most important qualities of an excellent plastic surgeon.

CONCLUSION: Demographic minority groups and trainees are more likely to identify lack of surgeon diversity as a weakness and a threat to the future of the specialty. Furthermore, different strengths and threats emerged based on practice in an academic or non-academic setting. Regardless of training level, technical competence and collaborative skill are highly valued.

Applying artificial intelligence to facial curvature analysis for gender-affirming surgery

Abstract Presenter
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INTRODUCTION: Artificial intelligence is an innovative, rapidly expanding field that transforms the ability to learn from complex data. Applications of artificial intelligence to plastic surgery have been limited despite its ability to advance practice, research, and education. The goal of this study was to create a validated machine learning model using three-dimensional images to identify and measure differences in facial feature curvature by gender.

METHODS: Three-dimensional facial photos of 75 men and 75 women aged 20-29 were collected. Each photo was divided into 100 cross-sectional images: 60 were used as training/validation data and 15 were used as test data to build a convolutional neural network that could classify gender based on curvature analysis of each cross-section. The model underwent a five-part cross-validation, and Gradient-weighted Class Activation Mapping was implemented to measure the facial curvatures used by the model as the basis of inference when determining gender.

RESULTS: The facial target area used by the model was bounded superiorly by the eyebrows, inferiorly by the upper vermillion, and laterally by the cheekbone apices. The model could classify gender with over 90% accuracy using any sagittal plane within the target area for females and any sagittal plane lateral to the oral commissures for males. Convexity of the nasal ala, protrusion of the supraorbital ridge and nasal dorsum, and a pointed nasal tip were all predictors of male gender in the model. Flat glabella and convexity of the cheeks and eyelids were determined to be feminine features.

CONCLUSION: The machine learning model identified novel features as determinants of gender that currently do not serve as areas of focus for gender-affirming surgery. The objective measurements of curvature provided by the model advance the sparse, subjective literature on facial feminization/masculinization, and this method of curvature analysis can be applied to pre-operative planning for all facial reconstruction or aesthetic procedures.

Preliminary Clinical Trial of a Wearable Sensor for Pressure Ulcer Prevention

Abstract Presenter

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BACKGROUND: Pressure ulcers are challenging for patients and the healthcare system. About 2.5 million pressure ulcers are treated annually in the United States alone, resulting in approximately $11 billion per year in healthcare costs.1-4 There is currently no universally reliable modality to prevent pressure ulcer formation. We have developed and completed initial animal studies on a wearable wireless sensor less than 2 centimeters in diameter which uses algorithms that measure pressure, time, temperature, and moisture at a given skin surface site to monitor at-risk sites for pressure ulcer prevention.5 Our system uses wireless sensors and proprietary algorithms to monitor these variables continuously. The purpose of this study was to complete initial clinical trials on volunteer healthy patients to establish preliminary clinical algorithms for decision making in the use of sensors in wider clinical deployment.

METHODS: Healthy adult volunteers (N=20; 10 females, 10 males) were recruited for the study. Subjects were placed on a table, supine. For reproducibility the posterior heel was selected as the sensor site over the most prominent portion of the calcaneus. The calf was off-loaded with a table gap in order to maximally load the heel. Twenty-pound weights were placed on the ankle to increase heel pressure. Patients were studied continuously for 30 minutes measuring pressure. Pain and numbness in each heel were recorded every three minutes using a 1-10 Likert Scale. Subject feedback on the wearability of the sensor at the end of the testing period as well as photo documentation of the sensor site was recorded.

RESULTS: Twenty subjects were enrolled. The average age was 31.5±13 years and the average weight was 159.3±18.5. Ten males and ten females were enrolled. Average pressure recorded by the sensor was 205.5 mmHg. Average increase in pain from baseline was 3.8 and the average pain was 4.1 by the end of the trial. Average increase in numbness from baseline was 3.1 and the average numbness by the end of the trial was 3.6. All 20 subjects reported ease of wearing the sensor.

CONCLUSIONS: The results of our preliminary study demonstrate that our wearable sensors can accurately measure pressure at localized sites at high risk. Subjects reported high wearability and comfort of the sensors. Our preliminary findings and algorithms suggest that current clinical guidelines for pressure ulcer prevention, such as patient turning every two hours, are excessively broadly directed and unfocused, suggesting substantial opportunity for more focused prevention and care.

REFERENCES:
1. Ahmed AK, Goodwin CR, Sarabia-Estrada R, et al. A non-invasive method to produce pressure ulcers of varying severity in a spinal cord-injured rat model. Spinal Cord. 2016;54(12):1096-1104.
2. Alderden J, Rondinelli J, Pepper G, et al. Risk factors for pressure injuries among critical care patients: A systematic review. Int J Nurse Stud. 2017;71:97-114.
3. Bennett L, Kavner D, Lee BK, Trainor FA. Shear vs pressure as causative factors in skin blood flow occlusion. Arch Phys Med Rehabil. 1979;60(7):309-314.
4. Chan B, Cadarette S, Wodchis W, et al. Cost-of-illness studies in chronic ulcers: a systematic review. J Wound Care. 2017;26(4)S4-S14.
5. Hickle K, Slamin R, Baez A, et al. Wireless Pressure Ulcer Sensor: Validation in an Animal Model. Ann Plast Surg. 2019;82(4S Suppl 3):S215-S221. doi:10.1097/SAP.0000000000001882

Rethinking Visualizations in Plastic Surgery: Open-Source Artificial Intelligence Can Accelerate Cosmetic and Reconstructive Operative Techniques and Reports

Abstract Presenter
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INTRODUCTION: Artificial intelligence (AI) describes the field of computer learning that relies on extensive data sets and has accelerated in its capabilities through a transition to open source code. We reviewed widely used current AI softwares surrounding smart speech-to-text transcriptions,1 computer-generated images from text,2 and conversational Chat programs,3 to illustrate how open-sourced AI (OpenAI) can be incorporated into the plastic surgeon's toolkit now, and how it may change the field in the future.

METHODS: We trialed the following OpenAI interfaces: (1) Stable Diffusion and (2) DALL-E, both text-to-image applications; (3) Clip, an image-to-text program, and (4) ChatGPT, a conversational Chat AI software. Inputs included operative descriptions from plastic surgeon operative notes, de-identified images from plastic surgery case reports, and verbal descriptions discussing operative techniques. AI-generated outputs were evaluated for accuracy to true anatomy and steps in the surgical procedure.

RESULTS: Current OpenAI systems can generate semi-accurate depictions of surgical procedures using phrases from operative reports. Stable Diffusion has the benefit of "image-to-image" mode, in which users can command the program to edit an existing image via a text prompt. This process allows for more accurate image adjusting via iteratively composing an image.

To convert intraoperative images and videos into operative notes, we found that CLIP and ChatGPT can generate captions for inputted images.4 However, the program is pre-trained on public image databases which are currently limited in relevant content for surgical purposes. More development is needed before these programs can describe more specialized images. With a broader training database, OpenAI can be expanded to caption intraoperative images.

CONCLUSION: Open source, web-based applications can generate and edit accurate operative and anatomical figures. As researchers refine AI image and video generation, plastic surgeons can use AI to make operative reports more image- and video-based and accelerate the operative report writing process.

REFERENCES:

1. Whisper.ai I. Whisper.ai. Updated 2022. Accessed 02/25/23, https://whisper.ai/
2. Online SD. Stable Diffusion. Accessed 02/25/23, https://stablediffusionweb.com/
3. OpenAI. ChatGPT. Updated 02/13/23. Accessed 02/25/23, https://chat.openai.com/chat
4. Mokady R, Hertz A, Bermano AH. ClipCap: CLIP Prefix for Image Captioning. 2021;doi:10.48550/arxiv.2111.09734

Rat Hindlimb Amputation Model to Assess Nerve Transfers for Pain Relief

Abstract Presenter
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The development of neuropathic pain will affect upwards of 70% of all amputees. Surgical techniques to reroute amputated nerves to create an appropriate signal for a prosthesis have been shown to also reduce amputation-related pain. One of these, targeted muscle reinnervation (TMR) reroutes nerves to motor branches. Previously we studied TMR in a rodent using the spared nerve injury model which preserved the hindlimb for standard pain behavior testing in the portion of the foot that remained innervated. Our aim is to expand to a full amputation model to study TMR and analgesia. This study evaluated a rat hindlimb amputation model to determine if it was effective to examine pain with and without TMR.

Ten male rats were randomly split into two cohorts: amputation with immediate TMR (iTMR) and amputation-only. For iTMR the common peroneal, tibial, and sural branches were transected and coapted to the motor branches of the semimembranosus and bicep femoris. For the amputation-only cohort, the nerves were ligated, and a 4-5mm distal segment was removed. A full below the knee amputation was then performed in both groups. Baseline behavior testing pre-amputation was obtained. At two weeks and five weeks post-amputation, von Frey

(mechanical hypersensitivity) and pin responses (hyperalgesia) were tested. Conditioned place preference (CPP) with gabapentin was completed at three weeks post-amputation. At five weeks post-amputation, acetone cold hypersensitivity and guarding (spontaneous pain), and flinching (spontaneous) were assessed.

Hyperalgesia measured at two weeks post-amputation showed the iTMR rats had an average noxious response of 10%, and amputation-only had an average noxious response of 46% ($p<0.05$). At four weeks post-amputation, iTMR rats had an average noxious response of 36%, while amputation-only rats had 48% noxious response ($p<0.05$). For acetone cold hypersensitivity, iTMR rats exhibited 30% noxious responses, while amputation-only exhibited 100% noxious responses ($p<0.05$). Rats with iTMR demonstrated an average of 19.2 seconds of guarding over a two-minute interval, and amputation-only rats averaged 28.9 seconds ($p<0.05$). At seven weeks, rats underwent nerve stimulation, and three of the amputation-only rats exhibited successful reinnervation.

The pain behaviors of iTMR rats showed significantly greater analgesia, including reduced hyperalgesia, cold hypersensitivity, and spontaneous pain, compared to amputation only. However, the reinnervation of some of the ligated nerves in amputation-only rats may have resulted in the trend of improved pain behaviors over time. To better reflect clinical findings in humans, future studies will focus on preventing reinnervation in the amputation-only model and investigate sex-based differences. Additionally, our work will aim to assess differences in motor versus sensory regeneration compared to different interventions and provide a more thorough characterization of the regenerative microenvironment at the coaptation sites.

Augmented Reality in Plastic and Reconstructive Surgery: What It Is, How Far It's Come, and the Limitations Impacting Further Adoption

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BACKGROUND: Augmented reality (AR) is the process of visually overlaying digital information on top of the physical world and can include interactions between the digital display and physical world. Within the field of plastic and reconstructive surgery (PRS), AR can utilize

patient imaging to aid preoperative surgical planning, intraoperative image guidance, as well as patient and resident education. Previous reviews of AR in PRS have been limited in not addressing the underlying technological shortcomings of AR nor fully evaluating physician usability limitations. In this review, we discuss both current uses as well limitations that need to be addressed as development moves forward.

METHODS: A review of relevant literature was conducted. Electronic databases were screened using keywords including "augmented reality," "mixed reality," and "plastic surgery." Studies were individually assessed for quality using technological usability heuristics.

RESULTS: A total of 90 studies were reviewed. Several studies used the phrase "augmented reality" interchangeably with other imaging and guidance modalities, especially other types of extended reality, such as mixed reality (MR) or virtual reality (VR). Of the applied AR device studies, primary usage fell into one of three categories: preoperative surgical planning, intraoperative surgical guidance, or surgical education. A wide range of devices within the AR umbrella were utilized, with studies most commonly citing the HoloLens (Microsoft LLC, Redmond, Wash.). Across several plastic surgical subspecialties, AR has demonstrated practicality and success in surgical planning and education but minimal intraoperative usage due to device specific limitations or issues with physician usability. The most cited technical issues hampering widespread adoption were software difficulties distinguishing soft tissue and need to streamline artificial marker registration. Meanwhile, physician usability issues included limited field of vision, insufficient battery life and dim viewing conditions.

CONCLUSION: The utility of augmented reality in plastic surgery is an exciting and nascent field of study. While there have been many initial attempts to develop relevant technology, significant limitations remain that constrain AR's ability to be used as an autonomous intraoperative guidance system. Promoting engineering-physician partnerships will allow for prioritization of key physician usability issues critical for AR's success in the operating room.

Where do plastic surgery leaders come from? A cross-sectional analysis of research productivity

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BACKGROUND: It has become increasingly apparent that a plastic surgery residency application with robust and lengthy research publications is the new standard when evaluating applicant competitiveness. Integrated residency match data from 2022 demonstrates a mean total publication of 7.21 and 1st author publications of 5.1 for matched medical students. This study

aims to evaluate the research history of plastic surgery program faculty leadership to glean insight into the trends and evolution of research expectations.

METHODS: Faculty members who serve in leadership positions in the residency admissions process among all ACGME-accredited integrated and independent plastic surgery residency programs in the U.S. were reviewed. The following faculty positions were included in the study: Chairs, Chiefs, Associate Chiefs, Program Directors, and Associate Program Directors. Doximity and individual program websites were used to gather information on faculty. H-index as well as number of publications at the time of graduation from medical school, general surgery residency, and plastic surgery residency were collected through SCOPUS. Faculty were further classified based on whether they hold a leadership position at one of the top 20 research medical institutions in US News recordings. Student's t-test and Pearson's product-moment correlation were used to analyze data.

RESULTS: Two hundred thirty-six plastic surgeons held the title of Chair, Chief, Associate Chief, Program Director, or Associate Program Director and were considered in the analyses. Altogether, faculty held a median of 0 (IQR 0-1) publications by the end of medical school, 1 (IQR 0-3) publications by the end of general surgery residency (for those who attended), and 3 (IQR 1-8) publications by plastic surgery residency graduation. Number of publications at the end of medical school were greater in those who attended integrated programs compared to independent plastic surgery programs (1.67 ± 5.00 publications vs. 0.56 ± 1.48 publications; $p=0.09$). Integrated program residents graduated with significantly higher publications after plastic surgery residency compared to independent program residents (8.48 ± 10.53 publications vs. 4.89 ± 5.89 publications; $p=0.01$). More recent graduation year was weakly positively correlated with more publications obtained at the time of plastic surgery residency graduation ($p<0.001$). Faculty leaders at top 20 research medical institutions had significantly higher H-indices than those from other programs (24.2 ± 15.19 vs. 14.2 ± 10.87; $p<0.001$). Chiefs were found to have significantly higher H-indices compared to Program Directors and Associate positions (Chief: 23.7 ± 15.60, Program Director: 14.7 ± 11.05, Associate position: 12.2 ± 9.31; $p<0.001$).

CONCLUSIONS: Based on current data, the majority of research publications in faculty leaders was performed after graduation from plastic surgery residency. However, it appears that research volume among plastic surgeons-in-training has increased more recently. This is especially evident among integrated pathway residents, who had a higher number of publications than their independent colleagues. Though historically it was not necessary to have a high pre-graduate research output to become an eventual leader, the current required research threshold to matriculate into a plastic surgery residency has profoundly increased.

Demographics, Trends, and Outcomes of Medical Student Presenters at National Plastic Surgery Conferences

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PURPOSE: As many medical students continue to pursue research initiatives as a means of increasing their prospects in the plastic surgery (PS) match, presenting at national conferences has become a rite of passage for most applicants. Conferences can also serve as an additional opportunity for students with no home integrated PS residency program (NHP) to network. However, little is known about the backgrounds and match outcomes of student presenters in plastic surgery. Given the rapidly changing climate of the application process, an assessment of the trends and utility of students presenting research at national PS conferences is necessary.

METHODS: Names of medical student presenters from the 2013-2020 ACAPS, AAPS, and ASPS annual meeting programs were obtained online after exclusion criteria were applied. Doximity, residency webpages, and LinkedIn were used to determine when and where each individual attended medical school and residency. Data was collected on the frequency of presentations, the presenters' medical schools, where their research was performed, and their match outcomes. Pearson's $\chi 2$ test was performed to assess differences between groups.

RESULTS: In total, 369 students delivered a total of 600 presentations across three national PS conferences from 2013-2020. The number of student presentations in 2020 was five times greater than in 2013. Of this total population, 63% matriculated into an integrated PS residency program. Only 16% of student presenters were from medical schools with NHP, of which 53% of them presented research performed at other institutions with home programs (HP). Overall, NHP presenters had a 59% average PS match rate, while HP student presenters had a 64% match rate ($p=0.57$). NHP students who performed research externally had a 74% match rate, while NHP students who researched within their own institutions had a 43% match rate ($p=0.014$). Finally, students who delivered just one presentation had a 55% average PS match rate, while students who delivered multiple presentations had a 77% PS match rate ($p<0.001$).

CONCLUSIONS: Presenting frequently at conferences is positively correlated to improved PS match outcomes for medical students, including those without home integrated programs. The rising volume of student presentations at national conferences accurately mirrors the increasing competitiveness of the PS match in recent years. For NHP students, performing research externally at other HP institutions is associated with increased success in the PS match. Further discussion is warranted to determine whether the key benefit of presenting at conferences is the opportunity to network with faculty members, having a platform to demonstrate engagement in PS research, or a combination of the two. Nonetheless, the rising numbers across the years indicate that presenting at national conferences will remain an integral component of the PS application process.

Pursuing Research Fellowships: Resources and Considerations of Integrated Plastic Surgery Residency Applicants

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BACKGROUND: Matching into an integrated plastic surgery residency program is highly competitive, with a limited number of available seats and a highly qualified applicant pool. Many medical students elect to complete research fellowships to increase their research productivity and strengthen their residency applications. This study aimed to understand the process of identifying opportunities, financial considerations, and overall satisfaction with research fellowships.

METHODS: A national survey was distributed to integrated plastic surgery residency applicants in the 2020-2021 and 2021-2022 application cycles. The survey elicited information regarding demographics, resources utilized in identifying positions, as well as motivators and deterrents for pursuing research fellowships. Questions related to the productiveness of the fellowship as well as perceived benefit of the experience were also included.

RESULTS: Five hundred thirty-four integrated plastic surgery applicants were identified from our institution's records and included in our study. Our preliminary results revealed that out of 52 respondents, 19 completed research fellowships (37%). The average fellowship length was 11.6 months, with most completing their research at another institution (63%) between the third and fourth year of medical school (84%). Respondents utilized mentors (83%), previous applicants (48%), and other medical students (35%) to help with the decision to pursue or forgo additional time for research. All respondents, whether they chose to complete a research fellowship or not, considered publications (88%), opportunities for letters of recommendation (63%) and networking (52%) as the top motivational factors. Conversely, aspects that adversely impacted applicants' decisions included an additional year of education (83%), funding concerns (63%), and a delay in generating income (40%).

The most common avenues to identify available research positions were from online listings (42%), word of mouth (37%), and suggestions from mentors (37%). Over half of research fellows received full funding (58%), with the remainder receiving partial (16%) or no funding (26%). The average salary for a research fellowship was $27,900, with the main sources of funding being the institution where the fellowship was completed. Productivity was assessed by the average number of accepted or published publications (11.8 papers), oral presentations (6 presentations), and poster presentations (2.9 presentations) produced during dedicated research time. Overall, most respondents who completed a research fellowship found that a fellowship was worthwhile (83%), made them a stronger applicant overall (94%), and would recommend this opportunity to prospective applicants (72%).

CONCLUSION: As the applicant pool for plastic surgery continues to expand, many

candidates have been motivated to pursue dedicated research fellowships in attempts to make their residency applications stand out. Overall, almost all who completed research fellowships found their experiences worthwhile and recommended them to future applicants. However, the majority of prospective trainees have concerns about funding these endeavors and, for many applicants, the drawbacks still outweigh the benefits.

RNA Sequencing Reveals a Conserved Mechanism of T Cell-Mediated Rejection in Vascularized Composite Allotransplantation Across Anatomical Sites

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PURPOSE: Despite substantial technical advances that make vascularized composite allotransplantation (VCA) viable for patients with devastating soft tissue injuries, acute rejection remains a major morbidity, with approximately 85% of patients experiencing a rejection episode within the first postoperative year (1). The molecular mechanisms of VCA rejection have not yet been fully elucidated, including its potential variation across anatomical sites. While there is some data to suggest disparate histopathological findings between oral mucosa and skin (2,3), differences between the face and hand remain unexplored.

METHODS: NanoString RNA sequencing (RNAseq) was performed on 27 FFPE skin biopsies (16 face, 11 hand) from 3 VCA recipients; 7 were categorized as nonrejection (NR) and 20 as acute rejection (AR) by clinical status. Data analysis and visualization was performed using the NanoTube and ggplot2 packages in R, in addition to Metascape for pathway analysis.

RESULTS: Upon principal components analysis (PCA), AR samples grouped separately from NR samples, without discernable clustering by patient or anatomical site. These findings were confirmed with hierarchical heatmap clustering of gene fold changes. We then compared fold changes from AR face biopsies to AR hand biopsies, which yielded a strong positive correlation across anatomical site ($r \geq 0.38$, $p < 0.05$). Indeed, AR face and AR hand biopsies each exhibited 151 DEGs when compared to NR samples, with 127 of these DEGs overlapping between the face and hand. With such similarities in rejection between anatomical sites, we aggregated face and hand samples for downstream differential expression analysis. We found that differentially expressed genes in AR were highly enriched for adaptive immune response, leukocyte activation,

and chemokine pathways ($p<0.05$). Finally, using a regularized regression model, we determined 7 genes that most significantly correlated with clinical rejection: CCL5, NKG7, CD8A, CD38, FASLG, SH2D1A, and KLF2.

CONCLUSIONS: Our results demonstrate that the molecular mechanism of acute rejection in VCA appears to be conserved across different recipient anatomical sites. Antigen-activated T cells and NK cells mediate AR through production of cytokines and recruitment to graft tissue. In particular, cytotoxic and apoptotic markers such as CD8A, NKG7, and FASLG are highly diagnostic for clinical evidence of graft damage. Longitudinal sampling for RNAseq will identify key genes driving the mechanism of VCA rejection and inform targeted therapies.

REFERENCES:

(1) Petruzzo P, Lanzetta M, Dubernard JM, et al. The International Registry on Hand and Composite Tissue Transplantation. Transplantation. 2010 Dec 27;90(12):1590–4
(2) Bergfeld W, Klimczak A, Stratton JS, et al. A Four-Year Pathology Review of the Near Total Face Transplant. Am J Transplant. 2013;13(10):2750–64.
(3) Kanitakis J, Badet L, Petruzzo P, et al. Clinicopathologic monitoring of the skin and oral mucosa of the first human face allograft: Report on the first eight months. Transplantation. 2006 Dec 27;82(12):1610–5

Are Plastic Surgery Residents Properly Compensated? An Analysis of Resident Compensation When Adjusted For Cost Of Living

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INTRODUCTION: Resident salaries have remained stagnant. The 2022 Medscape Report states a 3% increase from 2017-2020, well below the 5.6% increase in Consumer Price Index. The Medscape report suggests most residents feel inadequately compensated, stating that compensation neither reflects the number of hours worked nor meets residents' local cost of living. During residency, many trainees face financial stressors, decreasing quality of life, and increasing burnout and attrition. Furthermore, applicants to plastic surgery cite resident compensation as a core factor in rank-order. As such, it is necessary to investigate the true value of resident stipends as compared to local costs of living.

METHODS: Resident stipend information for PGY levels 1-6 was collected directly from plastic surgery residency program websites or their institutional GME stipend pages. Programs without available data were excluded from analysis. Stipends were adjusted by the cost-of-living index (COLI) of each program's city, yielding an adjusted effective stipend. Differences between raw and adjusted resident salary were calculated and descriptive and statistical analysis was performed. Data was grouped and analyzed by US Census Bureau geographic region (Northeast, South, Midwest, and West). Statistical analysis was performed using Python and significance was set to $p < 0.05$.

RESULTS: Most residency programs were included in analysis (85 of 88); compensation data was not available for three programs. The mean annual stipends for PGY 1-6 were $63,235, $65,682, $68,224, $71,064, $73,960, and $76,806, in increasing PGY-level order. The average COLI-adjusted effective salary was $60,065, $62,330, $64,663, $67,314, $70,020, and $72,683, respectively. In the Northeast ($p = 0.044$) and West ($p < 0.001$) regions, the COLI-adjusted effective stipends were significantly lower than the nominal value of the stipend, suggesting reduced purchasing power for residents in these regions. In contrast, for the Midwest region ($p = 0.003$), the COLI-adjusted effective stipends were significantly greater than the nominal value of the stipend, suggesting increased purchasing power for residents in these regions.

Residents in programs in the West received the lowest COLI-adjusted average stipends, at $46,342, $47,965, $49,847, $51,976, $54,175, and $56,444 respectively. The difference between unadjusted and COLI-adjusted stipends was -28.8%. Residents in the Midwest received the greatest COLI-adjusted average stipends, at $68,610, $71,162, $73,475, $76,288, $79,319, and $82,376 respectively. The difference between unadjusted and COLI-adjusted stipends was +10.5%. The Midwest was the only region in which residents had an increase in effective stipend based on COLI.

CONCLUSION: Residency stipends do not currently account for COLI, leading to large discrepancies in resident compensation. After adjusting for COLI, resident stipends in the Northeast and especially the West significantly lose value, while stipends in the Midwest gain value, suggesting that residents in Northeast or West are underpaid. This may lead to financial distress and burden for these residents, especially regarding student loan debt. Future research should investigate COLI-adjusted under-compensation versus resident wellness/burnout, quality of life, and financial burden by region. Such information may allow future applicants to more appropriately plan their rank-lists, and may allow programs to advocate for greater resident reimbursement.

Mixed Reality in the Operating Room: Utility within Facial Feminization Surgery

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PURPOSE: Of the procedures that make up facial feminization surgery, frontal sinus setback has a particularly high impact on gender perception. Mixed reality (MR) is a nascent technology that holds significant promise in plastic and reconstructive surgery. MR allows a user to view and manipulate three-dimensional patient images while superimposing them on the patient. This method allows for direct visualization of deep structures, improving a surgeon understanding of vital patient anatomy in real time. To the best of our knowledge, this is the first usage and evaluation of this technology inside of a plastic surgery operating room in the United States.

METHODS: The Medivis SurgicalAR system was used in conjunction with the Microsoft HoloLens, an MR headset with a see-through visor. CT imaging was uploaded to the SurgicalAR system and a three-dimensional hologram was projected onto the display of the HoloLens. The CT was registered to the patient using a point-to-point framework that relied on bony fiducials identified intra-operatively, namely the supraorbital notches, nasion, and glabella, matched to virtual counterparts. The system relies on a localizing wand with an affixed optical code that the 2D RGB camera on the headset tracks. Time measures and discrepancy from our standard-of-care 3D cutting guide were measured along with survey of the operating surgeon.

RESULTS: Qualitative descriptions demonstrated that 3-dimensional visualization of deep structures improved surgeon confidence and operative decision making. The process of matching the hologram to the patient and cropping to see intended structures took three minutes and twelve seconds. Tracing of the frontal sinuses based on the hologram took 61 seconds. Maximum discrepancy from the 3D cutting guide was 5mm and minimum was exactly the same. In addition, the workflow that was established was both efficient and intuitive.

CONCLUSION: Mixed reality was shown to be accurate in superimposing a patient's CT on top of their actual skull during surgery, allowing for a tracing of the frontal sinuses. This rapidly developing technology demonstrates promise for being a viable intraoperative image guidance technology and may provide a faster and more effective method of anatomical identification than the current standard of care.

Who's an Author? Public Perception of Medical Advice from ChatGPT versus Medical Professionals

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BACKGROUND: ChatGPT is an artificial intelligence (AI) model that can generate text and provide responses to questions, including answers that include medical knowledge and advice. Prior studies have established that text written by the AI model is often indistinguishable from human generated text. The purpose of this study was to gauge public opinion on responses to a medical question written by actual medical professionals versus simply generated by ChatGPT.

METHODS: Amazon's Mechanical Turk crowdsourcing service and REDCap's survey manager were used to recruit survey participants and collect responses. An anonymous 13-question survey was distributed that provided two different responses to a plastic surgery-related question about which patients are appropriate candidates for liposuction. One response was written by a medical professional while the other was generated by artificial intelligence (AI) machine ChatGPT. Responses were graded for various qualities and participants chose if they thought the response was written by AI or a medical professional. Five-point Likert scales were converted to binary variables for tabulation and a logistic regression analysis was performed.

RESULTS: A total of 578 participants were included for analysis. All participants were in the United States and had a mean age of 35.3 years. When assessing both responses on warmth, conciseness, thoroughness and clarity, there were no statistically significant differences between medical advice provided by AI writers versus medical professionals ($p>0.05$). Overall, only 41% of the public was correctly able to identify ChatGPT's response as having been written by AI. The public was better able to identify that the medical professionals' response was human generated (70% vs. 41%, $p<0.0001$). Further, as respondent age increased, there was a significant increase in the ability to correctly identify AI-written text ($p = 0.00082$). Oppositely, as age increased, there was also a significant decrease in the ability to correctly identify that a response was written from a medical professional ($p = 0.00082$).

CONCLUSION: When assessing responses to a plastic surgery-related question, respondents felt that the answers from both a medical professional and from ChatGPT were equally warm, concise, thorough and clear. Likewise, less than half of the public could identify a response as AI generated. However, significant limitations to ChatGPT have been made apparent, including the possibility for incorrect or misleading information. Therefore, considering its ability to produce convincing responses, increased vigilance by healthcare professionals is necessary to ensure that medical information relayed to the public is accurate.

The Fat and the Furious: MCF-7 Breast Cancer Cell Proliferation Trends in Fat Grafting Lipoaspirate Conditioned Media

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INTRODUCTION: Autologous fat grafting is a common technique used to enhance aesthetic outcomes in post-mastectomy breast reconstruction patients. Adipokines are hormones secreted by adipose tissue that play a critical role in regulating metabolic processes and the immune system.1-2 However, dysregulated adipokine secretion and signaling can contribute to the development and progression of cancer by promoting angiogenesis, altering the immune response, and inducing the epithelial mesenchymal transition, which allows breast cancer cells to subsequently metastasize and become endocrine-resistant.1-3 Past meta-analyses on the oncologic safety of fat grafting did not show significant effects on loco-regional recurrence or patient disease free survival.4 We aimed to assess how breast cancer cells behave in conditioned media derived from fat grafting lipoaspirates, and gain a better understanding of the potential interactions that may occur within the tumor microenvironment.

METHODS: A prospective randomized control trial (ClinicalTrails.gov identifier: NCT04891510) that enrolled post-mastectomy breast reconstruction patients is conducted at our center. Subjects are randomized into one of three fat grafting methods (active filtration, low pressure decantation, and standard suction decantation) in a 1:1:1 ratio. The extracted lipoaspirate from each patient is incubated in starving media for 24 hours. Conditioned media is then created using 20% of the secretome and 80% starving media. MCF-7, a human ER/PR+ breast cancer cell line, is plated at a density of 2000 cells per well and allowed to proliferate for four days. CyQUANT Cell Proliferation Assay, which utilized fluorescence binding to nucleic acid, is performed for growth quantification. Statistical analysis is done using One-Way ANOVA.

RESULTS: MCF-7 cells incubated in lipoaspirates processed using active filtration, low pressure decantation, and standard decantation did not show significant differences in their proliferation patterns. Across all treatments, the breast cancer cells incubated in conditioned media showed similar growth trends as those in complete media, which is enriched to contain the growth requirements of the cell line. MCF-7 cell behavior in conditioned media differed significantly from their proliferation patterns when serum starved in 100% starving media ($p < 0.05$).

CONCLUSION: Existing clinical series with or without control group offered conflicting evidence on whether fat grafting increases the risk of loco-regional recurrence and distal metastases, and it is unclear whether the interplay of autocrine and paracrine factors produced by transplanted lipoaspirate is linked to cancer recurrence.5 Based on the in-vitro assessment of

luminal breast cancer cell behavior in conditioned media, it seems that the microenvironment can support cell proliferation. This does not necessarily indicate comparable patterns will occur in-vivo. However, it could influence the ideal time point for autologous lipid transfer, and potentially suggest that revisions should be postponed until after the complete course of breast cancer treatment. Additionally, unlike mastectomy patients, who achieve immediate regional disease control after resection, breast conservation therapy (i.e., lumpectomy) patients may not be optimal candidates for fat transplantation before the completion of their treatment course.

REFERENCES

1. Kang C, LeRoith D, Gallagher EJ. Diabetes, Obesity, and Breast Cancer. Endocrinology. 2018 Nov 1;159(11):3801-3812. doi: 10.1210/en.2018-00574. PMID: 30215698; PMCID: PMC6202853.
2. Bhardwaj P, Au CC, Benito-Martin A, Ladumor H, Oshchepkova S, Moges R, Brown KA. Estrogens and breast cancer: Mechanisms involved in obesity-related development, growth and progression. J Steroid Biochem Mol Biol. 2019 May;189:161-170. doi: 10.1016/j.jsbmb.2019.03.002. Epub 2019 Mar 6. PMID: 30851382; PMCID: PMC6502693.
3. Hass R, Otte A. Mesenchymal stem cells as all-round supporters in a normal and neoplastic microenvironment. Cell Commun Signal. 2012 Sep 3;10(1):26. doi: 10.1186/1478-811X-10-26. PMID: 22943670; PMCID: PMC3444900.
4. Sun J, Liang H, Lin D, Han B, Zhang T, Gao J. Oncological safety of reconstruction with autologous fat grafting in breast cancer patients: a systematic review and meta-analysis. Int J Clin Oncol. 2022 Sep;27(9):1379-1385. doi: 10.1007/s10147-022-02207-8. Epub 2022 Jul 5. PMID: 35790652.

A Single Cell and Spatial Transcriptomics Approach to Elucidating CD8 T Cells in Vascularized Composite Allotransplantation Rejection

Abstract Presenter
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PURPOSE: Much of our understanding of acute rejection in vascularized composite allotransplantation (VCA) is drawn from principles in solid organ transplantation. However, there remains much speculation given the unique immunogenicity of skin and involvement of

multiple tissue types. Current studies suggest the implication of T cells in VCA rejection, though the exact molecular mechanisms have not yet been elucidated.

METHODS: Single cell RNA sequencing (scRNAseq) was performed on 10 fresh skin biopsies (5 face, 5 hand) from one VCA recipient; 2 were categorized as nonrejection (NR) and 8 as acute rejection (AR) by clinical status. Spatial transcriptomics was performed on 8 FFPE skin biopsies (7 face, 1 hand) from 3 VCA patients; 3 were NR and 5 were AR. Analysis and visualization was performed using the Seurat and Monocle3 packages in R.

RESULTS: We identified 13 clusters on scRNAseq corresponding to 14 distinct cell types. Spatial transcriptomics demonstrated colocalization of macrophages, T cells, and NK cells near the basement membrane during a rejection episode. We then focused on the T and NK cell cluster, further subsetting these cells by relative expression of key genes in the literature. Specifically, we identified 4 subsets of CD8 T cells: GZMKlow/GZMBhigh, GZMKhigh/GZMBlow, GZMBhigh/CX3CR1high, and "transitional" CD8 T cells, named for their lack of strongly expressed markers and indistinct clustering. To better understand the dynamic states of CD8 T cells in VCA rejection, we performed trajectory analysis starting at GZMKhigh/GZMBlow T cells, which did not express the exhaustion marker LAG3 or cytotoxic markers. Trajectory analysis revealed a shared path through transitional CD8 T cells which then diverged into 2 distinct endpoints: GZMKlow/GZMBhigh and GZMBhigh/CX3CR1high cells.

CONCLUSIONS: Our analyses demonstrate colocalization of T cells and macrophages near the basement membrane and the involvement of dynamic CD8 T cell states in VCA rejection. Cytotoxic markers such as GZMB and CX3CR1 are seen, however the role of GZMKhigh/GZMBlow-expressing cells is largely unknown. Future studies aim at clarifying CD8 T cell differentiation and their interaction with other cell types during AR.

Triple Negative Breast Cancer Proliferation and Migration in a Tissue Engineered 3D Biomimetic Platform

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PURPOSE: Characterizing tumor cell behavior within patient-specific in vitro models of the breast milieu is critical to advancing therapeutics, particularly with the advent of increasingly personalized treatment options. Challenges to developing such platforms include successfully

isolating and co-culturing the many primary cell types that constitute the tumor microenvironment and creating analytic methods that allow for reliable, accurate characterization of cell behavior over time. While prior studies have cultured tumor cells alongside patient-derived breast cells in a 3D extracellular matrix, we describe an engineered platform with a high fidelity to the tumor microenvironment due to its inclusion of mature patient derived adipocytes, an important contributor to tumor angiogenesis. We further characterize a novel machine learning-based image analysis approach.

METHODS & MATERIALS: Stromal vascular fraction (SVF), organoids and mature adipocytes were isolated from breast tissue obtained from healthy female patients undergoing reduction mammoplasty. Isolated cells were embedded in non-ribosylated collagen, creating a biomimetic milieu that approximates the patient-specific in vivo cellular environment ("biomimetic collagen"). 3D collagen constructs consisting of a bottom layer of RFP-tagged MDA-231 tumor cell-embedded collagen followed by a layer of plain or biomimetic collagen were plated in triplicate on a 96-well plate. GFP-tagged human umbilical vascular endothelial (HUVEC) cells were plated in a monolayer layer on top of the collagen to mimic the endothelial barrier. Constructs were cultured at 37°C and 5% O2 and underwent confocal imaging on days 0 and 7. Vertical cell movement was measured in the z-axis; cells were considered "migrated" when z-axis position was more than one standard deviation above the mean z-axis position. Confocal image analysis was completed in Imaris; migration analysis and statistics were completed in RStudio. P-values of less than 0.05 were considered significant.

RESULTS: Confocal microscopy at day 0 revealed ~800μm thick constructs with distinct MDA-231 and HUVEC cell layers. The custom-built imaging and machine learning algorithm accurately parsed fluorescent cells from surrounding background collagen and SVF autofluorescence, allowing for precise measurement of migration distances between timepoints. Analysis of confocal images at day 7 revealed MDA-231 in all collagen platforms, with significantly greater tumor cell migration in plain collagen groups than biomimetic groups (76.78μm versus 71.33μm, $p < 0.05$). Discrete migrating MDA-231 cell clusters associated with migrating HUVECs were observed in plain collagen and biomimetic collagen construct with average migration distances of 98.65 and 68.14, respectively ($p < 0.05$).

CONCLUSION: This tissue engineered biomimetic platform design and image analysis allows for reliable, reproducible and precise characterization of tumor and endothelial cell interactions in the tumor microenvironment. Findings of cell migration in both plain and biomimetic collagen groups indicates that the angiogenic capacity of tumor cells preserved in each condition. Increased migration in the plain collagen groups indicates that the biomimetic milieu alters the dynamics of tumor cell invasion; this relationship will be further elucidated in future studies. Importantly, this platform's utilization of patient-derived SVF and mature adipocytes makes it inherently personalized, a vital component of any future clinically-relevant in vitro cancer platforms.

First Use of DataTables to Create a Topic-specific, Plastic Surgery Literature Mini-database

Abstract Presenter
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PURPOSE: The advent of the internet has significantly increased the amount of medical information that is available to doctors, scientists, and researchers who are seeking information about specific topics. Unfortunately, this information is increasingly scattered in disparate locations online. This leads to challenges in identifying and accessing the accumulated knowledge about a given topic, and thereby limits the additional research that can be performed. As proof-of-concept for a new approach in developing topic-specific research mini-databases, the software program DataTables was used to create a comprehensive electronic database for all publications regarding deep inferior epigastric perforator (DIEP) flap breast reconstruction.

METHODS: Three databases (Medline via both the PubMed and OVID interfaces, SCOPUS, and CINAHL) were exhaustively searched for every publication that referenced DIEP flap breast reconstruction. Full text articles were obtained and transported to Covidence, where inclusion and exclusion criteria were applied using a two-person reference review method. Included publications were exported to Mendeley which allowed further classification of these references. DataTables software was used to create a customized, user-friendly user-interface by which the mini-database can be accessed, sorted, and queried.

RESULTS: The first mini-database has been developed, contains 2,635 publications, and is freely accessible as a research tool at www.DIEPDIVE.org. Users are provided detailed information about each article, a single-click link to the article, a search tool, a filter tool, and multiple sorting capabilities. The mini-database is continuously maintained in order to stay up-to-date.

CONCLUSION: This topic-specific mini-database serves as a proof-of-concept of a novel type of research tool for studying and conducting research on specific topics. With further refinement and expansion of the concept, it can serve as a template by which countless other topics can be better studied in plastic surgery, and beyond.

Did the COVID-19 Pandemic Impact the Clinical Skills and Subjective Characteristics Exhibited by Trainees Taken During MATCH 2021? A Survey of Integrated Plastic Surgery Program Directors

Abstract Presenter

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Introduction: The cancellation of clinical rotations (CRs) and implementation of virtual interviews (VIs) during the COVID-19 pandemic profoundly affected the 2020-2021 residency application cycle. Many educators have raised concerns regarding the potential impact that the aforementioned changes had on the subjective characteristics (such as personality and program fit) and clinical skills of the 2021 intern class, however, no outcomes data has been published leaving much of this discussion left to conjecture. The aim of this study is to describe the impact that the cancellation of CRs and implementation of VIs had on the clinical skills and subjective characteristics exhibited by the 2021 intern class from the perspectives of program directors (PDs) of integrated plastic surgery residency programs.

METHODS: A 13-question survey was administered to PDs of ACGME-accredited integrated plastic surgery residency programs with a "continued-accreditation" status using REDCap© (Vanderbilt University, Nashville, TN) from March 2022 through May 2022. Questions were designed to collect information regarding program characteristics along with PDs' outlooks on their 2021 intern class's subjective characteristics and clinical skills relative to previous resident classes, the relationship between cancelled CRs and incoming residents' clinical competency, and the utility of VIs for evaluating applicant subjective characteristics. An optional free-response text box was included for respondents to provide additional comments. Responses were collected in a deidentified fashion.

RESULTS: A total of 32 (43.8%) PDs of included integrated plastic surgery residency programs responded to our survey. Programs in our sample offered a median of 2 [Interquartile Range (IQR), 2-3] training positions during the 2020-2021 residency application cycle. Twenty-six (81.3%) programs offered more than one training position with 52.4% and 19.0% of said programs taking approximately the same number or more home medical students in the 2021 NRMP Match, respectively. The majority of respondents observed no differences in their 2021 intern class's fit with their program (68.8%), communication skills (65.6%), responsiveness to clinical instruction and feedback (68.8%), work ethic (75.0%), and rotation evaluations (78.1%) when compared to previous resident classes. Five (15.6%) responding PDs reported that they received more complaints about their intern class that required disciplinary action, however, no increases in resident attrition rates were observed. Twenty-five percent of PDs reported that VIs negatively impacted their program's ability to accurately assess applicants' subjective characteristics. Interestingly, 37.5% of PDs reported that the cancellation of CRs in 2020

negatively affected their 2021 intern class's clinical competency at the start of residency; however, only 21.9% of respondents observed that their 2021 intern class exhibited poorer clinical skills when compared to previous resident classes one year following the MATCH 2021.

CONCLUSIONS: The outcomes of MATCH 2021 suggest that VIs limited selection committees' ability to accurately assess applicant's subjective characteristics to a lesser degree than previously described in the literature. Cancellation of CRs had a significant impact on the 2021 intern class's clinical skills at the start of residency; however, many residents rectified these shortcomings during their first year of clinical training.

Biomarker and Pathological Changes during Skin Ischemia and Reperfusion Injury in Flap-based Reconstruction Models

Abstract Presenter
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BACKGROUND: Cell injury caused by ischemia and ischemia-reperfusion injury (IRI) affects most reconstructive surgical procedures including flap surgery, revascularization and replantation of composite tissues and vascularized composite allotransplantation. Compared to muscle and nerve, fewer studies have focused on pathological skin changes during ischemia and/or reperfusion. The aim of this study was to review the nature and timeline of pathological, molecular and genetic changes during skin ischemia and subsequent reperfusion to provide a guide for selection of appropriate markers in studies on skin ischemia and reperfusion injury.

METHODS: A systematic review was performed in accordance with PRISMA guidelines. Studies investigating skin ischemia were included. Model type, experimental intervention, ischemia method and duration, reperfusion duration, biopsy location and time point, staining method, gene and protein expression (PCR and western blot) were collected.

RESULTS: Ninety-nine articles were included. Hematoxylin and eosin (H&E) was the most used assessment, with three categories of changes identified: inflammatory, structural, and vascular. H&E showed inflammatory infiltration in early responses (12-24 hours), with structural modifications (3-14 days) and neovascularization (5-14 days) as delayed responses. Immunohistochemistry (IHC) was used to evaluate for angiogenesis and apoptosis. Cluster of differentiation 31 (CD31), cluster of differentiation (CD34), and vascular endothelial growth factor (VEGF) were used as angiogenic markers, while terminal deoxynucleotidyl transferase dUTP Nick-End Labeling (TUNEL), caspase-3, Bcl-2 associated x protein (Bax), and B-cell

lymphoma 2 (Bcl-2) were used as apoptosis markers. Gene (PCR) and protein expression (western blot) were used to detect (1) inflammation and apoptosis; (2) Endoplasmic reticulum stress/oxidative stress and hypoxia; and (3) neovascularization. Gene and protein inflammatory markers were elevated with tumor necrosis factor α (TNF-α, increased 6 hours – 7 days) the most common, followed by Interleukin 6 (IL-6, increased 12 hours – 7 days) and Interleukin 1β (IL-1β, increased 1 – 7 days). The most common gene and protein apoptosis markers were Caspase-3 (increased 24 hours – 7 days), apoptosis signal-regulating kinase 1 (ASK-1, increased 12 – 14 hours), and the Bax/Bcl-2 ratio (increased 24 hours – 7 days). Hypoxia and neovascularization were evaluated with VEGF (increased 6 hours – 10 days) and HIF-1α (increased 4 hours – 7 days). Oxidative stress kits measured malondialdehyde (MDA), glutathione (GSH), glutathione peroxidase (GSH-Px), catalase (CAT), and superoxide dismutase (SOD) with changes observable after 24 hours of reperfusion.

CONCLUSION: Compared to other components of the composite organs, skin is less susceptible to ischemia due to low metabolic demands. H&E histology may show inflammatory cell infiltration (12-24 hours) in reperfusion injury, however structural and neovascular changes are delayed responses (3-14 days). While IHC may detect apoptosis (6 hours – 7 days) and angiogenesis (5-14 days), gene and protein expression of inflammatory, hypoxic, and apoptotic biomarkers may provide more quantitative and earlier insight into immediate cellular-level responses in skin ischemia.

Abstract Conversion Rate for Plastic Surgery The Meeting: A 10-Year Analysis of Factors for Success

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INTRODUCTION: Presentations at national meetings are an important means of knowledge generation. Eventual publication of these studies is important for dissemination of findings beyond meeting attendees. Given growing emphasis on research productivity, a longitudinal evaluation of abstracts at Plastic Surgery The Meeting (PSTM) is warranted with critical attention on factors that improve odds of successful abstract conversion. We analyzed a 10-year sample of presented abstracts at PSTM and describe factors that improve rate and speed of conversion to peer-reviewed publication.

METHODS: Abstracts presented at PSTM from 2010-2019 were sourced from the ASPS Abstract Archive. A random sample of 100 abstracts from each year was evaluated. If fewer than

100 abstracts were available for a given year, all were evaluated. Demographics of primary presenter, academic affiliation, and subspecialty track were collected. Doximity research ranking was recorded for US-academic-affiliated institutions. The title of each abstract was used to find a corresponding published paper on PubMed, Google Scholar, and Google. Time to publication, journal, and impact factor at time of publication were recorded. Data were analyzed for trends over time and factors affecting conversion rate.

RESULTS: 983 presented abstracts were included. Overall conversion rate was 54.1%. 14 months was median time to publication. Median impact factor was 2.72, and this did not significantly change during the study period (p=0.09). Most common geographic region of presenters was the northeast (25.1%). Affiliation of the primary presenter changed over the study period, with an increasing number of private practice and international presenters (31% vs 52%) (p<0.001). Residents and fellows were the largest proportion of presenters (38.4%); however, there was an increase in the number of medical student and research fellow presenters during the study period (7.0% vs 21%) (p<0.001). Conversion rate was not affected by the Doximity research ranking of a presenter's affiliated institution (β=1.001, p=0.89), geographic location (p=0.60), or subspecialty tract (p=0.73). US-academic programs had a higher conversion rate (61.8%) than US-non-academic (32.7%) and international abstracts (47.1%) (p<0.001). Conversion rate differed by level of training of the primary presenter (p<0.001). Medical students had the highest conversion rate (65.6%). Attendings had the lowest rate (45.0). Level of training affected time to publication (p=0.007). Studies presented by research fellows had the shortest average time to publication (11.6+/-10.6 months), followed by Non-MD Researchers (14.65+/-7.72), and Medical Students (14.68+/-12.49). Residents had the longest average time (18.8 months). There was no difference in journal impact factor based on the presenter's level of training (p=0.25)

CONCLUSIONS: Over half of presented abstracts included in our 10-year representative sample were published. Trends highlight an increasing proportion of students and trainees presenting at PSTM. Medical students as primary presenters and US-academic affiliation increased the rate and speed of successful publication. This increase in medical student publication, with maintained quality of research based on similar journal impact factor to other presenters, highlights the growing demand for high-quality research at the student level.

Elucidating Patient-Specific Features Predictive of Opioid Use at Discharge in a Pediatric Plastic Surgery Population

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INTRODUCTION: Understanding key drivers of opioid use after surgery is crucial as opioid misuse continues to increase.1 Past studies have shown that opioid use in children has been linked to a 33% increase in opioid misuse in adulthood.2 Therefore, the present study aims to identify patient-specific features that are associated with post-operative opioid prescription at discharge in pediatric plastic surgery patients.

METHODS: Using patient data from a single pediatric plastic surgeon, demographic, clinical, intraoperative, and medication characteristics were collected for each patient < 18 years old at time of procedure who underwent pediatric surgery between January 2020 and November 2022. These characteristics included the Child Opportunity Index, language spoken, patient race, procedure type, sex, age at surgery, Body Mass Index (BMI), insurance type, length of stay, intraoperative time, surgical history, and opioid prescription in the inpatient setting. The outcome analyzed was active opioid prescription at hospital discharge. Patient-specific characteristics were inputted into a backwards-elimination logistic regression model to identify key patient features associated with opioid prescription at this time point. Sub-analyses were conducted for two groups: cleft palate/alveolar graft surgeries and cutaneous procedures.

RESULTS: A total of 516 patients were analyzed in the overall cohort (70 patients underwent a cleft palate procedure/alveolar graft and 212 patients underwent a cutaneous procedure). After adjusting for covariates in the overall cohort, opioid use in the inpatient setting (OR: 5.71, $p=0.009$), private insurance status (OR: 1.87, $p=0.018$), cleft palate/alveolar graft procedure (OR: 2.38, $p=0.015$), increased age (OR: 1.15, $p<0.001$), and greater intraoperative time (OR: 1.01, $p<0.001$) were significantly associated with higher odds of opioid use at discharge. Conversely, cutaneous procedures were associated with lower odds of opioid use at discharge (OR: 0.32, $p=0.003$). However, when analyzing sub-cohorts of cleft palate/alveolar bone graft patients and cutaneous procedure patients, there were no predictive characteristics identified with logistic regression.

CONCLUSION: Patient-specific characteristics, including increased age, intraoperative time, and cleft palate/alveolar bone graft procedure were identified as independent predictors of opioid use at discharge in this pediatric plastic surgery patient population. These findings highlight the critical importance of early identification of these risk factors during the surgical planning stage. Armed with this information, healthcare professionals can provide families with valuable education and counseling regarding opioid use, empowering them to make informed decisions about pain management after discharge.

REFERENCES:

1. Jalali MS, Botticelli M, Hwang RC, Koh HK, McHugh RK. The opioid crisis: a contextual, social-ecological framework. Health research policy and systems. 2020;18(1):87-87. doi:10.1186/s12961-020-00596-8
2. Meza BC, Swarup I, Woodard T, Cazzulino A, Talwar D, Shah AS. Refilling Opioid

Prescriptions After Pediatric Orthopaedic Surgery: An Analysis of Incidence and Risk Factors. Journal of pediatric orthopaedics. 2021;41(3):e291-e295. doi:10.1097/BPO.0000000000001736

An Evaluation of the Presence of Diversity, Equity, and Inclusion Information on Plastic Surgery Residency Program Websites

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PURPOSE: Increasing the diversity of plastic surgery trainees is an important step in providing better care for our increasingly diverse patient populations. However, many barriers exist in recruiting candidates who are underrepresented in medicine (URiM) to plastic surgery. Prior research suggests that URiM applicants place significant emphasis on institutional and program diversity when choosing residency programs. Given that information presented on residency programs' websites can strongly influence applicants' decisions to apply to or rank a program, demonstrating a commitment to diversity, equity, and inclusion (DEI) on program websites may aid in recruiting applicants with URiM backgrounds. Previous studies have evaluated the presence of DEI-related information on the program websites of surgical subspecialties. However, to our knowledge, no such studies have evaluated the presence of similar information on plastic surgery websites.

METHODS AND MATERIALS: Using eight DEI-related criteria, we evaluated the websites of 103 plastic surgery residency programs for the presence of DEI-related content during the month of June 2022. Programs were included for analysis if they were listed in the FREIDA AMA residency database. Each program was evaluated by two individual graders. We analyzed the data using confirmatory factor analysis in R, using the Lavaan package.

RESULTS: On average, programs fulfilled 2.1±1.6 of the metrics with a range of 0-7 fulfilled per program. Our model revealed that the criteria were a high quality ($p<0.0001$) measure of DEI-related metrics. Criterion 5, the presence of a diversity page or section (25%), was most achieved, followed by criterion 2, the presence of a diversity mission statement (22%), and criterion 4, mention of diversity initiatives (19%). Factor analysis demonstrated that criteria 1-5 were significant (1-5, loading between 0.41-0.92, all $p<0.01$), including the CFI of 0.89, RMSEA of 0.06 and SRMR of 0.07, with 90% CI [0.022, 0.096]. Criteria 7 and 8 were not significant and were fulfilled by only 5% and 6% of program websites, respectively. There is a significant association between program size and the presence of DEI-related criteria (linear 0.039;

quadratic -0.005; both $p<0.01$), such that mid-sized programs (16-18 residents) had the highest quality of DEI advertising compared to both small and large programs. Programs associated with USWN Top 20 Hospitals published significantly fewer DEI-related criteria on their residency websites than other programs ($p<0.0001$). Program region had no association with the presence of DEI-related criteria ($p=0.41$).

CONCLUSION: Mid-size programs had greater DEI quality on their websites, while smaller and larger programs similarly had poorer assessed quality. There is room for all programs to improve the presence of DEI-related material on their websites, especially related to care of transgender patients and populations.

Replacing The Scalpel with A Computer Mouse: An Evaluation Of Time Spent On EMR For Plastic Surgery Residents And Its Impact On Resident Training

Abstract Presenter
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BACKGROUND: Following the integration of the electronic medical record (EMR) into the healthcare system, concern has grown regarding EMR use on physician well-being. For surgical residents, time spent on the EMR increases the burden of a demanding, hourly-restricted schedule and detracts from time spent honing surgical skills.

OBJECTIVE: To characterize these burdens, we sought to describe EMR utilization patterns for plastic surgery residents.

METHODS: Integrated plastic surgery resident EMR utilization from March 2019 to March 2020 was extracted via Cerner Analytics at a tertiary academic medical center. Time spent in the EMR on-duty (0600-1759) and off-duty (1800-0559), including chart review, orders, documentation, and patient discovery, was analyzed. Statistical analysis was performed through independent T-tests and ANOVA.

RESULTS: Twelve plastic surgery residents spent an average of 94 ± 86 minutes/day on the EMR, one third of which was spent off-duty. Juniors (PGY 1-3) spent 123 ± 99 minutes/day versus seniors (PGY 4-6) who spent 61 ± 49 minutes/day (p-value < 0.01). Seniors spent 23% of time on the EMR off-duty, compared with 40% for juniors (p-value < 0.01). Chart review comprised the majority (42%) of EMR usage, followed by patient discovery (22%), orders (14%), documentation (12%), other (6%), and messaging (1%). Seniors spent more time on

patient discovery (25% versus 21%, p-value < 0.001), while juniors spent more time performing chart review (48% versus 36%, p-value = 0.19).

CONCLUSION: Integrated plastic surgery residents average 1.5 hours on the EMR daily. Junior residents spend one hour more per day on the EMR, including more time off-duty and more time performing chart review.

Utilization of ChatGPT for Plastic Surgery Research: Friend or Foe?

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BACKGROUND: On November 20, 2022, ChatGPT was made available to the general public free of charge. As a large language model (LLM), the software was able to process inquiries by users and generate text based on compiled datasets in a humanist manner. Due to the importance of research in the Plastic Surgery community, we set out to determine if ChatGPT could be utilized to produce novel systematic review ideas relevant to Plastic Surgery.

METHODS: ChatGPT was given commands to "give novel systematic review ideas" for 4 unique topics: cosmetic, craniofacial, microsurgery, and hand. For each topic, the open AI model was told to give 10 general systematic reviews and 10 systematic review topics focusing on 2 specific areas within that topic for a total of 80 systematic review topics. To assess for ChatGPT's accuracy to devise unpublished systematic review ideas, a literature search was conducted by the authors in PubMed, CINAHL, EMBASE, and Cochrane to account for general literature and the number of systematic review papers that had been published on each topic.

RESULTS: Overall, we determined that our study had a 61.3% accuracy rate in forming novel systematic review ideas. When stratified by general and specific topics within Plastic Surgery, we found that ChatGPT was 60% accurate for general topics and 62.5% accurate for specific topics. There were 8 topics (16.3%) of novel systematic review ideas that had no previously published literature. Taking into account the inability to write systematic reviews on those topics, our updated accuracy of ChatGPT was determined to be 58.6% (41/70). Overall, the majority of systematic review ideas that were derived from ChatGPT were novel.

CONCLUSION: Particularly in Plastic Surgery, ChatGPT can be used in research and development to analyze large amounts of medical data, identify trends, and provide insights into best practices in plastic surgery. Our study demonstrates that the software can reliably come up

with novel systematic review ideas to help providers institute evidence-based research into their practices. Plastic Surgery is a field that relies heavily on research to improve the care of patients and utilizing technology to our advantage may be a method to optimize patient outcomes.

Persistence Of Racial Disparities Amongst Plastic Surgeons: What Are We Missing?

Abstract Presenter
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BACKGROUND: Recent studies have shown a declining percentage of Underrepresented Racial Minority (URM) plastic surgery residents despite the rising number of URM medical students. This study aims to identify reasons behind the persistence and exacerbation of this disparity despite awareness of the barriers and efforts made toward diversity and inclusion.

METHODS: Results from a systematic literature search of the PubMed/MEDLINE, ASPS publications, and Embase databases were uploaded to Ryyan and reviewed for inclusion by two independent reviewers in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines.

RESULTS: 18 articles and one database report published between May 1996 and May 2022 were reviewed and analyzed, identifying implicit bias in scores, evaluations, and mentorship disproportionately affecting minority medical students. 58% of these studies were published between 2020 and 2022. Of the studies included, 37% examined diversity trends of medical students/applicants, 47% analyzed diversity amongst residents and faculty, and 72% argued the necessity for diversity in healthcare. Every included article addressed race and ethnicity.

CONCLUSION: Despite identifying several barriers and efforts made towards alleviating them, the exacerbating lack of racial diversity amongst plastic surgery residents proves that there is a hole in studies around barriers preventing URM medical students from joining plastic surgery programs. Many reports focus on obstacles URM medical students face within the medical education system and fail to account for the disadvantages of being a racial minority individual as it pertains to life outside medical education. Overlooked psycho-socio-economic barriers marginally faced by URM students may reveal additional obligations and challenges outside of medicine that impact their interest and ability to pursue competitive specialties. Therefore, we have developed a survey targeting medical students nationwide to identify these overlooked barriers.

Organoids for Idealistic Reconstruction: A Systematic Review on Advancing the Scope of 3D Modeling in Plastic and Reconstructive Surgery

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BACKGROUND: Organoids are best characterized as three-dimensional, scalable representations of in-vivo structures in which the morphological and molecular features of the tissue are preserved ex-vivo at the cellular level. Incorporating these constructs in studies of pathophysiological abnormalities has led to enhanced disease modeling in translational research and improvements in cell-based therapies in plastic and reconstructive surgery. Additionally, organoids have served as a valuable asset for assessing mechanical aspects of regeneration derived from in-vivo observation, as well as the signaling pathways that mediate lineage-dependent differentiation and collective cellular plasticity. This systematic review seeks to highlight key developments in the generation and application of organoids that, in the future, may pave a way forward for enhancing patient treatment and care in plastic surgery.

METHODS: This review was carried out in accordance with PRISMA guidelines and included 3 databases: PubMed (NLM), Embase (Elsevier), and Web of Science Core Collection (Clarivate). Terms queried in these databases consisted of organoids, organoid constructs, and organoid models combined with plastic surgery, cosmetic surgery, aesthetic surgery, and reconstructive surgery to explicitly gauge relevant applications of organoids within the specialty. All database searches were completed on February 17th, 2023. Two reviewers simultaneously screened full articles for inclusion and exclusion factors. Articles were excluded if they (1) solely mentioned organoids from the standpoint of experimental research in fields other than plastic and reconstructive surgery, (2) did not discuss models for the purpose of regenerative research or development of regenerative models, and (3) did not mention the term organoid at all. Studies were included if they (1) alluded to organoid models as an intermediate or end product in studies related to aesthetic, cosmetic, reconstructive, or plastic surgery, (2) incorporated organoid models in translational and basic science research in Departments of Plastic Surgery, or (3) concentrated on organoid models in the last 10 years in relation to regenerative medicine and the development of research- and transplant- grade synthetic human or animal structures.

RESULTS: A total of 36 studies met inclusion criteria, 35 of which were published within the last 5 years, and 15 of which were published in the last 12 months. Of significance, 11 articles pursued studies involving mammary organoid models. At the cellular level, such models primarily examined cellular differentiation, aging, senescence, immortalization, tumorigenesis, and disease heterogeneity. At the molecular level, these studies documented breast cancer risk factors, generalized gene expression, protumorigenic modifications as a result of exogenous exposures, alternative splicing mechanisms in gene mutations, endogenous gene induction,

influence of lipid or fibroblast co-culture, estrogen and androgen receptor-positive modeling, drug screening with corresponding clinical response, and ductal elongation remodeling.

CONCLUSIONS: Organoids epitomize a novel approach for investigating the cell-cell and cell-matrix interactions in plastic and reconstructive surgery research. Characterizing how these constructs are used elucidates areas where these tools have been and can be most impactful. Ultimately, the accelerated usage of organoid models over time demonstrates significant purpose in goals related to enhancing regenerative medicine and bio-technical approaches in plastic, cosmetic, aesthetic, and reconstructive surgery.

Effects of Negative Pressure Wound Therapy on Lymphangiogenesis: A Systematic Review and Proposed Mathematical Model

Abstract Presenter
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BACKGROUND: Negative pressure wound therapy (NPWT) has been shown to improve wound healing via macro- and micro-deformational forces, altered wound microenvironment, and modulated local fluid balance in part via enhanced lymphatic function. This systematic review captures basic science findings, clinical outcomes, physiologic studies, and mathematical models describing the effects of NPWT on lymphangiogenesis and lymphatic regeneration.

METHODS: This systematic review was conducted per PRISMA guidelines. PUBMED, OVID, and Web of Science were searched. All studies published before March 2023 were assessed for eligibility. Inclusion criteria were prospective or retrospective studies in English that reported novel basic science or clinical data, physiologic mechanisms, or computational and mathematical theorems on the effects of NPWT and altered pressure systems on lymphatics. Reviews, opinions, case reports, and zoologic studies were excluded.

RESULTS: 29 studies met inclusion criteria. All manuscripts were published between 1989 and 2023. The distribution of study types was basic science (n=7), clinical (n=12), physiologic (n=6), and computational or mathematical models (n=4).

From a basic science standpoint, histological analysis of animal and human tissue samples after NPWT using lymphatic markers D2-40 podoplanin stain and LYVE-1 have demonstrated morphologic improvement in lymphatic vessels including increased vessel diameter, open lumens, and orientation of regeneration in the direction of subatmospheric pressure. On longer timescales, NPWT was shown to increase lymphatic vessel counts and density, though effect modulated by patient comorbidities. Microdeformational forces are suggested to compress lymphatic capillaries at the wound-sponge interface, decreasing lymph fluid exudation and potentially explaining observed increased intraluminal B-cell concentrations with decreased

macrophage penetrance into surrounding tissue.

Clinically, incisional wound vacuums (VAC) under continuous suction -80 to -125mmHg were most frequently used (incisional VAC n=7; traditional VAC n=2; external negative pressure therapy (NPT) n=3). Positive clinical outcomes included effective prophylaxis against lymphedema and lymphorrhagia after inguinal lymph node dissection and lower extremity vein harvest for vascular intervention, as well as managing such complications. NPT was used for lymphedema treatment and orthopedic perioperative edema management.

From a physiologic standpoint, interstitial edema, central venous pressure (CVP), and contraction of collecting lymphatics against one-way valves modulate lymph flow. NPWT primarily affects initial lymphatics and interstitial pressure; this contrasts with NPT reduction of CVP and increased lymph flow into the venous system. Existing computational models modify Starling's equation with novel parameters for lymphatic resistance, tissue compliance, vessel permeability, and colloid transport via lymph. However, the clinical utility of these models is limited by assumptions necessary to generate a cohesive system.

CONCLUSION: The positive effects of NPWT on lymphatic function and regeneration are supported by basic science and clinical literature, with explanatory mechanisms presented in physiological studies and computational models. We propose a clinically relevant mathematical model to synthesize cell signalling pathways, mechanotransduction, and fluid dynamic principles to elucidate lymphangiogenesis and improved wound healing to inform clinical use of NPWT.

Interventional Clinical Trials Trends Within Plastic Surgery

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PURPOSE: Clinical trial research in plastic surgery is growing but to a lesser degree than in medical specialities and certain other surgical specialties. Within plastic surgery and the major subspecialties, the amount of research varies. This study aimed to establish the current state of plastic surgery research globally by analyzing recent trends in clinical trial research.

METHODS: The ClinicalTrials.gov database was used to collect data on registered trials including study status, country, sponsor, study phase, and primary purpose. The following search

terms were used: "plastic surgery", "craniofacial surgery", "hand surgery", "microsurgery", "aesthetic plastic surgery", "aesthetic breast surgery", and "breast reconstruction". Descriptive statistics were performed, and Chi-square tests using adjusted residuals were conducted to compare trial characteristics between subspecialties.

RESULTS: There were 257 registered trials found for "plastic surgery". Top three countries included the US (142), Canada (13), and France (10). Academic institutions/hospitals sponsored 51% of trials while industry sponsored 36%. Primary purposes included 79% for treatment, 10% for prevention, and 4% for supportive care. Distribution of study phases included 27% for phase 2 and 4 each and 22% for phase 3. Among the subspecialties, there were significant differences for the trial sponsor type ($p = .002$), study purpose ($p = .002$), and study phase ($p = .001$). For sponsor type, "microsurgery" trials were significantly more likely to be funded by industry (33% of those funded by industry) and less likely to be funded by academic institutions and hospitals (7% of those funded by institutions/hospitals). "Hand surgery" trials were significantly more likely to be funded by institutions/hospitals (61%) and less likely to be funded by industry (31%). "Craniofacial surgery" studies were significantly more likely to be funded by foundations/societies (34% of those funded by foundations/societies) and less likely to be funded by institutions/hospitals (5%). "Aesthetic plastic surgery" trials were significantly more likely to be funded by industry (15%) and less likely to be funded by institutions/hospitals (2%). For study purpose, "breast reconstruction" trials were significantly more likely to be supportive care trials (47%) and less likely to be treatment trials (18%). For study phase, "microsurgery" trials were significantly more likely to be phase 3 studies (22%). "Hand surgery" trials were significantly more likely to be phase 4 studies (62%) and less likely to be phase 2 (46%) and phase 3 (46%).

CONCLUSION: Plastic surgery research has grown over the years, but inconsistently across subspecialties. It will become increasingly important to recognize research needs and potential sources of funding for such research. This is a first step to better understand the current state of research around the world and to facilitate identification of areas requiring further development.

Evaluating an Original, QR-Code Based Surgical Guidance Tool: The Next Step in Mixed-Reality Based Virtual Surgical Planning

Abstract Presenter
Brian Yuen

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pushpak patel

BACKGROUND: Mixed Reality Head Mounted Displays (MR-HMDs) can superimpose virtual elements like digital models of patient anatomy (skulls, muscles, organs) onto the real world, allowing users to visualize and interact with them similarly to physical objects. This technology

presents an exciting path forward for surgical planning; Superimposing surgical guides and medical imaging directly on patients enriches surgical procedures, and previous studies by our team have shown that the use of 3D modelling for craniofacial reconstructive surgery is both cost-effective and time-efficient. With these benefits in mind, we developed a novel MR program for the Microsoft HoloLens 2 which can accurately position digital models and potentially any virtual element in real space using non-proprietary QR codes. This approach is unique even among current industry-leading MR surgical tools, and we believe that playing to the strengths of MR while also being clinically useful through high accuracy will pave the next step in the expansion of MR in surgery.

OBJECTIVE: We aim to evaluate the utility of our in-house developed Mixed Reality HoloLens 2 program for use in virtual surgical planning.

METHODS: Currently, our program works by reading a QR code and then placing a virtual element a certain distance from a scanned QR code. The virtual element can be any 3D object, and the distance is determined by integrating user-defined parameters and a formula that we developed which converts the HoloLens's QR positioning data into a real-life position. To test the utility of our project, we created a virtual model of a patient's skull with 8 "landmark points" on the face of the skull. We then used our program to superimpose the virtual model on an anatomically accurate 3D-printed version of the patient's skull using a QR code placed near the anterior fontanelle as a reference point. The position of QR code reference point is adjustable and can be modified to fit the procedure with simple adjustments. With the virtual model superimposed, the physical markings on the skull were made on top of the landmark points. The distances between the physical markings and the landmark points were measured with calipers twice.

RESULTS: Overall, the average distance between the points drawn on the physical skull and the landmark points was 1.95mm (SD 2.56mm). The first measurements had a mean difference of 1.95mm (SD 2.65mm) and the second attempt had a mean of 1.84mm (SD 2.39mm). The average discrepancy between attempt measurements were only 0.63mm.

CONCLUSION: The high difference and variance between the "ideal" positions indicated by the landmark points and the drawn-on points indicates the need for further adjustments before this program can be used as a surgical guidance tool. Since most of the points deviated in a similar direction (as indicated by the low discrepancy between measurements), an ideal fix could be simply adding a linear transformation into the formula. This, when combined with the overall benefits and flexibility of using QR codes, demonstrates that this guidance tool still has a high degree of utility for virtual surgical planning.

Longitudinal Characterization of Deep Polymicrobial Biofilm Penetration And Antimicrobial Resistance In A Novel Chronic Diabetic Wound Model

Abstract Presenter

Alexandra Vagonis

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BACKGROUND: A long-standing challenge of utilizing murine models of infected recalcitrant wounds is lack of a penetrating polymicrobial, antimicrobial resistant, biofilm infection within the deep wound bed that recapitulates clinical pathogenic phenotypes of chronic wounds. In mice, acute wounds inoculated with planktonic or pre-formed biofilms have insufficient maturation time due to inherent differences in native wound healing mechanisms, whereby mice heal through rapid contracture, and the bulk of bacterial contamination remains in the eschar rather than directly growing on wound surface. We hypothesize that this limitation can be overcome by surgically eradicating re-epithelialization with wound edge inversion prior to biofilm grafting to allow granulation tissue synthesis and biofilm maturation to occur simultaneously and unimpeded. In this study, we will report the reproducibility of robust, polymicrobial biofilm persistence in deep granulation tissue of a diabetic wound mouse model and test resistance to oral antibiotics.

In a previous study, we showed that wound edge inversion, mimicking an epibole structure, significantly inhibited re-epithelialization, increased wound inflammation and delayed wound closure for 7 weeks compared to controls. We conducted a pilot study in which preformed biofilms were grafted directly onto 7-day old wounds and determined that 44% of wounds remained open and infected for 14-days, with two wounds maintaining infection for 6-weeks. To generate biofilms, monocultures of P.aeruginosa, P.mirabilis, E.coli, S.Aureus, and E.faecalis were combined in a 1:1 ratio and cultured using the "Lubbock" method. The culture timeframe for which species representation in the biofilms remained relevant was verified over 21 days utilizing CHROMagar Orientation plates and CFU counting. In this study, 25 severely diabetic female C57BLKS/J-(BKS.Cg-Dock7m+/+Leprdb/J)-000642 mice received bilateral edge inverted wounds which were inoculated after 7-days with polymicrobial biofilms. To determine biofilm penetration depth, wounds were sharply debrided weekly for 10 weeks post-inoculation, with specimens collected for PCR. Immediately following debridement, wounds were blotted and stained with Alcian blue to detect microbial presence. Following three weeks of positive Alcian blue staining, one group of 5 mice received oral ciprofloxacin, vancomycin, and metronidazole. Impact of antibiotic administration on biofilm presence, wound architecture, and overall survival was assessed. Finally, cohorts were sacrificed biweekly for wound bed histology.

RESULTS: The current pilot study is underway and results from wound bed RNA analysis, biofilm persistence over time, culture swab characterization of biofilm components, histological analysis, and impact of antibiotic administration are pending .

CONCLUSIONS: Over 90% of chronic wounds contain bacterial biofilms and adequate therapeutics that are safe, cost effective and robust remain an urgent clinical need. To study biofilm effects on wound healing and test treatment modalities, mouse models of infected wounds have been developed since the late 1990's and have utilized both mono- and polymicrobial planktonic inoculations as well as grafted pre-formed polymicrobial biofilms but which lack clinically relevant biofilm distribution on chronic wounds. In this study, we have longitudinally characterized biofilm maturation and penetration into granulation tissue of a chronic diabetic wound. This new model will be invaluable for assessing therapeutics targeting contamination of the base and perimeter of the recalcitrant diabetic wounds.

Assessing the Capabilities of GPT-3 in Generating Abstracts for Medical Research: A Comparison with Human Authorship

Abstract Presenter
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PURPOSE: The field of Artificial Intelligence (AI) has been defined as the development of machines capable of solving problems and achieving goals in an ever-changing and unpredictable environment. AI involves automating complex algorithms that rely heavily on statistics, allowing computers to perform calculations and modeling that would be too complicated and time-consuming for humans to do. In recent years, there has been a significant increase in investments in AI in healthcare applications, such as diagnosing patients, researching pharmaceuticals, facilitating communication, and tracking and monitoring patient progress. Open AI has launched its GPT-3 models, which can generate and understand natural language, and use AI to create written texts mimicking that of humans. The present study aims to assess the capability of GPT-3 to generate an abstract from a baseline article and compare it to the original abstract, hypothesizing that current AI technology is capable of equal or superior abstract writing compared to human authorship.

METHODS: We searched the database of a leading plastic surgery journal for the latest articles on lymphedema and selected an article published between November 2022 and January 2023. We then used OpenAI's GPT-3 model to generate an abstract for the selected article, instructing the AI to match the number of words in the original abstract. Ten reviewers with M.D. or Ph.D. degrees were asked to evaluate both the original abstract and the AI-generated abstract blinded

from abstract authorship. An Independent Student's T test was performed to determine statistical difference in the scores given to the two abstracts.

RESULTS: Abstract #1 was written by human authors, while abstract #2 was written by AI. Four out of the five reviewers incorrectly identified abstract #1 as being written by AI, resulting in the lowest scores on our grading scale. Although abstract #2 received higher scores in both total score and individual question score, the difference was not statistically significant (p=0.2).

CONCLUSION: Our results suggest that the AI-generated abstract was preferred by reviewers and received higher scores, despite being incorrectly identified as the human-authored abstract by some reviewers. The results of our study also support and confirm our initial hypothesis that AI tools, such as GPT-3, can be beneficial for abstract writing and may even be superior to human authorship when used appropriately. The use of AI technology in medical research is expected to grow, and future studies should explore the potential of AI in this area.

CXCL1 and IL8 Promote the Migration of ADSCs, Fibroblasts and Fibrosarcoma Cells: Exploring cytokine-based wound healing therapy

Abstract Presenter
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BACKGROUND: Adipose-derived stem cells (ADSCs) have been widely used in the management of wounds because of their ability to release a variety of cytokines. Owing to their superior migratory ability, ADSCs are rapidly recruited into wounded sites, where they possibly undergo differentiation towards dermal fibroblasts, endothelial cells, and keratinocytes. However, the molecular mechanisms of the paracrine effect, including the types of cytokines released from ADSCs, are largely unknown. We previously reported that basic fibroblast growth factor (b-FGF) enhances the proliferative potential of ADSCs, and we identified an increased release of CXCL1 and IL-8 at 4 hours after stimulation of ADSC with b-FGF, and found that these cytokines promoted angiogenesis and lymphangiogenesis.1 In this study, we investigated the effects of CXCL1 and IL8 on the migratory ability of fibroblasts, fibrosarcoma cells, and ADSC cells.

METHODS: HT1080 (fibrosarcoma), TIG114, and ADSCs obtained from a 45-year-old African American male were seeded onto 48-well dishes in DMEM containing 10% FBS and cultured until they reached confluence. After scratch, HT1080, TIG114, and ADSC cells were incubated in DMEM containing 2% and 1% FBS, respectively, in the presence or absence of 10 ng/ml

human CXCL-1 or IL-8 for 6 hours. Images of each well were taken before and after incubation, and the area of the scratch was measured to calculate the reduction in the scratched area after 6 hours. Initially, the entire well was first photographed and recorded with a fluorescence microscope BZ-X800, and then a 350 x 350-pixel square area at the center of the image was measured using ImageJ software. Cell migration rate (%) was calculated by dividing the difference between scratch area (pixels) before and after 6-hour incubation by 350 x 350 pixels.

RESULTS: The cell migration rate of TIG114 cells without supplemental cytokines was 3.499% after a 6-hour incubation. This rate was significantly increased in the presence of CXCL-1 (8.830%, P=0.001) and IL-8 (9.304%, P=0.007). The cell migration rate of HT1080 cells without supplemental cytokines was 14.714%, which was significantly increased in the presence of CXCL-1 (20.115%, P=0.001) and IL-8 (19.934%, P=0.002). The cell migration rate of ADSCs without supplemental cytokines was 5.779%, which was significantly increased in the presence of CXCL-1 (15.325%, P<0.001) and IL-8 (16.044%, P<0.001).

CONCLUSION: In this study, by scratch assay analysis, we demonstrated that CXCL-1 and IL-8 can promote the migration of fibroblasts and ADSCs, which is required for wound healing. The scratch assay also demonstrated that CXCL-1 and IL-8 promote the migration ability of fibrosarcoma cells. Our results suggest that CXCL-1 and IL-8 secreted by ADSCs may be involved in the ADSC-promoted migration of cancer cells. Therefore, it is necessary to bear in mind the role of mesenchymal cells during fat grafting after excision of adipo-cutaneous or glandular neoplastic processes.

REFEREMCE

1. Matsui C, Koide H, Ikeda T, et al. Cytokines Released from Human Adipose-tissue–Derived Stem Cells By b-FGF Stimulation: Effects on Angiogenesis and Lymphatic Vessels Formation By IL-8 and CXCL1. Plast Reconstr Surg Glob Open. 2021;20;9(10Suppl):124-125.

PrevenaTM Negative Pressure Therapy Device Increases Blood Flow in a Live Porcine Model of Skin Perfusion

Abstract Presenter
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PURPOSE: Studies have demonstrated that negative pressure wound therapy (NPWT) reduces hematoma and seroma formation and improves healing compared to a standard wound dressing. However, the specific mechanisms of action by which NPWTs improve healing remain unclear.

We have developed a multimodal implantable biosensor which is capable of measuring cutaneous blood flow velocity, tissue oxygenation, and pressure. In this work, we utilize this novel tool to evaluate the effect of PrevenaTM NPWT on local tissue oxygenation (StO2), cutaneous blood flow, and pressure.

METHODS: We present a flexible, wireless, Bluetooth-enabled, percutaneously introducible subcutaneous multimodal device that directly and continuously measures StO2, blood flow velocity, and pressure within the target tissue. The multimodal device uses near-infrared technology to quantify tissue O2 saturation and precision thermal conductivity to quantify blood flow. A high sensitivity pressure sensor is also included. PrevenaTM therapy was placed on intact swine skin which had been implanted with a multimodal device which had previously been introduces into the subcutaneous plane. Four cycles of 15-min PrevenaTM on, 15-min PrevenaTM off were completed followed by one cycle of 60-min PrevenaTM on, 30-min PrevenaTM off.

RESULTS: The multimodal device recorded blood flow changes that correlated with negative pressure. When the PrevenaTM therapy was turned on, local blood flow rate increased and when the therapy was turned off, blood flow rate decreased. The multimodal device recorded negligible variation in StO2 and pressure values when the PrevenaTM was turned on.

CONCLUSIONS: This novel intramuscular multimodal device identifies increased local tissue blood flow, without changes in pressure or StO2, in the presence of NPWT. This porcine study provides initial evidence that PrevenaTM increases blood flow within the tissue that underlies the sponge. This offers some support for our clinical practice which includes the use of PrevenaTM for support of high risk and ischemic wounds. Future studies will include utilizing the multimodal device in both non-survival and survival excisional wound models with NPWT.

Clinical, Functional, and Sensorial Outcomes of the Agonist-Antagonist Myoneural Interface (AMI) Ewing Amputation

Abstract Presenter
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BACKGROUND: The Ewing Amputation is a modified approach to below-knee amputation (BKA) that incorporates the construction of Agonist-Antagonist Myoneural Interfaces (AMI) at the time of limb amputation. The AMI is a surgical construct in which naturally opposed,

neurotized muscles are biomechanically linked in order to recreate the neural feedback loops present in intact human joints. We here present the long-term clinical outcomes amongst our lower extremity AMI amputee cohort and demonstrate a mitigation of phantom and residual limb pain, preservation of residual limb volume, and functional excursion of AMI constructs across the post-operative period.

METHODS: We performed 36 Ewing procedures in a cohort of patients at Brigham & Women's Hospital (BWH) and Brigham and Women's Faulkner Hospital (BWFH) between July 2016 – March 2022. Outcomes were assessed prospectively over time and were clinical (demographics, surgical variations, complications), functional (construct excursion, prosthetic usage), and sensorial (residual limb pain, phantom pain, proprioception) in nature.

RESULTS: Thirty-Six (36) Ewing patients were included in this study; 17 left (47.20%), 15 right (41.70%), and 4 bilateral (11.10%) for a total of 40 limbs. Patients were split between male (20, 55.60%) and female (16, 44.40%). Mean age at index amputation was 40.19 ± 11.11 years. Mean residual limb volume preservation at 12-months was 97.58% ± 4.13% of the preoperative state. Average construct excursion evidenced by ultrasound at 12-months post-operatively was 4.31mm ± 2.18mm, with strain relationships paralleling those of normal muscle dynamics. 72.20% (n=18) of patients reported no residual limb pain, 77.80% (n=18) reported no phantom limb pain, and 100.00% (n=15) reported anatomically correct phantom limb sensation at 12-months post-operatively.

CONCLUSION: The Ewing amputation presents as a promising surgical intervention that can mitigate phantom and residual limb pain, preserve proprioception, and preserve residual limb volume.

Fasciocutaneous Free Flap Transfer in a Novel Ovine Model: Translational Model for the Future of Microsurgery

Abstract Presenter
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BACKGROUND: Free tissue transfer stands at the apex of the reconstructive ladder, however, despite decades of surgical innovation, free flaps remain limited by physiologic need for rapid and sustained reperfusion to maintain viability. This need can cause a particular limitation in cases of prolonged ischemia periods and restricted availability of recipient vessels. To overcome this limitation, paradigm shifts towards device-assisted and/or ex vivo perfusion supported flap technology are necessary to expand capabilities of free flap surgery. However, in developing these technologies, there is a need for a replicable, docile, and anatomically relevant large-animal model from which we could easily assess and modify free tissue transfer with external analytic and/or treatment devices. Here we aim to describe the novel ovine model of fasciocutaneous free flap transfer, which we have developed for this purpose.

METHODS: Female Suffolk sheep cadavers weighing 50-65 kg were studied to identify a saphenous system-based fasciocutaneous free flap model. Anatomical measurements and photography were performed to standardize flap harvest and feasibility of cadaveric flap perfusion was assessed via ex vivo fluorescein angiography. Following flap identification, the autologous microsurgical transfer of the flap to the neck was performed in a female Hampshire sheep weighing 65 kg. The sheep was followed for 2 weeks with daily photography. Extracellular tissue lactate and glucose levels were characterized during the transfer and weekly with a custom microdialysis probe placed in the flap tissue. Doppler ultrasonography was performed weekly to assess pedicle viability. Fluorescein angiography was used to assess flap viability at the initial surgery as well as the endpoint. Tissues were collected for histology at the endpoint.

RESULTS: Saphenous vessels branching off the femoral system were identified to have up to 2.5 mm vein and 2.0 mm artery diameter, with the total pedicle length reaching up to 6 cm. The cadaveric flap tissue demonstrated feasible inflow and outflow with fluorescein angiography. Upon autologous transfer, the transferred flap of 9x6 cm provided complete coverage of the neck defect and demonstrated viability for the entire duration of the experiment. Viability of the free flap was confirmed with doppler ultrasonography and fluorescein angiography. The donor site was covered with a skin graft from the neck with bolster placement.

CONCLUSION: We identified a novel model of free flap transfer to serve as a testbed for clinically translatable approaches to improve outcomes in reconstructive microsurgery. Ovine docility, relative to other quadrupeds, improves daily flap accessibility and supports survival. These initial studies serve to set the foundation for the use of complex extracorporeal membrane oxygenation (ECMO)-like devices for enhancing uses of the free flaps.

Utilization of Patient Reported Outcome Measures in Plastic Surgery Clinical Trials: A Systematic Review

Abstract Presenter
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BACKGROUND: Over time, patient-reported outcomes (PROs) have progressed from rudimentary surveys to validated questionnaires that gauge health-related quality of life. These measures hold great significance in clinical trials, as they empower patients to relay their experiences and enable clinicians to ascertain the efficacy of treatments from a patient-centric viewpoint. The objective of this systematic review was to evaluate the prevalence of PROs in plastic and reconstructive surgery (PRS) clinical trials (CTs) conducted in the United States and determine the proportion of studies that utilize validated instruments.

METHODS: A comprehensive systematic review of several databases was performed. The search strategy was designed and conducted by an experienced librarian using controlled vocabulary with keywords. Inclusion criteria encompassed all clinical trials in PRS from 2012 to 2022. A two-stage screening process was conducted to identify CTs then assess for the use of PROs. Summary Statistics were calculated based on underlying variable distribution and a subgroup analysis was then performed using Fisher Excact testing.

RESULTS: A total of 3,609 studies were identified in an initial search with 154 later determined to be CTs in PRS. Overall, 80 studies (52%) used PROs and were included in the analysis. A total of 13,190 participants were present in the included studies with 95% (12,229) females. Moreover, 37 (46%) of the CTs were in the field of reconstruction, while 25 (31%) were cosmetic. Further, 35% of the CTs reported pain as the primary outcome, followed by 24% assessing patient's satisfaction. However, only 61% of the 80 included CTs had a validated PRO as the primary outcome of the study. Visual Analog Scale (VAS) (19%) was the most frequently used validated questionnaire, followed by Breast-Q (15%). Regarding funding, 34% (27) of the CTs were funded by a private institution while 49% (39) did not report any type of funding. A trend analysis did not show a statistically significant increase in the use of validated PROs in CTs between 2012 and 2022.

CONCLUSIONS: The use of PROs is very relevant for healthcare delivery and improvement as they provide insight into the efficacy of treatments from a patient-centric viewpoint. PROs are reported in just over half of PRS CTs, and within those CTs, the use of validated questionnaires is inconsistent. Therefore, emerging clinical trials should strive to incorporate PROs measures and utilize the existing validated tools to assess novel interventions and ensure that the data reported is objectified.

Local Addition of Bupivacaine/Meloxicam Extended-Release Solution in Panniculectomy: A Prospective Comparative Study on Postoperative Opioid Usage

Abstract Presenter
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BACKGROUND: 91% of aesthetic plastic surgeons tend to prescribe opioids for postoperative pain after abdominoplasty.[1] We aimed to compare the postoperative opioid usage with the local addition of Bupivacaine (29.25mg/ml)/Meloxicam (0.88mg/ml)(ZynrelefTM, Heron Therapeutics, (Z)) to the current multimodal regimen after a panniculectomy.

METHODS: With informed consent, 34 patients scheduled for panniculectomy were divided into the Z group(n=17) and the Non-Z group(n=17). Both groups had the same intraoperative anesthesia. At the end of panniculectomy, both groups received 1% lidocaine with epinephrine. Z-group received an additional 14ml of ZynrelefTM at the panniculectomy site. ZynrelefTM was applied over the fascia using an applicator and a subcutaneous fat flap was created from the cephalad incision to separate it from skin closure. All the patients were discharged on oral acetaminophen. Opioids were prescribed based on pain control at discharge. Demographics, analgesic use, operative time (minutes), and duration of hospital stay (days) were recorded. Outcomes included hourly postoperative pain scores using a Visual Analog Scale, in-hospital opioid use in oral morphine equivalents (OME), and post-discharge opioid prescriptions. This study did not involve any off-label use of the medication.

RESULTS: Mean age (45.5±9.8 vs. 47.3±10.8 years), BMI (26.3±1.8 vs. 25.3±2.37 kg/m2), and operative time (254.2±80.9 vs. 219.4±83.6 minutes) ($p>0.05$) were similar in Z and Non-Z groups respectively. History of opioid use was present in 11.8% and 23.5% of the patients in the Z and Non-Z groups ($p>0.05$), respectively. 35.3% and 41.1% underwent brachioplasty, thighplasty, or incisional ventral hernia repair with panniculectomy in Z and Non-Z groups. Z compared to the Non-Z group had a shorter hospital stay (0.17±0.39 vs. 0.88±0.48 days, $p=0.0002$) and fewer overnight stays (17.7% vs. 82.3%, $p=0.0004$). Z group had a lower mean OME on postoperative day#1 (0.005±0.002 vs. 2.071±4.7, $p=0.03$) and post-discharge opioid prescriptions (0% vs. 35.3%, $p=0.02$). All Z-group postoperative pain scores were lower but not statistically significant. There were no side effects with the use of ZynrelefTM.

CONCLUSIONS: Adding ZynrelefTM decreases hospital stay and opioid usage after a panniculectomy. The local inflammation contributes to an acidified environment which hinders the ability of the local anesthetic to remain active.[2] The lower opioid usage observed could be attributed to the addition of meloxicam to decrease the local inflammation, which potentiates better and longer action of bupivacaine on the panniculectomy site.

REFERENCES:
[1] Sherif RD, Lisiecki J, Waljee J, Gilman RH. Opioid Prescribing Habits and Pain Management Among Aesthetic Plastic Surgeons. Aesthetic Plast Surg. 2022;46(2):965-971.
[2] Ottoboni T, Quart B, Pawasauskas J, Dasta JF, Pollak RA, Viscusi ER. Mechanism of action of HTX-011: a novel, extended-release, dual-acting local anesthetic formulation for postoperative pain [published online ahead of print, 2019 Dec 16]. Reg Anesth Pain Med. 2019;rapm-2019-100714.

Mechanical Stimulation Improves Functional Recovery After Skeletal Muscle Injury in Rats

Abstract Presenter
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PURPOSE: Skeletal muscle injury (SMI) caused by trauma or surgery can result in permanent disability and loss of function. Physical therapy is the current standard of care for SMI, but long-term recovery of muscle strength has shown to be inadequate in severe SMI. Initial evidence suggests that in animals' invasive mechanical stimulation can increase up to 3-fold the tetanic torque after SMI. Here, we hypothesize that mechanical stimulation can improve functional recovery after SMI by stimulating skeletal muscle regeneration and by mitigating fibrosis.

METHODS: A standard excisional muscle injury (8mm ∅) was created in the left Tibialis Anterior (TA) muscle of female adult (200-250 grams) Sprague Dawley rats (n= 10/group). Post-injury, animals were either followed up with no treatment (control group) or subjected to controlled mechanical stimulation of injured muscles (experimental group). Functional recovery was measured at 14 and 28 days post-injury (PID) by measuring the TA tetanic torque and the animals' endurance on a treadmill run. In addition, as a measure of not challenging physical activity, the distance traveled was measured by fixed-point observation using a camera. At PID 28, samples of injured TAs were processed for histology (Masson) and immunohistochemistry (CD31 marker for angiogenesis) to measure myocyte/fibrosis percentage composition.

RESULTS: At PID 28, the tetanic torque in the experimental group was significantly higher than in controls (73.1±18.7% of pre-injury baseline vs. 47.0±23.7%, p=0.014).
The resistance to fatigue in the experimental group was significantly higher than in controls (88.7±24.9% of pre-injury baseline vs. 56.6±27.5%, p=0.014).
Endurance on a treadmill run was also significantly higher in the experimental group compared

to controls (97.8±58.5% of pre-injury baseline vs. 40.6±35.4%; P=0.016) at PID 28. Histological analysis of the TA muscle showed a smaller percentage of fibrosis with increased CD31 immunohistochemical staining.

CONCLUSION: In rats, mechanical stimulation promotes improvement in functional recovery after skeletal muscle injury. Validation of these findings in large animal models and in humans might help develop novel treatments for patients with muscle injuries caused by trauma or surgery.

Establishment of a Novel Explant Human Fasciocutaneous Flap Model to Understand the Mechanism of Radiation-Induced Skin Fibrosis

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INTRODUCTION: Radiation-induced skin fibrosis is one of the main adverse effects of radiation therapy for cancer treatment. Radiation fibrosis syndrome is caused by the overactivation of TGF-B that promotes fibroblast that induces collagenases and breaks down type III collagen and replaces it with type I collagen. The inhibition of P53 and the accumulation of ROS are the main mechanisms of radiation-induced damage. To fully understand these mechanisms, we tested the use of our novel human skin perfusion model to recreate the damage caused by radiation and as a platform to test possible therapeutic and/or prophylactic treatments to prevent fibrosis.

METHODS: We use our perfusion model, which consists of a human tissue sample recovered from abdominoplasty. We dissect the superficial inferior epigastric artery and cannulated it and perfuse it with special culture media. On the first day after cannulation, we exposed the skin to a single targeted irradiation dose of 20gy and 40gy and took punch biopsies on days 3, 6, 12, and 16 for histological and gene expression analyses. The histological samples were stained with H&E, and Masson´s Trichrome stain to determine the morphology changes and extracellular matrix deposition respectively. TUNEL and DAPI immunofluorescent staining was performed to

analyze for apoptotic changes in the epidermis/dermis. Expression of inflammatory, fibrotic and apoptotic genes was analyzed by real-time quantitative PCR.

RESULTS: The morphological changes in the skin were significant. The radiation-exposed skin started peeling compared to the control group. The H&E staining showed an increase of inflammation in the dermis along with epidermis/dermis separation as well as papillary dermis containing fibrin deposition, accumulation of inflammatory cells, reactive changes in the endothelial cells, and abundant necrotic keratinocytes. Masson's Trichrome staining revealed a increased deposition of extracellular matrix between the papillary and reticular dermis in the irradiated skin. The TUNEL and DAPI stain shows an increase in apoptotic cells in the radiation group that correlates with the damage induced by radiation. Gene expression analyses revealed upregulation of inflammatory and anti-apoptotic genes expression.

CONCLUSIONS: Our perfusion model was stable for 19 days and was able to recreate the radiation-induced deposition of collagen shown in the H&E and Masson´s trichrome as well as the radiation-induced damage in the TUNEL and DAPI staining. Our system is reliable and can be used as a platform for developing therapeutics to mitigate the effects of radiation on the skin

Digital Simulation for Cleft Surgery Education: A 10-Year Assessment of Global impact

Abstract Presenter
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PURPOSE: In October 2012 an open-access multi-media digital cleft simulator was released in partnership with the philanthropic sector, academia, and industry. The purpose of this resource is to address global disparities in cleft surgery education and to provide an easily accessible surgical atlas for trainees nationally. Ranging from operative videos, self-assessment quizzes, and interactive diagrams, the platform provides the user with several learning opportunities. Disparities in Plastic Surgery training between high and low-to-middle-income regions impact operative outcomes and equitable access to proper craniofacial care. While the availability of operative resources may not be promptly mitigated, electronic educational programs in other surgical sub-specialties have been proven clinically effective. This report assesses the demographics, usage, and global impact of our simulator, in its 10th year since inception.

METHODS: Usage data of the simulator over 10 years were retrospectively collected and analyzed. Data parameters included the number of users, sessions, countries reached, and content access.

RESULTS: The total number of simulator new and active users reached 7,687 and 12,042. Since its inception, the platform has reached 146 countries on all continents. The countries with the most numbers were the United States, Brazil, India, Mexico, and China. The simulator was accessed an average of 172.9.0 ± 197.5 times per month. Low-to-middle-income regions accounted for 43% of these sessions - an increase of 8% from 2017. The mean session duration was 11.4 ± 6.3 minutes yielding a total screen time of 181,320 minutes (3,022 hours). The most accessed learning modules were unilateral cleft anatomy followed by the Mohler cleft lip procedure, Furlow (primary palate), and bilateral cleft anatomy. The most common device used was the desktop (83.4%), followed by mobile (12.3%), and tablet (4.3%).

CONCLUSION: A freely available, digital, multi-media simulator can provide valued educational resources in low-resource as well as high-resource regions of the world. Global utilization has been sustained after 10 years from inception with an increased presence in low-to-middle-income nations. Access to this resource was not restricted by socioeconomic barriers and was recurrently used. This suggests that future surgical simulators of this kind may provide sustainable training platforms to surgeons working in areas with limited access to resources as well as US trainees.

ChatGPT Versus the 2022 ASPS In-Service Examination

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INTRODUCTION: Chatbots can be leveraged to execute a variety of tasks and answer questions in seconds. Recently, ChatGPT, an open access chatbot, has been used for various applications including writing essays, responding to emails, and helping with research questions. We had OpenAI's ChatGPT chatbot take the American Society of Plastic Surgeons (ASPS) In-Service Examination. The performance of the natural language processing artificial intelligence was evaluated and summarized.

METHODS: OpenAI's 2023 ChatGPT February 13 release was used to answer questions from the 2022 ASPS In-Service examination using the answer key. Each question was asked in three separate structures using a new chat to remove any possible memory retention in the following standardized formats: 1) question in an open ended (OE) format that removed all answer choices, 2) question in multiple choice (MC) format with answer choices after the phrase "please select the correct answer:", and 3) question in multiple choice format with answer choices and prompted reasoning (MCE) after the phrase "please select the correct answer and provide an explanation:". A standardized rubric was applied to evaluate each strategy. The 2022 ASPS Norm Table was utilized to compare ChatGPT's performance on the examination to subgroups of plastic surgery residents. Question prompts with graphics or images in addition to free text were included. All questions that the examination committee subsequently removed prior to scoring due to possible content ambiguity or poor statistical performance were excluded from the analysis. Questions that solely required analyzing a graphic or image to correctly answer the question were also excluded. Each question was assigned to ASPS Education Network (EdNet) subcategories. Analysis included metrics on accuracy, concordance, and insight that were assessed by two independent reviewers and tabulated.

RESULTS: A total of 238 questions were included in the final analysis. A total of 17 (7%) questions were indeterminate amongst all strategies employed (14 OE and 3 MC). Accuracy for OE questions, MC, and MCE were 57.6%, 54.9%, and 56.3%, respectively. Output and concordance were best for OE questions 100% (238/238) followed by 97.1% (231/238) for MCE and 96.2% (229/238) for MC. ChatGPT was insightful on 83% (197/238) of questions across all structured formats. When faced with a question relating to graphics or images (32/238) ChatGPT was accurate from 46.9% (OE) to 59.4% (MCE) of the time.

CONCLUSION: ChatGPT's performance on the 2022 ASPS In-Service Examination was assessed. Based on ChatGPT's overall accuracy using the OE methodology, it scored better than more than half of first year integrated residents (52 percentile). ChatGPT performed the best using the OE strategy. This is an early release of the artificial intelligence software. Similar to a typical resident undergoing training who benefits from additional expertise gained from each year of residency, it will be interesting to trend the performance of ChatGPT on the In-Service Examination with improvements in future updates. With the release of new chatbots and advances in the technology, plastic surgeons should explore their capabilities with caution.

Creation of a biological sensorimotor interface for bionic reconstruction

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Neuromuscular control of bionic arms has constantly improved over the past years, however, restoration of sensation of the lost limb remains elusive. Previous approaches to reestablish sensory feedback include tactile and electrical stimulation of remnant skin as well as peripheral nerve stimulation. However, none of these modalities have reached daily clinical practice in part due to their inability to create natural, intuitive sensation. Here, we establish an experimental biological sensorimotor interface and demonstrate its potential use for prosthetic control and sensory feedback (Figure 1). In rats, a mixed nerve was transferred to a skeletal muscle combined with the transplantation of a glabrous dermal skin graft on top of it, thus forming a bi-directional communication unit. Morphological analyses indicated reinnervation of the transplanted skin, neuromuscular junctions and muscle spindles. Furthermore, sequential retrograde labeling revealed specific sensory reinnervation of the skin at the level of the dorsal root ganglia, supporting the morphological findings. The results indicate the possibility of surgically creating an interface for both decoding efferent motor control as well as encoding afferent tactile and proprioceptive feedback in a compact reinnervated muscle-skin unit using reinnervated end organs as robust translators. This pre-clinical evidence may indicate the way forward regarding clinical translation of biological bi-directional communication pathways for neuroprosthetic applications.

Artisanal Implants: Fabricating Miniature Gel-Filled Soft Implants for High Throughput Breast Implant Research Accessibility

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PURPOSE: Miniature soft breast implants for pre-clinical research are essential for advancing the field of plastic surgery. However, obtaining such custom implants from commercial implant manufacturers has becoming increasingly difficult in the current environment of company cost-cutting and decreased resources for sponsored research. As an alternative, researchers can fabricate their own custom implants allowing for faster turnaround times and reducing the reliance on external entities. Here we present a straightforward and inexpensive method for the fabrication of custom miniature implants with a separate silicone shell filled with silicone gel for high throughput pre-clinical investigation.

METHODS: Polydimethylsiloxane (PDMS) was mixed in a 20:1 silicone to curing agent ratio, placing it in a CAD-designed inverted-mandrel negative mold. A vacuum degassed the PDMS at 37°C and cured until reaching a honey-like viscosity. The mold was spun using a Dremel to

create a 2.5-3.5mm smooth implant shell, which immediately underwent a second curing step utilizing a heat gun fanning ~455°C air for 5s. A 1mm indented mold of the flat implant shell segment was covered with non-cured PDMS, and the rounded implant segment was placed on top of the PDMS. The PDMS cured around the rounded implant shell at 37°C overnight, creating an airtight soft pliable implant. The curing time and curing temperature determined the shell firmness. A 16G catheter was slipped through the flat implant segment and breast implant gel harvested from a commercial smooth implant was injected. The implant was sealed with a layer of PDMS and cured overnight at 37°C. Textured implants can be created using a salt-loss technique, and other implant features can be added to the design including suture tabs. Implants were stress tested using a lab shaker and a 46g sphere striking the implant 300,000 times at 37°C over the course of 7 days. One teardrop-shaped implant was placed under the panniculus carnosus muscle on the dorsa of Sprague-Dawley rats bilaterally. Three anchoring Polysorb sutures were placed through the suture tabs anchoring the implant to the underlying tissue to ensure short-term implant stability counteracting the loose skin rat model. Implants were explanted at 1-month.

RESULTS: Implants recapitulated the small mold structures and stress testing did not cause shell cracking or gel extrusion. Implant shell firmness was tunable by changes in curing temperature, curing time, and filling materials used. Breast implant profile was modifiable by amount of implant gel injected. To ensure the safety and effectiveness of the new implants, testing was conducted on rats. At 1 month, implants were found to be safe and retained its shape during the testing period.

CONCLUSIONS: This method for fabricating custom miniature implants allows researchers to quickly modify implant designs based on their findings, thereby enabling high throughput pre-clinical investigation. This approach allows for the tunable fabrication of implant shell thickness, firmness, and implant forward projection while recapitulating intricate surface topographies as small as 1mm in size. This reduces the reliance on external sources for implant fabrication and implant design, which can be completed and implanted within a few days.

Development of an Educational Program for Medical Students Without Home Residency Programs to "Explore Plastic Surgery"

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BACKGROUND: Medical students who attend institutions without plastic surgery residency programs are at a significant disadvantage in the plastic surgery match. We developed an educational program for medical students without home programs called "Explore Plastic Surgery" to provide an overview of the steps towards a career in plastic surgery. The purpose of this study was to assess the impact, utility, and success of the novel program.

METHODS: Pre- and post-event surveys were distributed to participants. Survey data were analyzed including participant demographics, perceptions of barriers unique to those without home programs, and the overall event utility.

RESULTS: Two hundred eighteen medical students registered for the Explore Plastic Surgery program. Ninety-five participants completed the pre-event survey (44%) and of those, 57 participants completed the post-event survey. There was a significant increase in understanding of the steps towards a career in plastic surgery ($p < 0.001$), confidence in overcoming barriers unique to those without a home program ($p = 0.005$), and level of comfort in reaching out to faculty for opportunities ($p = 0.01$). There was a significant decrease in the perceived negative impact that attending a medical school without a home program will have on their abilities to pursue careers in plastic surgery ($p = 0.006$).

CONCLUSIONS: Following the event, participants demonstrated an increase in their confidence in overcoming barriers and a decrease in their perceptions that attending an institution without a home program will negatively impact their ability to pursue plastic surgery. Initiatives focused on early exposure and recruitment of medical students are important to promote accessibility and diversity within plastic surgery.

ChatGPT Versus The ASPS In-Service Exam: Who Would Win?

Abstract Presenter
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BACKGROUND: Artificial intelligence has entered many aspects of medicine, with applications growing daily. ChatGPT, a text-based artificial intelligence (AI) has been shown to solve natural language problems with surprising accuracy with preliminary studies demonstrating ChatGPT narrowly passing USMLE 1, 2, and 31. In this study, we challenged ChatGPT to take the annual 2022 ASPS In-Service Examination for Plastic Surgery residents.
Methods:
All 250 items in the 2022 American Society of Plastic Surgeons In-Service Exam were answered by listing the prompt: "answer the multiple choice question:" followed by the question listed verbatim. Answers were verified with the official answer key.

RESULTS: ChatGPT successfully answered 126 of 250 (50.6%) questions. However, seven questions were thrown out in the answer key, resulting in an adjusted score of 126/243 (51.9%). Many prompts included an image; for six of these prompts, ChatGPT requested the image in order to answer the question properly (even though it cannot process input images). With removal of these six questions, ChatGPT scored 53.2% (126/237). ChatGPT scored highest in Section 3: Craniomaxillofacial with 59.1% (29/49) and lowest in Section 5: Core Surgical Principles with 45.8% (22/48).
Discussion & Conclusion: According to the published 2022 Norm Table, a 53% total test score ranked ChatGPT in the 26th percentile of first year integrated plastic surgery residents. This is a remarkable result given the ChatGPT's lack of specialized resources and training in plastic surgery. This study speaks to the power and abilities of current artificial intelligence, as well as the limitations and shortcomings of current resident evaluation methods. Furthermore, ChatGPT does not utilize the internet to answer questions and formulates answers by providing rationales in the text generated. Further studies are needed to determine the effects and applications of AI in collaboration with current physicians and physicians in training for future medical practice.

REFERENCES:
1. Performance of ChatGPT on USMLE: Potential for AI-Assisted Medical Education Using Large Language Models. Tiffany H. Kung, Morgan Cheatham, ChatGPT, Arielle Medenilla, Czarina Sillos, Lorie De Leon, Camille Elepaño, Maria Madriaga, Rimel Aggabao, Giezel Diaz-Candido, James Maningo, Victor Tseng medRxiv 2022.12.19.22283643; doi: https://doi.org/10.1101/2022.12.19.22283643

Filling In the Gaps: Retelling the History of Black Representation in Plastic Surgery

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PURPOSE: In recent years, there has been growing interest in the history of Black American plastic surgeons and their contributions to the field of Plastic and Reconstructive Surgery (PRS). Several recent studies have evidenced extreme disparities in representation of African Americans among plastic surgeons.(1) While significant forward-looking efforts are being made to identify and intervene in the factors perpetuating this demographic inequality, the history of how plastic surgery became one of the most ethnically segregated surgical specialties remains unexplored.

METHODS: This project uses a variety of primary and secondary sources including archival documents, historical newspapers, obituaries, and oral histories, to identify the political and cultural factors that excluded Black practitioners from the first 50-years of American PRS professional societies. The historical framework explores how the political campaigns employed by early societies to legitimize plastic surgery as an independent specialty relied on the explicit

association between PRS and the rehabilitation of disfigured soldiers. This strategy had the indirect consequence of barring Black surgeons from centers of PRS innovation. Until 1948, when President Truman signed Executive Order 9981 and officially desegregated the US Armed Forces, African American medical professionals were essentially ineligible to participate in the surgical reconstruction of injured veterans.(2) Ironically, integration of military veteran hospitals on the Homefront similarly disqualified Black surgeons from participating in PRS because the military refused to place Black physicians in positions of authority over White patients.(2)

RESULTS: Despite these barriers, a handful of pioneers practiced plastic surgery without the support of the early professional societies. Dr. DeHaven Hinkson, the first Black surgeon to run a US Army station hospital, served in World War I and II and became an early advocate for plastic surgery in the psychological rehabilitation of veterans.(2,3) In 1930, Dr. H. Dodford Dismukes and his assistant, Dr. Joseph E. Brown, opened the largest private African American hospital in the nation with an emphasis on the surgical reconstruction of local workers injured in coal mining accidents.(4) In WW II, Dr. Walter Scott Brown became the first Black man to serve as flight surgeon for a primarily White military unit before dedicating his career to plastic surgery.(5)

CONCLUSION: The achievements of these groundbreaking figures are almost entirely absent from the PRS literature. By telling their stories, we can address the legacy of inequity and recognize these individuals as part of American PRS history.

1. Butler PD, Britt LD, Longaker MT. Ethnic Diversity Remains Scarce in Academic Plastic and Reconstructive Surgery. Plast Reconstr Surg. 2009;123(5):1618-1627. doi:https://doi.org/10.1097/prs.0b013e3181a07610
2. Marble S. "Separate, But Almost Equal": The Army's Negro Medical Field Units in World War II. J Natl Med Assoc. 2012;104(1-2):96-103. doi:https://doi.org/10.1016/s0027-9684(15)33513-6
3. Hinkson D. Problems in the Rehabilitation of Victims of War. J Natl Med Assoc. 1922;14(4):229.
4. Calvin FJ. Dr. Dismukes tells of his $75,000 Hospital. The Pittsburgh Courier. October 25, 1930:A1.

We Can’t Read the PROM: Readability of Patient-Reported Outcome Measures (PROMs) Used in Plastic Surgery

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BACKGROUND: Patient-reported outcomes (PROs), collected via patient-reported outcome measures (PROMs), are assessments of health status made directly by the patient. PROs are particularly important to capture in plastic surgery, as many procedures are aimed to improve patients' quality of life. More commonly used measures such as mortality, functional outcomes, or radiographic outcomes are inadequate as they do not directly measure quality of life. Although self-administration of PROMs is cost-effective and avoids potential for interviewer bias, it is unknown whether plastic surgery PROMs are written at or below the 6th-grade reading level per recommendation by the American Medical Association (AMA). This is important because an estimated one-fifth to almost half of Americans have low levels of print literacy. The aim of this study is to evaluate the readability of plastic surgery-specific PROMs.

METHODS: We conducted a literature review to identify the most commonly used PROMs in plastic surgery. We included English PROMs that underwent both qualitative and psychometric testing. We extracted the text and instructions from these PROMs and analyzed readability. Our primary outcome of interest was the Simple Measure of Gobbledygook (SMOG) index, which detects word complexity. Our secondary outcome measures included the Flesch-Kincaid (FK), the Coleman-Liau index (CLI), and the Automated Readability index (ARI) which capture different aspects of readability. All readability measures report a score that corresponds to the grade level required to understand the text. We used paired t-tests to compare readability of the PROM questions and responses to readability of the instructions.

RESULTS: We identified a total of 62 PROMs; 39 met our inclusion criteria. Of those, 12 (31%) were hand/peripheral nerve, 10 (26%) craniofacial, 5 (13%) aesthetic, 5 (13%) transgender, 4 (10%) lower extremity reconstruction, 2 (5%) burn, and 1 (2%) breast. The average SMOG index was 8.22 (SD=1.28), indicating a reading level above the 8th grade, and average FK=4.75 (SD=1.60), CLI=6.03 (SD=2.17), and ARI=3.34 (SD=1.65). Only 3 (8%) PROMs had a SMOG index at or below the 6th-grade level. For PROMs that included instructions (n=32), the text of the directions had a SMOG index of 9.88 (SD=2.53), while the text of the questions and responses had a SMOG index of 8.04 (SD=1.24). The PROM instructions had a significantly higher reading level than the questions/responses for all readability indexes ($p<0.01$ for SMOG, FK, CLI, and ARI).

CONCLUSIONS: PROMs used in plastic surgery, and especially the instructions for these PROMs, are written at a higher reading level than is recommended by the AMA. This may limit comprehension and accurate completion of PROMs, and therefore PROMs' validity and reliability for a large proportion of plastic surgery patients. PROMs should be better designed and developed to address the needs of low and limited-literacy patients.

Gender Bias in Lower Extremity Amputation and Prosthesis: A Narrative Review

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PURPOSE: There are over 1,700,000 people living with limb loss in the United States alone and 185,000 new amputations per year. Nevertheless, little information is available regarding the effect of gender on management decisions following devastating injuries or patient care following amputations. Therefore, the primary objective of this study is to identify potential gender bias across a milieu of perioperative milestones for patients who undergo lower extremity amputation (LEA) and prosthesis-based rehabilitation. The secondary aim of this study is to provide a succinct overview of the prosthetic devices available to these patients to equip plastic surgeons with relevant knowledge to best care for their patients longitudinally.

METHODS AND MATERIALS: A narrative review was conducted within PubMed and several commercial prosthesis websites in February 2023, without any date or geographic restrictions. Studies were screened and reviewed by two reviewers. Studies that evaluated topics in LEA, prosthesis, and rehabilitation were included and underwent descriptive analysis. Aggregate subgroup analyses were performed by gender.

RESULTS: 109 studies met the inclusion criteria. Of these, 34 (31.1%) were retrospective cohort studies, 25 (22.9%) were cross-sectional studies, 14 (12.8%) were systematic reviews or meta-analyses, 10 (9.2%) were prospective cohort studies, 5 (4.6%) were qualitative interview studies, and 3 (2.8%) were randomized controlled trials. Gender bias was identified among several siloes of perioperative care preceding and following LEA and rehabilitation. On average, women undergo higher levels of amputation compared to men: approximately 39.0% of women underwent above-knee amputation compared to 20.0% of male counterparts, despite bearing a lower incidence of comorbid diabetes, in a retrospective review of 5,762 patients conducted by Kamrad et al. [1] Women also experience a 1.1 times higher odds of mortality following major amputation for peripheral vascular disease compared to men, despite similar disease severity. [2] With regards to prosthesis, women are significantly less likely to be successfully fit for prosthesis compared to men in the context of in-patient rehabilitation (29.5% vs. 42.7%, respectively; $p < .001$). [3] Women also report lower satisfaction with prosthetic fit ($p = .030$), comfort ($p = .070$), and appearance ($p < .001$) compared to male counterparts. [4] Finally, contemporary prosthetic devices are designed based on male models, limiting options that are compatible for women. Several qualitative analyses cite device weight, socket size, shoe size, and adjustable heel-height as limitations in applying the standard prosthetic device to the needs of women users. [5]

CONCLUSIONS: Gender bias was isolated across several indices for LEA and prosthesis, elucidating potential areas for reform. There is a need for gender-inclusive study populations and subgroup analyses to elevate the current landscape of patient-centered healthcare for women who experience lower limb loss. We recommend instating checkpoints at the following milestones to introduce intention and mitigate gender disparities: (1) amputation level (including advanced indices for identifying multiple levels of disease, such as Computed Tomography scan), (2) targeted post-operative pain control, (3) multidisciplinary task force with mental health support,

(4) shared decision-making for prosthesis selection, (5) novel prosthesis design based on female models and with variable heel heights, and (6) elevated community and occupational re-integration.

BIBLIOGRAPHY:

1. Kamrad I, Söderberg B, Örneholm H, Hagberg K. SwedeAmp-the Swedish Amputation and Prosthetics Registry: 8-year data on 5762 patients with lower limb amputation show sex differences in amputation level and in patient-reported outcome. Acta Orthop. Aug 2020;91(4):464-470. doi:10.1080/17453674.2020.1756101
2. Lo RC, Bensley RP, Dahlberg SE, et al. Presentation, treatment, and outcome differences between men and women undergoing revascularization or amputation for lower extremity peripheral arterial disease. J Vasc Surg. Feb 2014;59(2):409-418.e3. doi:10.1016/j.jvs.2013.07.114
3. Davie-Smith F, Paul L, Nicholls N, Stuart WP, Kennon B. The impact of gender, level of amputation and diabetes on prosthetic fit rates following major lower extremity amputation. Prosthet Orthot Int. Feb 2017;41(1):19-25. doi:10.1177/0309364616628341
4. Pezzin LE, Dillingham TR, Mackenzie EJ, Ephraim P, Rossbach P. Use and satisfaction with prosthetic limb devices and related services. Arch Phys Med Rehabil. May 2004;85(5):723-9. doi:10.1016/j.apmr.2003.06.002
5. Manz S, Valette R, Damonte F, et al. A review of user needs to drive the development of lower limb prostheses. J Neuroeng Rehabil. Nov 5 2022;19(1):119. doi:10.1186/s12984-022-01097-1

Sex-specific differences in self-confidence and skill of plastic surgery trainees: a pilot analysis in the setting of simulation

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BACKGROUND: Underrepresentation of women in plastic surgery remains a concern. Because research has found gender-related gaps in surgical trainee confidence, and because confidence influences others' perception of competence, this study investigates sex-specific differences in self-confidence and correlation with surgical ability in a way that can uniquely be done with simulation. This could inform strategies to mitigate disparity and ultimately work toward gender parity in plastic surgery.

METHODS: Plastic surgery trainees were recorded performing up to three cleft lip repairs on a high-fidelity simulator. Demographic information was collected, and questionnaires were

completed to assess procedural self-confidence and confidence with specific cleft lip skills. Videos were blindly rated by a single cleft surgeon using the Objective Structured Assessment of Technical Skills (OSATS), a global surgical skill scale, and the Unilateral Cleft Lip Repair competency assessment tool (UCLR), a procedure-specific checklist. Generalized Estimating Equations (GEE) modelling was used to estimate differences in demographic variables, questionnaire scores, and objective ratings between men and women, while controlling for multiple simulations per subject. Correlation between overall procedural self-confidence and performance was examined for men and women using Pearson R.

RESULTS: Twenty-six participants completed 73 simulated procedures. Six participants were women and 20 were men. There was no gender-related difference in training level, volume of prior experience, speed with which participants completed each simulated procedure, comfort level with specific skills, or objective performance measured by OSATS and UCLR. However, a significant difference was found between men and women in overall procedural self-confidence, with female trainees rating their confidence lower (Mean = 16.9, SD = 4.3) than male trainees (Mean = 19.4, SD = 3.8); $p = 0.048$. Examination of individual questions revealed that women scored significantly lower on questions related to anxiety ($p=0.007$) and desire to avoid the procedure altogether ($p=0.001$). Further analysis found that confidence scores correlated more strongly with objective performance on UCLR for females ($r = 0.83$, $p<0.001$) than for males ($r = 0.45$, $p<0.001$).

CONCLUSION: This study shows that as a group, female plastic surgery trainees had lower self-confidence than their male counterparts despite demonstrating the same level of skill performing unilateral cleft lip repair on a high-fidelity simulator. However, on an individual level, confidence and ability were more closely linked for women than for men. This suggests a uniquely impactful role for mentoring focused on concrete skill building to help close the confidence gap between men and women in plastic surgery.

The Pandemic's Effect on Residency Training: an Evaluation Of Electronic Medical Record Usage and How It Impacts This Era of Trainees

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BACKGROUND: The COVID-19 pandemic caused shifts in clinician schedules and electronic medical record (EMR) utilization. Ambulatory medicine literature reveals EMR usage dropped during the pandemic then returned to baseline levels with changed utilization patterns. This study aims to investigate how COVID-19 affected plastic surgery resident EMR utilization before,

during, and after the pandemic.

METHODS: EMR utilization data of 12 plastic surgery residents was extracted via Cerner Analytics at a tertiary academic medical center, encompassing March 15th through June 15th of 2019, 2020, and 2021 representing the pre-pandemic, COVID-19 pandemic, and post-pandemic eras, respectively. On-duty (0600-1759) and off-duty (1800-0559) EMR utilization (chart review, orders, documentation, and patient discovery) was analyzed.

RESULTS: Median minutes per day spent on the EMR decreased significantly during the pandemic, before returning to pre-pandemic levels (64.5 pre-pandemic, 37.2 pandemic, and 65.6 post-pandemic, p-value < 0.001). Residents spent significantly more time on the EMR during off-duty hours during the pandemic (31.9% pre-pandemic versus 38.2% pandemic versus 34.5% post-pandemic, p-value < 0.001). There was no statistical difference in off-duty utilization between eras for senior residents (p-value = 0.58), while junior residents spent more time off-duty during the pandemic which sustained into the post-pandemic era (35.6% pre-pandemic versus 44.9% COVID-19 versus 40.7% post-pandemic, p-value < 0.001). Patient discovery and chart review increased during the pandemic prior to returning to pre-pandemic levels (65% pre-pandemic versus 72% pandemic versus 68% post-pandemic, p-value < 0.001).

CONCLUSION: Plastic surgery resident EMR utilization decreased during the COVID-19 pandemic with sustained increase in off-duty EMR time spent in the post-pandemic era for junior residents.

Development of an Innovative Device to Enable on-site Cryopreservation of Lipoaspirates to be Used in Repeat Procedures.

Abstract Presenter
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INTRODUCTION: The main challenge of autologous fat transfer procedures in patients is the requirement of repeat grafting to compensate for the resorbed fat over time. On average about 40-50% of the grafted fat resorb in 3-6 months post grafting requiring repeat graft procedure. Repeat harvest is a painful and expensive procedure exerting a traumatic and financial burden on the patient. In addition, it also led to reduced productivity of the surgeons. The development of strategies that eliminate the requirement of repeat harvest is the need of time. In this direction, we have designed a cryopreservation device and optimized the protocol that enables on-site

storage of the excess harvested fat for repeat graft procedures thus eliminating the need for repeat harvest.

METHODS: We designed a device that can connect seamlessly to current devices used in fat harvest and grafting. We tested different approaches and methods combinations of cryoprotectant and freezing temperatures, and measured cell viability up to 3 months using viability stains Tryptan blue and Calcin-Am. For in-vivo validation, we used Nu/Nu athymic mice injected with human fat cryopreserved for 7 days, 21 days, 3 months, and 11 months. Each group was compared to a fresh fat graft. We analyzed the graft for weight, volume retention, histology, vacuole formation, and inflammation markers after 9 weeks. Using our method we determined the optimal time range for cryopreserving the fat post-harvest.

RESULTS: In vitro viability analyses showed a combination of 10% DMSO, 2% human serum albumin, and storage temperature of -80˚C demonstrated optimal viability of cryopreserved fat comparable to fresh fat. In vivo, Nude mice studies showed no significant changes in the graft weight and volume retention between the comparison groups up to 11 months. The histological scoring index for inflammation and vacuole formation also showed no significant changes. Our time range analyses showed the best outcome when the fat is cryopreserved within 5 hours post-harvest.

CONCLUSIONS: This study shows that the clinical adaptation of our device and protocol can reduce multiple harvest sessions along with the complications of this procedure e.g. ecchymosis, swelling, hematoma, and infections. Fat can be preserved without any morphological, weight, or volume changes for up to 1 year.

The Exoscope as a Valid Alternative to the Operating Microscope in Plastic Surgery

Abstract Presenter
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PURPOSE: Microsurgery is a specialized surgical area that involves a variety of procedures, commonly used in anastomosis of vessels, flap harvesting, lymphedema, nerve reconstruction, and other advanced techniques. It can be traced back to the 1500s, but significant advances in microsurgery began in the 1900s with the introduction of the triangulation technique of end-to-end anastomosis. The microscope has been the staple of microsurgery, but a new wave of technology, the exoscope, is emerging. This review aims to provide clarity and sufficient

evidence to support the use of exoscope systems in Plastic Surgery, which has not been widely used.

METHODS: A search for full-text articles where the use of an exoscope was compared against a traditional operating microscope was conducted on the databases PubMed, Scopus, Web of Science, and Embase. The following terms were used to guide our search: Microscope AND exoscope AND plastic surgery; Microscope AND exoscope AND microvascular surgery.

RESULTS: Our search yielded 69 studies of which 12 were included. Five exoscope systems were used by the authors. All studies reported the exoscope to be a valid alternative to the standard operating microscope. The development of new and improved exoscope systems such as Orbeye, Modus V, VITOM 3D, Zeiss Kinevo 900 microscope, and The Robotic Scope®-system have been able to bridge the gap towards the traditional OM. The exoscope offers several advantages such as comfort, versatility, teaching capabilities, and immersive experience. One drawback is a potentially steep learning curve, but this can be managed with repeated practice. Another disadvantage is a visually bothersome view of the 3D display, nausea, and set-up in some models. However, this may not apply to all systems and users.

CONCLUSION: Based on the evidence collected, we conclude that current exoscope systems are safe and comparable to the traditional OM and should be trialed in Plastic Surgery. In determining which system to implement, one should consider the requirements and specifications of each exoscope and program. Research should be performed on the system's capabilities before acquiring and trialing.

Pediatric Plastic Surgery Patients Have Higher Rates of Depression and Anxiety than Other Surgical Specialties

Abstract Presenter
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BACKGROUND: Depression and anxiety have been shown to affect clinical outcomes following surgery, impacting the immune response and lowering the pain threshold.1 As there is a paucity of mental health studies in pediatric surgical patients, the goal of our study is to describe the prevalence of depression and anxiety in this population.

METHODS: EPIC SlicerDicer was used to facilitate retrospective chart review of all patients seen by a surgical care specialty at Lurie Children's Hospital from January 2012 to December 2022. Percentage of patients within each specialty with concurrent diagnosis of depression, anxiety, and both were identified. Descriptive and statistical analysis was performed for differences in demographics and prevalence of depression and/or anxiety within surgical subspecialties.

RESULTS: 494,160 patients were included from 7 surgical subspecialties: Neurosurgery (n = 26,428, 5.35%), Ophthalmology (n = 52,593, 10.64%), Orthopedic Surgery (n = 143,567, 29.05%), Otolaryngology (n = 110,621, 22.39%), Pediatric Surgery (n = 64,620, 12.08%), Plastic Surgery (n = 23,348, 4.72%), and Urology (n = 72,983, 14.77%). Concurrent diagnoses of depression, anxiety, and both occur at significantly higher rates in pediatric patients seen by plastic surgery (0.24%, 0.32%, 0.18%, respectively) than those seen by most other surgical subspecialties ($p<0.05$). Median age of plastic surgery patients was 17 years (IQR = 15, 19) for those with concurrent anxiety and 18 years (IQR = 17, 20) for concurrent depression. Females made up greater proportions than males for both anxiety (69% vs. 31%) and depression (70% vs. 30%). Those who identified racially as White made up the greatest proportions out of all races for both anxiety (70.3%) and depression (73.2%), and those who identified ethnically as Non-Hispanic/Latino made up greater proportions than those who identified as Hispanic/Latino for both anxiety (75.7% vs 21.6%) and depression (73.2% vs 26.8%). There were no significant differences in rates of anxiety in pediatric plastic surgery (0.32%) compared with pediatric surgery (0.22%, $p = 0.561$) or neurosurgery (0.27%, $p = 0.357$).

CONCLUSIONS: Our single institution study demonstrates that rates of depression, anxiety, and both are higher in pediatric plastic surgery patients compared to patients from most other surgical subspecialties. As depression and anxiety have been associated with greater postoperative morbidity following surgery, pediatric surgical patients should undergo mental health screening using tools such as the PHQ-2/9 and GAD-7 with subsequent mental health resources provided as appropriate. Future studies examining postoperative outcomes in the setting of concurrent mental health diagnosis may better elucidate the relationship between psychosocial factors and surgical outcomes.

REFERENCES

1. Ghoneim, M.M., O'Hara, M.W. Depression and postoperative complications: an overview. BMC Surg 16, 5 (2016). https://doi.org/10.1186/s12893-016-0120-y

Immersive Virtual Reality First-Person Perspective Video for Surgical Education: Pectoralis Major Muscle Flap Reconstruction

Abstract Presenter
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INTRODUCTION: Pectoralis major muscle flaps (PMMF) are versatile and reliable procedures utilized in the reconstructive surgery for a variety of defects involving the head, neck, and chest. Acquiring and mastering an understanding of the anatomy and operative steps of complex procedures such as myocutaneous flaps by plastic surgery residents and fellows takes years. Surgical education and training is constantly evolving and is shifting towards advanced technology to deliver learning experiences. In this work, we demonstrate the potential for immersive virtual reality first-person video from the operative surgeon's perspective for teaching and learning plastic and reconstructive surgery.

METHODS & MATERIALS: The case is a 53-year-old male with a history of squamous cell carcinoma of the larynx status post total laryngectomy with simultaneous PMMF two years prior who had now developed a left sided pharyngocutaneous fistula. Contralateral PMMF was offered to reconstruct his defect. The full length of the procedure was captured in the surgeon's first-person perspective using our novel head-mounted gimbal stabilized stereoscopic camera system.1

RESULTS: From incision to skin closure, 207 minutes of 5.7K stereoscopic first-person video was recorded which was then edited down to a 14-minute immersive virtual reality video. The critical steps of the procedure including exposure and elevation of pectoralis major muscle, identification of the thoracoacromial vessels, and creation of the supraclavicular subcutaneous tunnel are highlighted during the video.

CONCLUSION: Pharyngocutaneous fistulas are not uncommon complications following total laryngectomy, and simultaneous PMMF reconstruction is used to mitigate risk.2 Further reconstructive efforts using the contralateral PMMF increases the challenges of this procedure. Learning how to perform difficult visuospatial techniques, especially in plastic and reconstructive procedures, often demands the visual perspective of the operating surgeon. Modern surgeons-in-training go beyond the conventional textbooks and atlases and seek out intraoperative videos in order to learn the craft. While there have been increasing reports of first-person surgical video in both the scientific and public domains, our camera system elevates this perspective into a novel, immersive experience by using stereoscopy and advanced stabilization to achieve unparalleled depth into the open operative field.

Surgical training models in residency and fellowship programs are competency-based and yet assessing operative competency is driven by subjective assessment by supervising surgeons. Limitations on training due to increasing competing demands on the surgical resident in the

context of strict duty hours requires innovative educational solutions. By enabling trainees to visually embody the master surgeons' visual perspectives, the conveyance of operative skills is facilitated. This video represents the first in a series of complex myocutaneous flap procedures captured using this technology at our institution. Further research is being conducted on the comparative impact of immersive video to conventional video.

REFERENCES

1. A head-mounted gimbal-stabilized stereoscopic camera setup for creating immersive open surgical video. Quaranto BR, Hu J, Raine B, Lamb M, Schwaitzberg SD. Surgical Innovation 2023, In Press.
2. Guimarães AV, Aires FT, Dedivitis RA, et al. Efficacy of pectoralis major muscle flap for pharyngocutaneous fistula prevention in salvage total laryngectomy: A systematic review. Head Neck. 2016;38 Suppl 1:E2317-E2321. doi:10.1002/hed.24248

Liposuction for Superficialization of Deep Hemodialysis Vascular Access: A Novel Application

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BACKGROUND: Over 750,000 people in the United States suffer from end-stage renal disease (ESRD) with upwards of 65% of these patients utilizing an arteriovenous fistula (AVF) for hemodialysis.1,2 Within this population, there is a growing incidence of co-morbid ESRD and obesity (BMI >35kg/m2), which precludes many patients from kidney transplantation and underscores significant need for long-term access.3,4 Compared to traditional superficialization techniques for overlying adiposity, liposuction is minimally invasive and well tolerated, allowing for earlier fistula use with a lower complication profile. We present a practical solution to deep hemodialysis access, highlighting the process of patient selection and pre-operative planning, surgical technique, and follow-up in 14 patients undergoing liposuction for AVF superficialization.

METHODS: Patients with well-matured fistulas with difficult access due to adiposity were selected. Pre-operative ultrasound mapped fistulas and their depths in 2cm intervals along their length, applying minimal skin pressure with the probe to preserve true fistula depth. Adiposity superficial and lateral to the fistula were marked and infiltrated with Klein tumescent solution to generate a 5cm-wide rectangular treatment zone longitudinally oriented over the fistula.5 The

zone was first pre-tunneled with basket-tipped cannulas off suction before changing to Mercedes and spatula-tipped cannulas for completion liposuction. Liposuction was conducted in a cross-hatched fashion through stab incisions on one end of the target area at each corner. Intra-operative ultrasound and digital compression of the skin over the cannulas confirmed cannula positioning superficial and lateral to the fistula, ensured guided liposuction in the treatment zone, and recorded fistula depth. A palpable thrill remained present throughout superficialization. The newly superficialized AVF was then dressed in gentle ACE wrap compression. Cannulation began 4-weeks post-operatively.

RESULTS: Mean BMI was 37kg/m2 (22-53kg/m2). Mean access depth pre-operatively was 10.9mm (8-15mm), immediately post-operative was 7mm (6-9mm), and at 4-weeks was 5.3mm (4-8mm). Thirteen fistulas were successfully accessed following liposuction superficialization. Average usable access length was 12.7cm (10-15cm) following surgery. All patients discharged home following surgery. There were no post-operative infections or hemorrhage.

CONCLUSION: Early experience with liposuction for superficialization of deep hemodialysis access is promising. It offers an innovative solution to an ever-growing problem, and the possibility of improved outcomes and quality of life for patients living with ESRD and obesity. Given poor graft survival when renal transplantation is pursued and often suboptimal long-term AVF patency in obese patients, ensuring durable access is warranted.4 Current approaches involve meticulous AVF dissection, fistula manipulation, and longer operative times. Our experience shows liposuction is a safe and effective superficialization technique to increase patient eligibility and enable successful and early cannulation, all the while decreasing recovery time.

REFERENCES:

1. Dahlerus C, Kim S, Chen S, Segal JH. Arteriovenous Fistula Use in the United States and Dialysis Facility-Level Comorbidity Burden. Am J Kidney Dis. 2020;75(6):879-886. doi:10.1053/J.AJKD.2019.08.023
2. Kidney Disease Statistics for the United States - NIDDK. https://www.niddk.nih.gov/health-information/health-statistics/kidney-disease. Accessed March 7, 2023.
3. Kramer HJ, Saranathan A, Luke A, et al. Increasing body mass index and obesity in the incident ESRD population. J Am Soc Nephrol. 2006;17(5):1453-1459. doi:10.1681/ASN.2005111241
4. Maliska CM, Jennings W, Mallios A. When Arteriovenous Fistulas Are Too Deep: Options in Obese Individuals. J Am Coll Surg. 2015;221(6):1067-1072. doi:10.1016/J.JAMCOLLSURG.2015.09.004
5. Klein JA. The Tumescent Technique: Anesthesia and Modified Liposuction Technique. Dermatol Clin. 1990;8(3):425-437. doi:10.1016/S0733-8635(18)30474-1

Inequity In Racial and Ethnic Representation in United States Plastic Surgery Clinical Trials

Abstract Presenter

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BACKGROUND: Racial diversity in clinical trials (CTs) serves as a metric of equality of access to health care, but unfortunately, trials frequently lack or misreport representation of the population they are intended to emulate. In 1993, the National Institutes of Health Revitalization Act mandated an increase in minority and women enrollment in CTs. Further, in 2016 the Food and Drug Administration released guidelines on collecting and reporting race and ethnicity in an effort to achieve meaningful diversity in racial and ethnic representation. The purpose of this study was to investigate trends in race and ethnicity enrollment and reporting in US plastic and reconstructive surgery (PRS) clinical trials and compare representation in clinical trials to the US population census.

METHODS: A comprehensive systematic review of several databases was performed. The search strategy was designed and conducted by an experienced librarian using controlled vocabulary with keywords. Inclusion criteria encompassed all clinical trials in PRS from 2012 to 2022. A two-stage screening process was conducted to select articles that met the inclusion criteria. To assess racial and ethnic representation within CTs, a random-effects meta-analysis of proportion was performed to pool the prevalence of the binomial data.

RESULTS: A total of 3,609 studies were initially identified in the search strategy with 154 of them later classified as clinical trials in PRS. Overall, 118 (76%) of the CTs did not report race or ethnicity. 36 met eligibility criteria of reporting race and ethnicity and were included in the analysis. From those, 29 (80.6%) and 27 (75%) of included CTs correctly reported race and ethnicity, respectively. A total of 7281 participants were present in the included studies, 446 (6.1%) males and 6835 (93.9%) females. Geographically, 28.5% of all CTs were done in the West, followed by the Midwest with 25%. Further, 38.9% of the CTs were in the field of reconstruction, while 33.3% were cosmetic. From CTs that correctly reported race, the pooled prevalence of races were as follows: Whites 78% (95% CI 73-82%), Black or African Americans 8% (95% CI 5-11%), Asians 1% (95% CI <1-2%), American Indians <1% (95% CI <1-<1%), and Pacific Islanders <1% (95% CI <1-<1%). From the studies that reported ethnicity correctly, the pooled prevalence of Hispanics was 7% (95% CI 5-9%) and Non-Hispanics was 12% (<1-38%).

CONCLUSIONS: Disparities in the representation of minorities were present among PRS clinical trials. This suggests clear limitations in the generalization of PRS clinical trials' results to

the general population. Efforts to decrease the gap in minority enrollment and correctly report race and ethnicity are much needed within the field.

Skeletal muscles are hyper-reinnervated according to the capacity of the surgically redirected neural input

Abstract Presenter
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Recent advancements in robotics and biomedical engineering have outpaced the capability of man-machine interfaces to decipher and transfer biological signals to prosthetic devices according to the demands of the human body. Here, we hypothesized that muscles could serve as an ultimate interface for amplifying neural input from the spinal cord. We emulated a clinical scenario where high- or low-neural capacity donor nerves (facial and ulnar nerves) were surgically rewired to a skeletal muscle controlled by a minimum of motor neural input (sternomastoid muscle). We found that the sternomastoid muscle successfully underwent functional reinnervation after nerve transfer using either facial or ulnar nerves as the donor of neuronal sources. Using retrograde neural tracing and electrophysiological tests, the reinnervated muscle showed almost a 15-fold hyper-reinnervation after the high-capacity nerve transfer (facial nerve), indicating its capability of incorporating a multifold of neural signals. Additionally, the surgically redirected neuronal sources redefined the physiological properties of the reinnervated muscle by altering the expression of myosin-heavy chain types according to the donor nerve (Figure 1). These findings suggest that skeletal muscles can serve as a biological amplifier of neural information from the spinal cord for controlling bionic prostheses.

First in Human Testing of a Novel Sutureless Drain Securement Device: A Randomized Clinical Trial

Abstract Presenter
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BACKGROUND: Surgical drains, used in a variety of procedures, are placed prior to closing an operative wound and allow for drainage of bodily fluids that would otherwise accumulate in potential spaces created by operations.1 To prevent premature drain removal, drain tubing is secured to the patient at the exit point by tying suture in a "Roman garter" technique.2 Suture-based drain securement is known to cause discomfort, particularly at the site of skin fixation as drain tubing movement is transmitted to a focal point. Patients may experience skin irritation, pain, skin tugging, loosening, and unintended loss of the drain.
A novel, sutureless drain securement device (SDSD) was created to address these factors which impact patient experience while maintaining the functionality and purpose of surgical drains.

METHODS: An IRB-approved randomized control trial enrolled 21 patients of 7 different surgeons. Patients 18 years or older who underwent placement of 2 or more drains as part of either breast reconstruction, breast reduction, abdominoplasty, or body contour surgery were included. Patients under the age of 18 and/or those with an allergy to skin adhesives or Tegaderm dressing and unilateral drain placement were excluded.
Subjects were then randomized to receive a right or left SDSD with the contralateral site undergoing traditional suture-based drain securement.
Outcomes evaluated included: time taken to secure and dress SDSD versus traditional suture-based technique, surgeon assessment of SDSD usability, adverse outcomes, patient satisfaction, and a blinded evaluation of each skin site at the time of drain removal. Analysis was performed using paired t-tests.

RESULTS: No drain securement failure was encountered. The average duration of drain placement was 8.24 days (range = 5-14 days). Securement of the SDSD was significantly faster ($p= 0.0008$) when compared to traditional suture. Blinded skin site evaluations concluded no significant difference in erythema and blistering, ($p=0.655$) and ($p=0.8936$) respectively. Patients significantly favored the SDSD in all survey categories including activities of daily living, irritation, itching, tugging, and pain.

CONCLUSIONS: The novel SDSD enhances the overall patient experience with surgical drains. The SDSD offers a reliable, standardized, patient-friendly alternative to traditional suture-based drain securement. Utilization of the SDSD reduces the time to secure drains and has the potential to reduce the risk of sharps injury. Implementation of the SDSD technology may be adapted to other suture-secured medical devices.

REFERENCES:

1. Khansa, Ibrahim M.D.; Khansa, Lara Ph.D.; Meyerson, Joseph M.D.; Janis, Jeffrey E. M.D.. Optimal Use of Surgical Drains: Evidence-Based Strategies. Plastic and Reconstructive Surgery 141(6):p 1542-1549, June 2018. | DOI: 10.1097/PRS.0000000000004413
2. Heskin L, Cahill V, Filobbos G, Regan P, O'Sullivan ST, Bryan K. A new adaptation for a secure surgical drain placement and a comparison with four common drain fixation methods. Ann R Coll Surg Engl. 2019;101(1):60-68. doi:10.1308/rcsann.2018.0177

Academic Plastic Surgeons Report Inadequate Knowledge and Training in Non-Technical Skills (NTS): a National Survey Study in the United States

Abstract Presenter
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BACKGROUND: Prior research has shown that low Non-Technical Skills (NTS) among surgical teams is linked to surgical adverse events, and formal training in NTS can significantly reduce these.1-3 To gauge the level of NTS knowledge and training among US academic plastic surgeons, we conducted a national survey study. We hypothesized that most respondents would not have received formal NTS training but would favor providing such training to residents.

METHODS: A 29-question survey was distributed to academic plastic surgeons via email with the support of the American Council of Academic Plastic Surgeons. The survey inquired about demographics, knowledge and training in NTS, NTS importance and assessment tools, and NTS training in plastic surgery residency programs. Outcomes were analyzed with descriptive statistics and for associations between co-variables (region, sex, years since completing residency/fellowship).

RESULTS: One-hundred ninety-three responses were obtained. Only 43.5% knew the definition of NTS. Most respondents (60.1%) thought a plastic surgery NTS assessment tool would lead to a lower rate of adverse surgical events in the operating room. Respondents that had received NTS training in the past (61.6%, p=0.003) and felt more experienced in NTS (60.6%, p=0.001) were significantly more likely to formally teach NTS. Professionalism was considered the most important NTS (42.0% ranked it highest). Leadership was considered the least important (69.1% ranked it lowest). Of the 74.1% of respondents that thought NTS teaching should be standardized nationally, most (55.5%) thought the format should be online lectures.

CONCLUSIONS: NTS knowledge and training among academic plastic surgeons could be improved. There is a preference for increased training and assessment for residents. The development of formal training and/or assessment programs could improve surgeons' NTS with the potential to improve patient outcomes.

REFERENCES

1. Suliburk JW, Buck QM, Pirko CJ, et al. Analysis of Human Performance Deficiencies Associated With Surgical Adverse Events. JAMA Netw open. 2019;2(7):e198067. doi:10.1001/jamanetworkopen.2019.8067
2. Zegers M, de Bruijne MC, de Keizer B, et al. The incidence, root-causes, and outcomes of

adverse events in surgical units: Implication for potential prevention strategies. Patient Saf Surg. 2011;5(1):13. doi:10.1186/1754-9493-5-13
3. Hernandez-Boussard T, McDonald KM, Rhoads KF, Curtin CM. Patient Safety in Plastic Surgery: Identifying Areas for Quality Improvement Efforts. In: Annals of Plastic Surgery. Vol 74. Lippincott Williams and Wilkins; 2015:597-602. Doi: 1097/SAP.0b013e318297791e

A Novel Method for Quantitative Analysis of Dermal Backflow of Lymphatic Fluid using Indocyanine Green (ICG) Lymphography: A Sensitivity and Specificity Analysis

Abstract Presenter
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PURPOSE: Indocyanine green (ICG) lymphography has emerged as a promising tool for surgical planning and staging of lymphedema. However, current approaches are qualitative in nature and limit our ability to longitudinally measure changes following surgical intervention. In addition, although it is clear that ICG lymphography abnormalities are present in lymphedematous limbs, the specificity of ICG abnormalities for disease diagnosis is not known. The purpose of this study was to develop a novel method for quantitative analysis of the dermal backflow rate and analyze the accuracy, sensitivity and specificity of ICG in detecting lymphedema in breast cancer patients undergoing axillary lymph node dissection (ALND).

METHODS: This was a prospective study conducted at a tertiary cancer center between 2019 and 2022. ICG lymphography was performed in patients 1 year after ALND, regardless of whether they developed lymphedema or not. Images were recorded 30 mins after dye injection, for both the lymphedema and the unaffected arm. Dermal Backflow rate was quantified using Image J. Both 2D and fluorescence images were thresholded and used to create a binary mask of each aspect of the arm. The ratio between the area occupied by dye and the total area of the patient's arm was calculated to provide the dermal backflow rate for each aspect of the arm. The mean value between the dorsal and volar aspects was calculated, with the unaffected arm acting as a control. Lymphatic Clearance Capacity was evaluated 10 days after dye injection, quantifying the percentage of dye left in each arm using the same methods utilized for dermal backflow analysis. Dermal backflow rate and clearance capacity were compared to relative volume change (RVC) to generate receiver operator characteristic (ROC) curves and the accuracy, sensitivity and specificity of both methods to diagnose lymphedema were analyzed.

RESULTS: 82 patients aged 47.6±11.2 with a mean follow-up time of 12.2±2.1 months were

included. 27 patients (32.5%) developed lymphedema, defined as an RVC of 10%. The optimal cutoff for dermal back flow rate and clearance capacity were 2.5% (AUC=0.635) and 10% (AUC=0.614), respectively. Dermal backflow rate had an accuracy of 63.6%, sensitivity of 70.6%, and specificity of 61.2%. Clearance capacity had an accuracy of 71.4%, sensitivity of 60.0% and specificity of 74.4%. LDEX scores had an accuracy of 61.3%, sensitivity of 55.0% and specificity of 63.3%.

CONCLUSIONS: Dermal backflow rate and clearance capacity demonstrated the highest sensitivity for the diagnosis of early-stage lymphedema. Screening for lymphedema and accurate quantitative assessment of dermal backflow patterns on ICG represents a major shift in current clinical practice paradigms, putting an emphasis on early detection of lymphedema rather than palliative treatments and symptomatic relief. These findings set the stage for the development of a practical, universal, ICG-based quantification system for the staging of lymphedema, a significant advancement in the field of plastic surgery.

Advancing Wound Closure Techniques: Safe and Successful Wound Closure with Novel Pulsed 980 nm Laser Welding

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INTRODUCTION: Laser-tissue welding is an important technique for achieving tight wound closure by simultaneously coagulating and cauterizing the tissue. It has several advantages over traditional suture-based wound closure methods, including fast wound closure and no foreign body reaction risk. Additionally, its ease of use makes it a potential option for wound closure in disaster scenarios or conflict areas, where trained personnel may not be available to perform complex surgical procedures. The unique properties of laser-based closure systems make them a promising frontier in wound care. However, the main challenge is to develop a laser-based method that can achieve potent wound closure without causing significant thermal injury. In this study, we aimed to investigate the use of different laser wavelengths to achieve better closure with minimal injury.

METHODS: Three vertical one cm full-thickness skin incisions were created along the paravertebral tract on both sides of the dorsolateral skin. Contralateral wounds were matched and closed with either a 980 nm or a 1064 nm laser-welding technique, using 1 watt for 10 seconds and 5 joules per wound. On postoperative day 4 or 7, skin samples were collected and stained with hematoxylin and eosin to measure superficial and deep wound closure, thermal damage

area, coagulation area, and granulation area.

RESULTS: On days 4 and 7, the 980 nm tissue samples showed significantly less thermal damage than the 1064 nm samples. Histological evaluation showed that the shorter wavelength pulsation achieved greater closure on the superficial wound edge, resulting in tighter wound closure. The deep dermal wound edges were comparable between the two laser cohorts. However, the wounds treated with the 980 nm laser showed a significant reduction over time, bringing the profundal part closer together. There was no statistical difference between the two groups in terms of coagulation area.

CONCLUSIONS: Our study demonstrated that the use of pulsed 980 nm laser welding resulted in a reduction in wound size and less formation of granulation tissue. Additionally, there were significantly fewer thermal side effects observed compared to the use of 1064 nm laser welding. These findings suggest that pulsed 980 nm laser welding may be a more effective and safer technique for wound closure. To our knowledge, there is no technique that can achieve good closure without excessive thermal side effects, and our method is novel in terms of achieving this. However, more research is necessary to fully understand the potential long- term effects of pulsed laser mode on various types of wounds and animal models. If future studies confirm the efficacy and safety of this technique, it could become a valuable method for surgical skin closure in both clinical and emergency settings.

Superiority of Silk Wound Dressing Over the Dermabond® Prineo® Skin Closure System: A Prospective, Randomized, Single-Blinded Clinical Trial

Abstract Presenter
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PURPOSE: Over 1.5 million patients annually in the USA have an adverse reaction to medical adhesive dressings including allergic contact dermatitis (ACD), skin blistering, skin tears, poor scar formation or surgical site infections.1 These complications, known as medical adhesive related skin injuries (MARSI), are one of the most overlooked complications in surgery.2 We hypothesize that a natural hypoallergenic silk dressing will decrease the incidence of MARSI in comparison to a synthetic alternative.

METHODS: This prospective, randomized, single-blinded trial studied 25 patients who were

dressed with Dermabond® Prineo® on one side of their body and on the contralateral side with the silk wound dressing after undergoing abdominoplasty or reduction mammoplasty procedures. Data was collected over 5 postoperative visits using photographs and an investigator administered questionnaire to track rash, itch, discomfort, erythema, SSIs, need for pharmaceutical intervention, mechanical injury, and bathing routines.

DATA: 64% (16/25) of patients characterized the severity of discomfort as a score of 4 out of 10 or greater on the Dermabond® Prineo® control side and only 4% (1/25) for the silk dressing side ($p<0.001$). 52% (13/25) had a visible rash of 4 or higher on the Dermabond® Prineo® side of their incision and 0% (0/25) had a rash on the silk side ($p<0.001$). 52% (13/25) required pharmaceutical intervention (steroids or antibiotics) to treat MARSI to Dermabond® Prineo® and 0% (0/25) required pharmaceutical intervention on the silk dressing side ($p<0.001$).

SUMMARY OF RESULTS: The study has revealed an alarming range of MARSI associated complications to the Dermabond® Prineo® skin closure system with ACD being the most significant; causing erythema, pruritus and discomfort. We believe that ACD to Dermabond® Prineo® can be the result of a skin reaction to the Dermabond® 2-octyl cyanoacrylate adhesive or the Prineo® synthetic polyester mesh. Hypersensitivity reactions may either be localized to the site of application or may spread causing a skin reaction beyond the site of application . ACD to Dermabond® Prineo® can result in both acute and chronic complications. Acute ACD is characterized by erythematous rash or vesicles. Chronic ACD leads to erythematous and pruritic lesions that may result in lichenification, scaling and fissuring.

CONCLUSIONS: We demonstrate the safe and effective use of a hypoallergenic silk wound dressing that is superior to the Dermabond® Prineo® skin closure system. The advantages of a hypoallergenic silk mesh laminated with a pressure sensitive acrylic adhesive includes the ease of application and removal, resistance to detachment during normal postoperative bathing routines, the ability to be applied over irregular surfaces and the low incidence of ACD or adverse mechanical injury. We postulate that the widespread adoption of a hypoallergenic silk wound dressing has the potential to decrease the financial burden MARSI causes the healthcare system while improving the overall patient postoperative experience.

REFERENCES:

1. Fumarola S, Allaway R, Callaghan R, et al. Overlooked and underestimated: medical adhesive-related skin injuries. Journal of Wound Care. 2020;29(Sup3c):S1-S24. doi:10.12968/jowc.2020.29.Sup3c.S1
2. McNichol L, Lund C, Rosen T, Gray M. Medical adhesives and patient safety: state of the science: consensus statements for the assessment, prevention, and treatment of adhesive related skin injuries. J Wound Ostomy Continence Nurs. Jul-Aug 2013;40(4):365-80; quiz E1-2. doi:10.1097/WON.0b013e3182995516

The role of Adipose Derived Mesenchymal Cell secretome in onset and treatment of Androgenetic Alopecia

Abstract Presenter
Katarina Andjelkov MD, PhD

INTRODUCTION: The secretory properties of white adipocytes are thought to contribute to the association between hair folliculogenesis and a hair growth. [1,2] We preset the results of our 10-years' experience in application of Adipose Derived Stem Cells (ADSCs) in treatment of Androgenetic Alopecia (AGA). Also, we analysed the quantitative and qualitative secretome profiling of ADSCs from different zones of hair growth in patients with AGA.

METHOD: We included all patients treated with ADRCs from January 2012 till January 2022 in our clinic. Additionally, we present 6 male patients, candidates for follicular unit extraction hair transplantation, all in early stage of AGA. 1mm punch samples of adipose tissue located beneath hair follicles of 3 scalp areas (alopecia, borderline and normal hair growth) and 1 periumbilical sample from each patient were enzymatically digested, centrifuged, washed, and cell pellets were ceded and maintained in culture medium until reached monolayer. {Figure 1] Conditioned media samples were thawed and analyzed with 41plex kit. Results were registered by Luminex platform and calculated with xPonent software.

RESULTS: From January 2012 till January 2022, we had 94 patients treated with ADRCs, 75 male and 19 female, all with confirmed diagnosis of Androgenetic Alopecia. The average improvement in hair growth was 17.5% of terminal hair increase. All patients were in early stages of hair loss.
From punch biopsies taken from different hair growth regions we analyzed the levels of 35 signaling proteins. The levels of Inteleukin-6, Vascular Endothelial Growth Factor, Endothelial Growth Factor and Eotaxin were significantly higher in the alopecia zone in comparison to the periumbilical and occipital. The similar trend was found for Monocyte Chemotactic Protein-3, Interferon gamma-inducible Protein-10 and Macrophage Inflammatory Protein-1 alpha. On the other side, Monocyte Chemoattractant Protein-1 level was the lowest in alopecia comparing to other zones. Other examined proteins did not shown changes.

CONCLUSION: Dermal white adipose tissue, especially those surrounding hair follicles should be considered a target for any potential therapy that aims to modulate the hair growth, weather to promote or to remove unwanted hair. The cell therapies for hair loss have not fulfilled the expectations so far. The observed differences in these signaling molecules expression could contribute for both, achieving therapeutic goals for hair loss conditions and shading more lights on the AGA etiology but also highlight the need to investigate ADSCs secretory proteome in all other conditions linked to hair loss.

REFERENCES:
1. Schmidt B, Horsley V. Unravelling hair follicle-adipocyte communication. Exp Dermatol. 2012;21(11):827-30. doi: 10.1111/exd.12001.
2. Kruglikov IL, Zhang Z, Scherer PE. The Role of Immature and Mature Adipocytes in Hair Cycling. Trends Endocrinol Metab. 2019;30(2):93-105. doi: 10.1016/j.tem.2018.11.004. Epub 2018 Dec 14.
Tracks:

Development of Three-Dimensional Breast Scanning and Geometric Measurement Application Using Laser Imaging Detection and Ranging (LiDAR) Sensor on iPhone

Abstract Presenter
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Abstract Co-Author
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BACKGROUND: Laser imaging detection and ranging (LiDAR) is a three-dimensional (3D) technology that measures the round trip of an infrared laser beam to accurately detect the presence and features of objects. Notably, iPhone with built-in LiDAR sensors have existed since 2020. Our team developed a software application for 3D breast scanning and geometric analysis. Therefore, this study assessed the precision of our application on this platform by comparing tapeline measurements.

METHODS: The software application Innoscan (Innoyard, Ltd., Seoul, Korea) based on iOS devices with built-in LiDAR sensors having two functional components: 3D scanning and 3D analysis. While using 3D scanning subsystem, each participant was instructed to maintain a comfortable sitting position while holding both hands overhead and relaxing the whole body. Anatomical landmarks were selected through touching on the device's screen. The photographer moved 360° around the participant at a distance of 50 cm from the object to capture the entire trunk. Spatial and RGB color point cloud features of the object were obtained through LiDAR sensor. The application automatically reconstructed a RGB 3D model with denoising artifact and detecting body segments. Using 3D analysis subsystem, the user selected two landmarks, and the application measured the distance between them. A curved line was used for the mid-clavicle-to-nipple, sternal notch-to-nipple and nipple-to-IMF distances. A straight line was used between nipples. 2D circumferential measurements were taken on vertical plane of nipple and IMF level. A total of 46 participants were scanned with iPhone application, and tapeline measurement were taken. Breast geometry, including mid-clavicle-to-nipple distance, sternal notch-to-nipple distance, nipple-to-inframammary fold (IMF) distance, distance between nipples and body circumference on nipple and IMF level were measured using both methods. The relative technical error of measurement (rTEM) value was used to calculate the error ratios between the measurements acquired by the software application and those of the tapeline.

RESULTS: Good rTEM values ranging from 2.99 to 5.19% were found in the mid clavicle-to-nipple distance, sternal notch-to-nipple distance, distance between nipples, nipple level circumference and IMF level circumference. However, there was a poor rTEM value over 10% in the nipple-to-IMF distance.

CONCLUSION: The proposed software application installed on iPhone with a built-in LiDAR sensor provides convenient 3D scanning capabilities to clinicians and patients worldwide. This

development provides good accuracy, uses smart mobile devices that people already own, and is more affordable than contemporary 3D scanning systems.

REFERENCES

1. Weissler JM, Stern CS, Schreiber JE, Amirlak B, Tepper OM. The Evolution of Photography and Three-Dimensional Imaging in Plastic Surgery. Plast Reconstr Surg. 2017;139:761-769.
2. Luetzenburg G, Kroon A, Bjork AA. Evaluation of the Apple iPhone 12 Pro LiDAR for an Application in Geosciences. Sci Rep. 2021;11:22221.
3. Petrides G, Clark JR, Low H, Lovell N, Eviston TJ. Three-dimensional scanners for soft-tissue facial assessment in clinical practice. J Plast Reconstr Aesthet Surg. 2021;74:605-614.
4. Rudy HL, Wake N, Yee J, Garfein ES, Tepper OM. Three-Dimensional Facial Scanning at the Fingertips of Patients and Surgeons: Accuracy and Precision Testing of iPhone X Three-Dimensional Scanner. Plast Reconstr Surg. 2020;146:1407-1417.

Application of 3D-printed Sequential Drug-releasing Patch in In-vivo Silicone Breast Reconstruction Model

Abstract Presenter
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PURPOSE: In implant-based breast reconstruction, infection is mainly concerned at the early stage and capsular contracture at the late stage [1,2]. Antibiotics are used systemically to prevent early infection, but antibiotics do not reach as much as expected immediately after mastectomy due to poor blood flow of the mastectomy flap. It would be ideal if the drug could reach effectively to the capsule tissue, and an antibiotic would act immediately after surgery and an immunosuppressive drug that prevents fibrosis after wound healing with late onset of release. In this study, we introduced a 3D-printed drug-releasing patch that was applied to the human-mimic rat model.

METHODS: Nineteen Sprague-Dawley rats were divided into 3groups. 2x2x0.7cm3 smooth silicone implants were placed pre-muscular pocket. The 3D-printed drug-releasing patch was made by decellularized extracellular matrix (dECM) from porcine blood vessels and methacrylate hyaluronic acid (HAMA). In group 1 (n=10), only the implant was inserted, and in group 2 (n=14), 2x108 colony-forming unit of S.epidermidis was injected after implantation. Group 3 (n=10) injected bacteria after implantation and placed an antibiotics-only drug-releasing patch on the ventral side. Group 4 (n=9) injected bacteria after implantation and placed an antibiotics&triamcinolone sequential drug-releasing patch on the ventral side After 8 weeks, rats were sacrificed and histological and immunohistochemical analysis (α-SMA and TGF- β) was performed.

RESULTS: Drug release patch (Group 3 and Group 4) groups show thinner capsules, lower myofibroblast, and inflammation compared to Group 2. Double-layered patch (Group 4) showed better results than single layered patch (Group 3) and has comparable results with the control group (Group 1).
Conclusion: The 3D-printed drug-releasing patch could reduce capsule formation and inflammation in the human-mimic rat model. An antibiotics&triamcinolone sequential drug-releasing patch has a better outcome than an antibiotics-only drug-releasing patch. This 3D-printed drug-releasing patch could be an ideal new technique that can be effective in preventing capsular contracture while reducing concerns about systemic side effects.

REFERENCES

1. Kanapathy, M., Faderani, R., Arumugam, V., Haque, S., Mosahebi, A. Management of periprosthetic breast infection: a systematic review and meta-analysis. J Plast Reconstr Aesthet Surg 2021;74:2831-2845.
2. Woo, S. H., Kim, W. S., Bae, T. H., Kim, M. K., Park, S. W., Kim, H. K. Comparison of the Effects of Acellular Dermal Matrix and Montelukast on Radiation-Induced Peri-implant Capsular Formation in Rabbits. Ann Plast Surg 2020;85:299-305.

A Prospective Study to Evaluate the Safety and Efficacy of Bone Marrow Mesenchymal Stem Cell Derived Extracellular Vesicle Isolate Product in Treating Radiated Breast Skin

Abstract Presenter
Tatjana Mortell

Abstract Co-Author
David Jansen MD

This study evaluated the safety and efficacy of the above product, (exosome) on radiated breast skin in post mastectomy and reconstructed breast cancer patients. The design involves an initial 5 mm biopsy of radiated breast skin, 5 ml of intradermal exosome treatment in the same 4x4 cm area and 9 months later, a second 5 mm biopsy of this radiated and exosome treated breast skin. Blinded dermatopathologic evaluation and comparative analysis of pre and post-treatment was done.
The second arm of this study is to evaluate clinical changes in the stiffness or indurated nature of radiated breast skin using a SkinFibrometer (Delfin) The stiffness reading is a quantity which indicates palpable tissue induration in quantitative means both prior to treatment and at the 9-month period.

The SkinFibrometer utilizes an indenter which is briefly pressed on the skin. The skin resists the change in shape when an external force is applied and thus the skin's response under short term load indicates its stiffness.
The specimens were embedded whole in paraffin and three sections were taken and stained: one with hematoxylin and eosin (H & E), one with Miller's elastic van Gieson and one with

picosirius red. Additional sections were taken as needed to serve as test and negative control sections for immunohistochemistry (IHC) labeling.

Sections designated for immunohistochemically were labeled for Type 1 collagen and CD31, an anti-human antibody specific for human endothelial cells. Human placenta sections served as a positive control tissue for both CD31 and Type 1 collagen labeling. The details of the preparation and processing can be discussed in a more formal setting.

A dermatopathologist with Histion Corp. provided a semiquantitative and qualitative analysis of the biopsies before and 9 months after treatment. The microscopic analysis was completed blind to treatment for all sections to evaluate fibrosis, necrosis, and a distinct dermal/epidermal junction, elastin, Type 1 collagen and inflammation using a predetermined semiquantitative scoring system. The qualitative analysis assessed the sections further microscopically. Photomicrographs were taken to illustrate the findings. A comparative analysis of each patient's two biopsies was also done. The planned number of patients in the study was 10. We have 6 completed study patients due to patients moving away, and refusals to undergo a second biopsy.

The goals of the study were to show safety and efficacy. These goals were achieved. There were no adverse events in any portion of the study other than patients not completing the study for personal reasons.

The objective fibrometer data show an average of 19.4% improvement in treated radiated breast skin stiffness. The comparative semiqualititative analysis shows varying levels of dermatopathologic improvement in skin integrity as seen by improvements in the elastin scores and fibrosis scores, more uniform distribution of long elastic fibers, and reduction in necrosis. The description most commonly seen are "Some evidence "in improvement in skin integrity. The raw data can be included in the more formal paper to be written.

These results indicate a high level of safety. The efficacy results should be interpreted with caution as sampling is a large variable in this study, the need to clearly determine efficacy would involve a larger study group.

A Prospective Study of Bone Marrow Mesenchymal Stem Cell Derived Extracellular Vesicle Isolate Product Injected After a Micro Fat Grafting to Improve Graft Take in the Perioral Area and Face

Abstract Presenter
Madeleine Landau

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David Jansen MD

This study was a prospective evaluation of the safety and efficacy of using the stem cell derived extracellular isolate product (1 ml in all patients) in combination with micro fat to subtlety

improve perioral facial volume.
We looked at 10 patients who received 6 cc of micro fat injected in precise areas in the perioral region along with the 1 ml of stem cell derived extracellular vesicle isolate product. Initial 3-dimensional photographic data (Canfield, Vectra) was acquired prior to treatment and then nine months after.

This study achieved the primary goal, proving the safety of the product. There were no adverse events in the ten patients treated. The efficacy will require a larger clinical trial
There were some difficulties with data capture in the three-dimensional facial data allowing us only to use three patients. The difficulties involved facial expressions which changed from the baseline to final evaluation. Of the three patients with solid data, there was a perceptible change in both the retained volume (43.7%) and improvement in skin quality. This supports what is accepted in the plastic surgery community. Historically, micro fat volume retention is very low. Micro fat grafting is seen as more of a treatment for skin texture. The purpose of this study was to evaluate the safety and efficacy of this product in combination with micro fat grafting There was an opportunity to study the product's ability to increase vascularity of the graft and decrease the inflammatory response thus allowing for more retention of the micro fat.

The actionable volume change image analysis data is as follows:
Subject JD
1.5 cc micro fat placed in each upper lip area
Right Volume increase, 56.91mm3 37.9 %
Left Volume increase,41.57mm3 27.7 %
Subject LH
1.5 cc micro fat placed in each upper lip area
Right Volume increase, 116.30 mm3 77.5%
Left Volume increase, 36.85mm3 24.6%
Subject MG
1.5 cc micro placed in each lower lip area
Right Volume increase, 101.30 mm3 67.5%
Left Volume increase, 35.57 mm3 23.7 %
Average graft take. 43.7 %

It has been commonly accepted that minimal volume change will occur with micro fat injections and that the greatest benefit is textural improvements. This limited data set seems to indicate that the average, 43.7%, improvement in micro graft take can be expected, clearly more than what was previously thought. The high mobility of this area has been seen to cause grafts to be absorbed over time.
Historically, this highly mobile, aesthetically important area has been over-treated with grafting in order to increase graft take. This can cause an extremely poor cosmetic appearance.
We feel this study, although limited in actionable data points, proves the safety and efficacy of this treatment plan and supports the somewhat surprising retention of volume. These careful volume changes seem to improve the overall aesthetic appearance with the added benefit of positive textural changes.
A subjective review of the remaining 7 patients shows excellent improvement in skin texture and overall skin quality. Six out of these seven patients expressed a positive and beneficial

improvement and would do the procedure again
The goal of this study was to access the safety of micro fat and the exosome treatment. This was proven with no adverse events. This limited data set does indicate further larger clinical studies in an attempt to improve and further quantify the volumetric changes. This can be achieved with a larger clinical trial in this very mobile and very aesthetically sensitive area.

AutoMated BUrn diagnostic System for Healthcare (AMBUSH)

Abstract Presenter
Mohamed El Masry MD, PhD

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BACKGROUND: In the United States (US), about 1.25 million people are treated each year for burns, and 40,000 are hospitalized for the treatment of these injuries resulting in high medical costs, approximately $7.9 billion per year. Early assessment of burn depth considered a predictor of pathological scarring that occurs in 30%-91% of burn injuries, and prioritizing burns that require surgical intervention is a critical task. However, it continues to be an open clinical challenge. We sought to develop a high accuracy automated system, that relies on multimodal Harmonic B-mode ultrasound (HUSD B-mode) and Tissue Elastography imaging (TEI), to classify burn pathology using novel techniques based on machine learning and artificial intelligence (AI).

METHODS: Burn wounds of different degrees (superficial, partial, and full thickness; n=2 each per pig; size 2"x2") were created on the dorsum of female domestic pigs (70-80lbs) (n=6 pigs) using a standardized burner. Burn wounds were treated with the same dressing. Progression of burn wounds was followed by non-invasive imaging using digital photographs, HUSD B-mode, and TEI videos at day 0 - postburn, and on days 3, 7, 14, 21, 28, 35 and 42 postburn. Burn depth was validated by histopathological analysis and results were compared with US-acquired data at different time points. State-of-the-art deep learning methods to analyze images and videos such as convolutional neural networks (CNNs) were employed. These features were used to train task-specific networks. In the case of depth classification, the classifier was further enhanced using traditional computer vision features.

RESULTS: Burns of different degrees were successfully created on all the pigs. HUSD B- mode and TEI showed characteristic biomechanical and biological response patterns unique to the different degrees of burn which was validated by H&E staining. Histological pattern graded the

burn injury from superficial involving only epidermal layer to the full thickness burn involving all skin and subcutaneous layers. Data labelling, segmentation and augmentation was done and fed into the AI system. Our system was able to classify burn wounds with a mean accuracy greater than 90%. In burn segmentation, our system achieved a mean global accuracy greater than 0.87. Further, we calculated a mean intersection over union (IoU) score of ~0.8. These scores represent a statistically significant improvement over our baseline segmentation model. Critically, this part of our system presented a clear and human-readable masks to understand the surface of burn wounds, allowing a high degree of explainability often required to interpret AI-produced results.

CONCLUSIONS: This work presented elements of an autonomous AI system to analyze and predict burn depth via texture-based image processing algorithms using multiple common medical modalities.

The Surprising Effect of Silicone Shells on the Growth of Primary Benign and Malignant Cells

Abstract Presenter
George Corpuz

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PURPOSE: Breast implant safety is a prominent topic within reconstructive surgery. The recognition of the role played by the breast implant shell in the development of Breast Implant Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) has spurred further intense investigation into the interactions between the breast implant shell and the cells commonly found around them. Although most previous studies examined cells directly seeded onto the shells, herein we investigated the direct and indirect interactions between silicone implant shells (textured and smooth) and both primary benign and triple negative breast cancer (TNBC) cells.

METHODS: MDA-MB-231 TNBC cells and HFF-1 human foreskin fibroblast cells were cultured in media containing 10% fetal bovine serum and 1% penicillin/streptomycin. Adenovirus transfected genetically-modified pro-angiogenic endothelial E4 cells and human umbilical vein endothelial cells (HUVECs) were cultured in media containing 10% endothelial cell supplement. Cells were plated at 1,000 cells/well in 96-well plates. Textured and smooth silicone implant shells of three major brands available in the U.S. were cut, cleaned, sterilized and then used to line the walls of wells within 96-well plates 24 hours after cells were plated. Wells with no implants served as a control. Plates were imaged over 10 days and cell morphology and numbers were quantified per image frame at 100x magnification with ImageJ.

RESULTS: Across implant shells from all three major manufacturers, the indirect lining of implant shells appeared to decrease cell counts of each cell type (more so in wells containing textured implants than smooth) relative to no implant comparison wells. For TNBC cells, wells without implant shells showed significant increases in normalized cell count over 10 days ($p<0.001$) that were greater than that of smooth implant wells ($p<0.05$); TNBC cells in textured-lined wells of all three brands grew significantly slower than smooth-lined counterparts ($p<0.05$). HUVEC, E4 and fibroblasts showed similar behavior with cells cultured with smooth implants growing significantly less than wells without shells but significantly faster than wells with textured shells.

CONCLUSIONS: This study is the first to examine the effect of exposure to various silicone breast implant shells (sourced from multiple manufacturers) on TNBC and other interstitial breast cell types in indirect culture. Surprisingly, both smooth and textured implant shells reduce the rate of growth of both primary and malignant cells, with textured shells consistently having a more pronounced effect. The underlying mechanism of this effect, which is seen despite the overwhelming majority of cells not being in direct contact with the implant shell, is currently under investigation.

The Simultaneous application of Monopolar Radiofrequency and Targeted Ultrasound for Stimulation of Hyaluronic Acid Production: The Summary of Current Evidence from Animal Research

Abstract Presenter
Diane Duncan MD

BACKGROUND: The monopolar radiofrequency (RF) generates heat, with the targeted ultrasound (TUS) delivering the heat to the dermal layer, ensuring deep and homogenous heating of the skin tissue. The heat induces regenerative response in the skin, namely increasing the fibroblast activity, leading to the increased production of various compounds of extracellular matrix, including the hyaluronic acid (HA). This work aims to review the current knowledge gained by animal research, investigating the effect of standalone RF treatment with the simultaneous application of RF+TUS on stimulation of the hyaluronic acid production.

MATERIALS AND METHODS: The author's review identified two studies with a combined number of 24 large white pigs. The treatment protocol consisted of four 30-minute procedures spaced 2-3 days apart. Two treatment groups were established based on the modality, which they were receiving. Group A (n=15) was treated with simultaneous application of RF+TUS, with group B (n=12) serving as a control group receiving standalone RF treatment only. PCR, MALDI-TOF, and ELISA were used for the quantitative evaluation of the changes in HA production. The distribution of hyaluronic acid within the skin tissue was then visualized with confocal and light microscopy.

RESULTS: The PCR focused on assessing the production of HAS1 and HAS2, enzymes

responsible for HA synthesis. PCR results of group A revealed a +98% and +32% increase in HAS1 and HAS2 production after the treatments, respectively. The MALDI-TOF revealed a +218% increase in measured hyaluronic acid 2 months after the treatments, with ELISA showing a +95.2% increase. The changes were also visible by both the confocal and light microscopy. The control group showed no significant (p-value > 0.05) results in either of the studies.

CONCLUSION: Based on the animal data, there is strong evidence that the simultaneous application of RF+TUS shows superior results for inducing the production of hyaluronic acid in the skin than radiofrequency alone. Supposedly, concurrent application of targeted ultrasound significantly enhances the natural regenerative processes in skin tissue. However, although the porcine animal model shares a great degree of similarity with human tissue, performing similar studies on human subjects in future would be a welcomed addition to this research.

REFERENCES:
1. Sakai S, Hirano K, Toyoda H, Linhardt RJ, Toida T. Matrix assisted laser desorption ionization-time of flight mass spectrometry analysis of hyaluronan oligosaccharides. Anal Chim Acta. 2007 Jun 19;593(2):207-13. doi: 10.1016/j.aca.2007.05.005. Epub 2007 May 6. PMID: 17543609; PMCID: PMC4129653.
2. Kim J. Clinical Effects on Skin Texture and Hydration of the Face Using Microbotox and Microhyaluronicacid. Plast Reconstr Surg Glob Open. 2018 Nov 12;6(11):e1935. doi: 10.1097/GOX.0000000000001935. PMID: 30881778; PMCID: PMC6414123.

Fibrin Glue Neurorrhaphy Acutely Blocks Distal Muscle Contraction After Confirmed PEG Nerve Fusion: An In Vivo Rat Study

Abstract Presenter
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BACKGROUND: Polyethylene glycol (PEG) is a synthetic, biodegradable and hyperosmotic material that has shown promise in the treatment of acute peripheral nerve injuries. Fibrin glue has been used as an alternative to epineural suture neurorrhaphy. Our purpose was to investigate the immediate intraoperative impact of fibrin glue upon a confirmed PEG fusion in a rat model. To our knowledge, there is no literature that reports changes to immediate nerve conduction following application of fibrin glue.

METHODS: Following a re-acclimatization period, 13 male Lewis rats underwent bilateral sciatic nerve surgery. In one leg, PEG fusion was performed using epineural sutures. Intraoperative electrophysiologic testing was performed. After recording nerve conduction parameters and confirming fusion, fibrin glue was applied to PEG fusion and then the same electrophysiologic testing was repeated. In the contralateral leg, fibrin glue was applied circumferentially to the intact sciatic nerve and nerve testing was performed once again. Outcome measures included nerve conduction velocity, nerve conduction latency, nerve conduction amplitude and visible distal muscle twitch with direct current stimulation (0.5 milliamps) proximal to the repair site. Independent samples t-test was used to compare primary outcome measures. A Shapiro-Wilk test was used to ensure normal distribution of data. Statistical significance was set at $p < 0.05$.

RESULTS: Twenty-six nerves were investigated with an average baseline amplitude of 677.7μv, an average baseline velocity of 34.09m/s and an average baseline latency of 0.41ms. The first cohort of 13 nerves, which received a suture repair, fused by PEG had confirmed peg fusion in all nerves. In all nerves a visible distal muscle twitch could be elucidated by a stimulation of the nerve proximal to the repair with a simulating potential of 0.5 milliamps. This group had an average conduction velocity of 39.6m/s and amplitude of 314.9μv. Fibrin glue was then applied to the recently fused nerve and average conduction velocity was 41.42m/s ($p=0.34$) and average amplitude conversely decreased to 151.2μv ($p<0.04$). Following fibrin glue application, a distal muscle twitch could not be produced with proximal nerve stimulation. In the second cohort of 13 nerves, following exposure, fibrin glue was applied circumferentially to the nerve without nerve transection. This resulted in a decrease in amplitude from 911.7μv to 339.3μv ($p = 0.037$) and a decrease in latency 0.41ms to 0.35ms ($p=0.013$) and an increase in conduction velocity from 34.6m/s to 41.2m/s ($p=0.013$). No distal muscle twitch could be produced in this group when stimulating the nerve proximal to the site of fibrin glue application.

CONCLUSION: Our data suggests that fibrin glue application impacts immediate peripheral nerve function either with or without a PEG fusion. We suspect that the fibrin glue construct dissipates the nerve charge thereby attenuating or blocking the nerve from stimulating distal muscle through a significant reduction in signal amplitude. Although fibrin glue is rapidly dissolved in the human body, this finding can make the intraoperative confirmation of PEG fusion thru a distal muscle twitch problematic after fibrin glue application. Further survival and functional outcome studies are necessary to understand if this observed electrical blockade has any implications on the long-term functional effects on application of fibrin glue to PEG nerve fusions.

Current goals for family planning and lactation in plastic surgery trainees and how these are influenced by policy change and perceived program support

Abstract Presenter
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PURPOSE: In 2020, the ABPS announced an update in the personal leave policy for plastic surgery trainees extending personal leave to 12 weeks without delay in graduation. Simultaneously, the ACGME announced their update in lactation policy stating protected time and access to pumping facilities for medical trainees. Little is known about whether these policy changes impact the perspectives on family planning and lactation in plastic surgery trainees. Further, it is uncertain if trainees feel supported by their program to benefit from these policy changes while undergoing training. This study sought to understand plastic surgery trainees' current goals for family planning and lactation and decipher if policy change or perceived program support played any role in their decisions to pursue a family or lactation during their training.

METHODS: An online 32-question survey was developed to evaluate plastic surgery trainees' perceptions of family planning, lactation, and perceived program support in the United States. The survey was approved by the ACAPS Research Committee which was sent out to a total of 216 plastic surgery program directors or coordinators. The survey included demographics, plastic surgery program characteristics, parental leave policies, lactational policies, and program support. Study data were collected and managed using REDCap electronic data capture tools.

RESULTS: 130 plastic surgery trainees completed the survey. 66% of participants were female. 34% of respondents started their training after the changes in the ABPS and ACGME policies and 41% of those respondents stated their decision to apply to plastic surgery residency was influenced by perceived support for family planning and lactational goals of their trainees. Regarding family planning, 27/58 (47%) of females, stated they'd plan to have children during their training. For those who stated they'd wait until after training the most cited reasons were work hours (27%) and demand of training (23%). Regarding personal leave, only 50% of female trainees who experienced live birth took up to 12 weeks of maternity leave and 100% of those who took less than 12 weeks felt this was insufficient. Paternity leave ranged from one to six weeks and 85% of those who took two weeks or less found this insufficient. Regarding lactation, 14/16 (87%) of females, who experience pregnancy during training pumped at work and 5/6 (83%) who are currently breastfeeding reported there were lactation rooms and protected time. 3/6 (50%) reported feeling supported by their program to take time to pump. In contrast, 66% of all respondents perceived their program as supportive of those pumping.

CONCLUSIONS: As women are undoubtedly entering the field of plastic surgery in increasing numbers, policies and program support for family planning and lactation are changing. We found that policy changes and perceived support for family planning influenced a significant portion of those who applied to plastic surgery residency since implementation. Regarding family planning and lactation, the majority of trainees felt supported most or all of the time by their co-residents and program leadership. This suggests that the new policy has a beneficial impact on helping trainees with family planning.

Risk factors for lymphedema-related soft tissue infections in female cancer survivors: a retrospective cohort analysis

Abstract Presenter
Hayson Chenyu Wang M.D.

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BACKGROUND: Lymphedema and subsequent soft tissue infection is a growing threat to the quality of life of cancer survivors. Prevention of soft tissue infection in lymphedema patients is very important.
Objective: To investigate the risk factors for soft tissue infection in female cancer survivors who had secondary peripheral lymphedema.

METHODS: A retrospective cohort study was conducted. Female patients with secondary lymphedema caused by breast, ovarian, endometrial, and cervical cancer were included. Clinical data related to the severity of edema, limb circumference at different sites, cancer treatment, comorbidities were included in the analysis as potential risk factors. The primary outcome was soft tissue infection. LASSO regression and multivariate logistic regression were used to screen the risk factors.

RESULTS: Seven out of 43 upper extremity lymphedema patients had soft tissue infection (16.28%), while 20 out of 81 lower extremity lymphedema patients had soft tissue infection (24.69%). The risk factors for lower extremity screened by multivariate analysis included: pain [OR=1.52085 (1.23571~1.87179), P=0.00023], limb circumference at 10 cm below the knee [OR=1.01559 (1.00521~1.02609) P=0.00479], Osteoporosis [OR= 2.50872 (1.53877~4.09009) P= 0.00055], Cancer Type [OR= 0.81159 (0.6935~0.94979) P=0.0121]. The internal validation of the multivariate regression results suggested a C-index = 0.917517, while the ROC curve suggested an area under the curve AUC = 0.918.

CONCLUSIONS: Limb circumference, pain, osteoporosis and cancer type are risk factors for soft tissue infection in lower extremity lymphedema in female cancer survivors. Targeting the preventable factors, such as edema control by daily management, could be an effective way to reduce the risk of soft tissue infection.

The Virtual Loupe: A Pilot Study Demonstrating the Use of Mixed Reality in Plastic Surgery

Abstract Presenter
Waylon Zeng MD

Abstract Co-Author

James Thompson MD

BACKGROUND: Traditionally, plastic surgeons have used loupes or operative microscope for visual magnification to aid in tissue dissection and anastomosis of structures. These devices have their own limitations, including fixed or lower magnification, bulkiness, narrow field of view and depth, cost, and set-up time.
Current uses of augmented and virtual reality technology in surgery have been limited to pre-operative planning and simulation. We present a proof of concept that utilizes AR and VR, known as mixed reality, to address the limitations of loupes and microscopes to augment visualization.

METHODS: We first evaluated methods of gaze-based eye tracking to enable digital magnification. Using the Varjo XR-1, an industry-ready head-mounted display (HMD), we compared discrete zoom through a displayed interface versus continuous zoom through eye squinting. Participants completed a survey and interview following the activity.
Next we assessed the performance and limitations of MR digital magnification. We utilized an upgraded headset, the Varjo XR-3, to address the hardware limitations of the first study. Participants were asked to complete anastomotic suturing tasks with progressively finer polypropylene suture. Participants completed a similar survey and interview.

FINDINGS: All participants felt the discrete zoom was easier to use. Participants had difficulty determining depth and visualizing the suture as it became finer regardless of the magnification level. Using the system usability scale, 9/13 participants rated the second stage user experience as acceptable or above, which was higher than phase 1 (3/6).
Wilcoxon rank sum test was used to examine the differences in percentile distribution. We found significant difference in distribution of percentile (p 0.0390). Observing the median and interquartile ranges, phase 2, 77.50 [67.50, 90.00] reported significantly greater percentiles than phase 1, 57.50 [17.50, 72.50].

CONCLUSION: These findings suggest that virtual loupes may be a valuable tool for plastic surgeons, offering potential for variable magnification and advanced visualization. Additionally, improvements in the hardware yielded significantly higher ratings of system usability and user experience. Further development is needed to address the limitations of existing devices.

Dr. ChatGPT: Utilizing Artificial Intelligence in Surgical Education

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ABSTRACT/PURPOSE: ChatGPT is a chatbot paired with powerful artificial intelligence (AI). It was released in November 2022 and within a month had over 100 million users, making it the fastest growing consumer internet application in existence. (1) Within the medical literature, AI has been used in various ways including recognizing the presence of cardiac ischemia and virtual surgical planning. (2,3) However, the utilization of ChatGPT in the field of surgical education has not yet been examined. This study sought to explore the capabilities of ChatGPT in describing the surgical steps of a specialized operation, the Fisher cleft lip repair. In doing so, this allowed testing the expertise and detail of ChatGPT, its ability to coherently write surgical steps, and applications in teaching introductory surgical concepts.

METHODS/MATERIALS: A chat log within ChatGPT was created to generate the procedural steps of a cleft lip repair utilizing the Fisher technique. A board certified craniomaxillofacial (CMF) surgeon then wrote the Fisher repair in his own words blinded to the ChatGPT response. Using both responses, a voluntary survey questionnaire was distributed to plastic and reconstructive surgery (PRS), general surgery (GS), internal medicine (IM) residents, and medical students at our institution. Using Likert scales (with 1 being lowest rating and 5 being highest), we collected information on understanding, preference, and identification of the procedural prompts in a blinded study.

RESULTS: Results show PRS residents were able to detect more inaccuracies of the ChatGPT response as well as prefer the CMF surgeon's prompt in performing the surgery. Residents with less expertise in the procedure not only didn't detect who wrote what procedure, but preferred the ChatGPT response in explaining the concept and chose it to perform the surgery. As responses strayed farther from familiarity with plastic surgery, the surgeon's explanation became more difficult to understand. PRS rated the CMF surgical steps with a comprehension score of 3.3, GS 2.6, IM 2.3, and medical students 2.1. In contrast, the ChatGPT response received a 2.7 rating from PRS in comprehension while all other groups rated it higher than 3.

CONCLUSIONS: In applications to surgical education, ChatGPT was found to be effective in generating easy to understand procedural steps that can be followed by medical personnel of all specialties. However, it does not have expert capabilities to provide the minute detail of measurements and specific anatomy required to perform medical procedures. As the technology advances, further studies should examine methods of implementing artificial intelligence in medical education and practice.

REFERENCES:

1. Milmo, Dan (February 2, 2023). "ChatGPT reaches 100 million users two months after launch". The Guardian. ISSN 0261-3077. Archived from the original on February 3, 2023. Retrieved February 3, 2023.
2. Baxt WG, Shofer FS, Sites FD, Hollander JE. A neural network aid for the early diagnosis of cardiac ischemia in patients presenting to the emergency department with chest pain. Ann Emerg Med. 2002;40(6):575-583. doi:10.1067/mem.2002.129171
3. Chim H, Wetjen N, Mardini S. Virtual surgical planning in craniofacial surgery. Semin Plast Surg. 2014;28(3):150-158. doi:10.1055/s-0034-1384811

Utility of a Novel Mobile Application (FLAPP) for Teaching Post-operative Monitoring of Microsurgical Anastomoses

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PURPOSE: Microsurgical reconstruction is an indispensable tool in Plastic Surgery. Early detection of microanastomosis failure is critical, but there is a paucity of teaching resources in postoperative monitoring. We recently developed a mobile application (Flap Assessment App; FLAPP), including microsurgery, clinical/Doppler assessments, and flap troubleshooting tutorials, and practice cases. This study tested the usefulness of this app.

METHOD: Members of the University of Manitoba Department of Plastic Surgery used the FLAPP teaching app then completed a questionnaire assessing the app sections using a Likert scale. Qualitative analysis was performed. Preliminary results are presented.

RESULTS: Participants included residents (43%), nurses (14%), attendings (4%) and physician assistants (PAs) (4%). Of residents, 50% were junior (PGY-1/2) and 50% senior (PGY-3/4/5). 50% of nurses/PAs had >5 years' experience monitoring free flaps, while 33% had <1 year. 100% of participants agreed/strongly agreed that each tutorial section was useful. 100% of participants agreed/strongly agreed that case video quality and variety was acceptable; 86% agreed/strongly agreed that audio quality was acceptable. 100% of participants agreed/strongly agreed the app was useful for teaching and improving confidence/ability in monitoring microanastomoses; 100% agreed/strongly agreed the app should be incorporated into teaching curriculum and would recommend to other trainees. 93% of residents, nurses, and PAs agreed/strongly agreed the app would be beneficial to use prior to clinical assessments and would use the app to practice independently.

CONCLUSION: The FLAPP teaching app contains tutorials and practice microsurgical cases useful for learning and improving confidence in post-operative microsurgical monitoring, beneficial for training prior to clinical assessments. Next steps include app updates based on feedback, and additional testing prior to wide release as a free teaching tool.

Access to Cleft Surgical Care in Low- and Middle-Income Countries: A Geospatial Analysis of 27 Countries

Abstract Presenter
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BACKGROUND: Access to essential surgical care is an indicator of the strength of a health system, as defined by the Lancet Commission on Global Surgery. Cleft surgery is one of the 44 essential surgical procedures, yet access to cleft care is limited in many low- and middle-income countries.

AIMS: 1) To map the number and types of existing cleft care providers in 27 countries where Operation Smile operates.
2) To estimate the proportion of the population within 100km radius of cleft care providers.

METHODS: This was a cross-sectional descriptive analysis conducted from April 2020 to October 2020. State (private or public) and NGO cleft care providers in 27 countries where Operation Smile is active were identified through online databases, geocoded, and verified by local Operation Smile staff. Geospatial analyses were performed on ArcGIS. Population density per administrative level 1 (region) was mapped, buffers for 100km radius were used per site. Averages were reported as medians (with ranges).

RESULTS: The average number of cleft care providers per country was 26 (range 11-107) with 0.09 providers per 100,000 population (0.01 - 0.1); 37% of providers (0 – 88%) were state and 61% (13 – 100%) were NGOs. Median percentage of the population that had access to safe surgical care within 100km radius was 37% (range: 13% - 90%).

CONCLUSION: Nearly two-thirds of the population in countries where Operation Smile works lacked access to cleft surgical care within 100km radius. The majority of care is provided by NGOs. Despite limitations, this is the first study to describe access to cleft surgical care. This research been used by Operation Smile to inform strategic planning of programs to increase access to cleft care in regions where care is limited.

Circadian gene-modulating compounds prevent hypertrophic scarring: in vivo study

Abstract Presenter

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OBJECTIVES: Due to the unpredictable and variable nature of scar formation, scarring presents a challenging issue for surgeons. Hypertrophic scarring (HTS) demonstrates increased collagen biosynthesis and deposition compared to normal scar. Circadian rhythms serve to maintain physiological homeostasis, and disruptions to these rhythms may impair wound healing. Neuronal PAS domain 2 (Npas2), a core circadian clock gene, is expressed in dermal fibroblasts and has been shown to play a critical role in wound healing. In previous studies, Npas2 knockout mice showed faster closure of dermal wounds [1], suggesting Npas2 might be a new therapeutic target for wound healing and pathological scarring [2]. As a result of high throughput drug screening followed by in vitro studies, we have identified two FDA-approved compounds (named Dwn1 and Dwn2) that modulate Npas2 expression without cytotoxicity and suppress the excessive collagen synthesis in vitro [3]. Here, we hypothesized that the therapeutic suppression of Npas2 by the hit compounds will result in accelerated wound healing in vivo with minimal HTS.

METHODS: Murine dorsal excisional wound model was created according to the previously established procedure [4]. The dorsal skin of the 12-week-old female wild type C57BL/6J mice (Jackson Laboratory) was shaved. Two 5 mm in diameter of full skin thickness excisional wounds were created using skin biopsy punch under general inhalation anesthesia with isoflurane. The open wound margin was tied with silicon splint by nylon stitch to prevent the skin contraction. Dwn1 or Dwn2 dissolved in vehicle solution were applied on the wound as an experimental group. For a negative control group, vehicle solution was applied. Wound healing was monitored every day. Mice were euthanized on 14 days after surgery and the entire full-thickness dorsal dermal tissue including wound were harvested and proceeded histological sections to stain with hematoxylin and eosin (HE) and Masson's Trichrome (MT).

RESULTS: Daily observations confirmed that wound healing was significantly accelerated in the Dwn1 or Dwn2 compared to the vehicle control group. In the HE observation, hyperkeratosis and residual clots were not observed in the Dwn1 or Dwn2-treated wounds. Furthermore, the edge of dermis connective tissue with hair follicles moved toward the center of wounds by Day 14. The epithelial layer at the wound area appeared to be similar to the intact skin epithelium, and the immune response had declined. In the MT observation, wounds treated with Dwn1 or Dwn2 showed histological evidence of less HTS phenotype in the wounded tissue.

CONCLUSION: This study suggests that the hit compounds may be novel therapeutic agents for accelerated wound healing with minimal HTS.

REFERENCES:
[1] Sasaki H, Hokugo A, Wang L, et al. Anat Rec 303(6):1630-1641.2020
[2] Shibuya Y, Hokugo A, Okawa H, et al. Elife. 11:e76207.2022
[3] Clements A, Shibuya Y, Hokugo A, et al. Front Med 9:1014763. 2023
[4] Wang X, Ge J, Tredget EE, et al. Nat Protoc 8(2):302-9.2013

Of Rats and Men: Comparing the Effects of Topical Minoxidil, Tacrolimus, and Petroleum Jelly on Skin Perfusion in a Rodent Ischemia Model

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INTRODUCTION: Skin necrosis is a pervasive challenge in the realm of plastic surgery, particularly for breast cancer patients who undergo reconstruction, with estimates suggesting that skin necrosis affects between 5% to 30% of mastectomy flaps.1 This complication is driven by various etiologies, including tissue hypoxia, ischemia, and venous and lymphatic congestion culminating in tissue edema and ultimately arterial insufficiency. Tacrolimus, a calcineurin inhibitor with demonstrated potential to enhance the growth of lymphatic collateral vessels and mitigate lymphedema, was posited as a possible solution to necrosis.2,3 Topical minoxidil is a vasoactive agent that has also been shown to improve perfusion and angiogenesis in cutaneous skin flaps.4 Previously, we found that topical tacrolimus can reduce full-thickness necrosis in rat pedicled dorsal flaps by an average of 33.8% compared to petroleum jelly, and that preoperative and postoperative applications of the agent led to increased tissue viability compared to postoperative treatments alone. The aim of this study is to further investigate the effects of topical minoxidil, tacrolimus, and petroleum jelly on skin perfusion after an ischemic challenge.

METHODS: 24 Sprague-Dawley rats were randomized to two treatment arms (0.1% topical tacrolimus, 5% minoxidil) and 2 were used as control (petroleum jelly). The rats are treated for seven days preoperatively, after which a cranially based dorsal skin flap measuring 3 x 10 cm was raised. The topical agents are applied for seven more days after the surgery. On POD 8, the rats are sacrificed. One blinded reviewer measured the total skin flap surface area, and demarcated regions of full perfusion (viable tissue), partial necrosis (reversible ischemia), and full thickness necrosis. Percentages were calculated using Fiji and statistical analyses were performed in Prism: GraphPad.

RESULTS: The average full perfusion (viable) areas for topical minoxidil, tacrolimus, and control were 41.4%, 50.9%, and 41.4%, respectively. The average partial necrosis (reversible

ischemia) areas for topical minoxidil, tacrolimus, and control were 39.7%, 39.2%, and 40.4%, respectively. The average full thickness necrosis areas for topical minoxidil, tacrolimus, and control were 18.9%, 9.9%, and 18.3%, respectively. Tacrolimus led to the lowest area of compromised (ischemic and necrotic) tissue compared to minoxidil and petroleum jelly treatments (49.1% vs. 55.6% and 58.6%).

CONCLUSION: Skin necrosis following breast reconstruction surgery can result in delayed wound healing, increased infection risk, prolonged hospitalization, and negatively impact aesthetic outcomes. Pre- and post-surgical treatment with topical tacrolimus resulted in notably less necrosis than minoxidil, which was similar to control. Further immunohistochemistry evaluations are needed to characterize their effects on angiogenesis.

REFERENCES

1. Robertson SA, Jeevaratnam JA, Agrawal A, Cutress RI. Mastectomy skin flap necrosis: challenges and solutions. Breast Cancer (Dove Med Press). 2017 Mar 13;9:141-152. doi: 10.2147/BCTT.S81712. PMID: 28331365; PMCID: PMC5357072.
2. Gardenier JC, Kataru RP, Hespe GE, et al. Topical tacrolimus for the treatment of secondary lymphedema. Nat Commun. 2017;8:14345.
3. Jung WF, Van YR, Huang H, Otterburn DM. The Effect of Presurgical and Postsurgical Topical Tacrolimus on Pedicled Flap Survival in Rats: A Pilot Study. Ann Plast Surg. 2022 May 1;88(3 Suppl 3):S235-S238. doi: 10.1097/SAP.0000000000003205. PMID: 35513326.
4. Gümüş N, Odemiş Y, Tuncer E, Yılmaz S. The effect of topical minoxidil pretreatment on nonsurgical delay of rat cutaneous flaps: further studies. Aesthetic Plast Surg. 2013 Aug;37(4):809-15. doi: 10.1007/s00266-013-0161-x. Epub 2013 Jun 14. PMID: 23764964.

ChatGPT is Equivalent to First Year Plastic Surgery Residents! Evaluation of ChatGPT on the Plastic Surgery In-Service Exam

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INTRODUCTION: ChatGPT is an innovative artificial intelligence (AI) language model developed and released by OpenAI in late 2022. Recent studies have assessed the use of ChatGPT in the medical field including for note writing, diagnostic purposes, and on medical licensing examinations. Given the expert knowledge and complexity of the context-dependent medical decision-making required to answer the Plastic Surgery In-Service Exam, we aimed to evaluate the performance of ChatGPT in answering these questions as compared with the average scores of plastic surgery residents.

METHODS: We used the Plastic Surgery In-Service exams from 2018 to 2022 as the question source for this study. For each question, the stem and all multiple-choice options were imported into the ChatGPT interface. Questions that were not scored on the in-Service exam were excluded from the study. Since ChatGPT only accepts text input, any questions that included an image or tables were also excluded. Categorical data were presented using counts and frequency analyzed using the Chi-squared test and Fisher's exact test. The 2022 exam was used to compare the performance of ChatGPT to plastic surgery residents nationally.

RESULTS: We reviewed the questions of 5 years of the Plastic Surgery In-Service exams, for a total of 1250 questions. A total of 18 questions were inconclusive according to the ChatGPT For these questions, ChatGPT either stated that more information was required to answer the question or that there were multiple correct answers from the choices given. After excluding inconclusive questions and questions with photographs and tables, a total of 1129 questions were included in the final analysis. ChatGPT was able to answer 630 (55.8%) of these correctly. ChatGPT scored the highest on the 2018 exam (58.1%) and on the comprehensive section (58.7%). There were no significant differences in regard to questions answered correctly among exam years or among the different exam sections. ChatGPT answered 57% of questions correctly on the 2022 In-Service exam. When compared to the performance of plastic surgery residents in 2022, ChatGPT would rank in the 49th percentile for first-year integrated plastic surgery residents, 13th percentile for second-year residents, and 0th percentile for 5th and 6th-year residents. ChatGPT's performance on this exam was in the 24th, 7th, and 10th percentile when looking at the first, second, and third-year independent track plastic surgery residents, respectively.

CONCLUSION: ChatGPT was able to answer the vast majority of questions that were on the exam, with less than 2% of questions being inconclusive. In terms of accuracy, ChatGPT is able to perform at the level of a first-year resident on the Plastic Surgery In-Service examination. However, it performed poorly when compared to residents in more advanced years of training. While ChatGPT has many undeniable benefits and potential uses in the field of healthcare and medical education, it will require additional research to assess its accuracy.

A Descriptive Analysis of Facial Plastic Surgery Fellowship Program Directors

Abstract Presenter
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INTRODUCTION: Facial Plastic Surgery fellowship is a post-graduate program available to residents in an Accreditation Council for Graduate Medical Education accredited otolaryngology or plastic surgery program. Fellowship program directors (PDs) play an essential role in the onboarding of new fellows. Because these PDs train the next generation of facial surgeons, there has been a widespread interest in characterizing the qualities and qualifications of these leaders. However, there is a lack of literature on the characteristics of facial plastic surgery fellowship PDs. To bridge this gap, we investigated the demographic, educational, and scholarly attributes of the American Academy of Facial Plastic and Reconstructive Surgery accredited facial plastic surgery fellowship PDs.

METHODS: Facial plastic and reconstructive fellowships were identified from the AAFPRS database. Demographic, educational, and scholarly characteristics of PDs were collected using publicly accessible resources such as institutional websites, physician databases (Healthgrades, Doximity, LinkedIn), and CMS Open Payments website. Clinical experience was calculated using the number of years since completion of medical school. Fisher's exact test, Chi-square test, and Student's t-test were used for comparisons of PD characteristics.

RESULTS: 98 PDs were identified, with a mean age of 54.7 ± 10.9 years. 87 PDs were men, and 11 PDs were women, with men significantly older than women ($p = 0.002$). All PDs completed their medical degree and residency in the US or Canada, exclusively in otolaryngology. Most programs had an academic affiliation (84.7%). Of PDs with an academic rank (74.5%), the majority were professors (41.1%). Overall, the mean h-index was 14.4 ± 9.9, the mean five-year h-index was 3.6 ± 3.0, and the mean m-quotient (a measure of average research productivity) was 0.6 ± 0.3. A majority (92.9%) of PDs received industry payments in 2021, totaling a mean of $14,144.1 ± $55,525.8 per physician. No differences in academic metrics were observed between men and women ($p > 0.05$). PDs of programs with an academic affiliation had a higher h-index, five-year h-index, and m-quotient relative to colleagues in programs without an academic affiliation ($p < 0.05$).

CONCLUSION: This study demonstrates that facial plastic surgery PDs are predominantly men and all were otolaryngology-trained. This training history may reflect the relative novelty of integrated plastic surgery residency programs and a preponderance of otolaryngology graduates within the subspecialty. There is a lack of plastic surgeons serving as PDs in facial plastic surgery fellowships. This may present a potential selection bias, favoring otolaryngology-trained candidates for fellowship positions compared to plastic surgery-trained individuals. Plastic surgeons who aim to achieve a PD position in this subspecialty may be presented with obstacles due to this current landscape. Moreover, although there were significantly more male PDs, there was no significant difference in academic productivity between gender. While these results suggest relative gender parity among those who reach this leadership position, there remain relatively few women in these leadership positions. These findings can serve as a baseline to study the contemporary state of facial plastic surgery leadership and monitor its evolution.

A SWOT Analysis of Hot Topics in Plastic Surgery Resident Education: Consensus from the ACAPS 10th Annual Winter Meeting

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PURPOSE: SWOT (strengths, weaknesses, opportunities, and threats) analyses are a business strategy tool that assess how an organization compares its competition. To facilitate a critical self-reflection on how to align plastic surgery education with making excellent plastic surgeons, a rotating small-group session followed by live interactive audience polling was used to perform a SWOT analysis at the 10th Annual American Council of Academic Plastic Surgeons (ACAPS) Winter Meeting. Participants analyzed 6 different domains of plastic surgery training and academic retention and voted on the most promising opportunities for growth in each respective domain.

METHODS: The 10th Annual ACAPS Winter Meeting took place in New Orleans on February 24-26, 2023. The theme of this meeting was "Deconstructing the Excellent Plastic Surgeon." The final day of the conference included a 3-hour session of rotating small groups followed by live interactive audience polls discussing the following 6 relevant educational topics: Plastic Surgery Common Application & Resident Selection, Aesthetic Surgery Education, Leadership Development & Business Education, Imbedded Fellowships & Focused Training, Mentorship, and Faculty Retention. A total of 6 groups consisting of approximately 8 attendees and 2 moderators rotated through each topic and conducted a SWOT analysis. A group scribe documented the most common recurring ideas. A live response poll was conducted to determine which opportunity for each group most warranted further investment. The results are presented here.

RESULTS: A total of 60 individuals participated in the small group activity and 35 to 40 individuals participated in the live response activity. The majority of participants were academic faculty surgeons. A SWOT analysis was successfully performed for each educational topic, and at minimum 4 opportunities were identified per topic to help guide future endeavors. The highest rated opportunities are presented here; if there is no true majority in voting percentage, the top two choices are presented.
(1) Resident Selection: Program statements regarding their values and what they are looking for in a prospective applicant (45%), and ACAPS releasing recommendations for the implementation of holistic review (25%).
(2) Aesthetic surgery: Developing formal guidelines for aesthetic surgery education in residency via collaboration between ACAPS, American Society of Plastic Surgeons (ASPS), and the Aesthetic Society (56%).
(3) Leadership Development and Business Education: Integrating business education into formal

curricula for all training levels (65%).
(4) Imbedded Fellowships/ Focused Training: Creating extended focused elective rotations in a given specialty (33%) and keeping training as is without shortened training options (33%).
(5) Mentorship: Creating structured resources for how to be a good mentor and mentee (45%) and aligning mentorship opportunities to streamline access to these opportunities (29%).
(6) Faculty Recruitment/ Retention: Enforcing transparency regarding position expectations and offerings including salary, call schedule, and current challenges (49%) and offering improve family/person support, childcare, and maternity/paternity leave (34%).

CONCLUSION: There is opportunity for improvement in multiple facets of training. The results of this study will help guide future initiatives by the American Council of Academic Plastic Surgeons to improve resident education and academic retention.

EVALUATION OF THE INFLUENCE OF VITAMIN D ON AUTOLOGOUS FAT GRAFTING IN PATIENTS WITH ENDEMIC GOITER

Abstract Presenter
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PURPOSE: Iodine Deficiency Disorder (IDD) is an important and actual public health problem throughout the world and particularly in Armenia.1 Armenia has high IDD prevalence and is an endemic zone for goiter.2 Autologous fat grafting (AFG) is quite a trendy and demanded intervention in modern regenerative and aesthetic medicine. AFG is a secure and successively applied method of soft tissue augmentation for both reconstructive and cosmetic indications.3 Main objective of our prospective study was to evaluate the potential effect of a Vitamin D supplement on AFG survival in patients with endemic goiter and to compare the results with a relatively healthy population undergone AFG.4

METHODS AND MATERIALS: A prospective study was conducted among 100 patients, who were hospitalized in the Department of Plastic and Reconstructive Surgery, Heratsi Hospital Complex from September 2022 to November 2022, whose average age was 35,24. According to the analysis of the received data 78% (n= 39) are female, 28.2% (n=11) of whom suffer from endemic goiter. Patients suffering with endemic goiter were examined in order to detect the effect of Vitamin D supplement on the outcome of AFG. Thyroid functional tests, the 25-hydroxy vitamin D test were performed to measure the level of TSH, FT3, FT4 and vitamin D among the participants of the study.5

RESULTS: As stated in research data, 30% (n=30) of patients suffer from endemic goiter (average age 32.8, average BMI 29,924). On the report of the functional analysis of the thyroid gland, 40% (n=6) of the latter had normal indicators (average level of TSH= 1.8±0.9mu/I, FT3=

1.5±0.6nmol/L, FT4= 90±13nmol/L), and the remaining 60% (n=9) had insignificant changes from the normal ranges (average level of TSH= 5.5±0.5mu/I, FT3= 2.8±0.4nmol/L, FT4= 60±10nmol/L). Studying the results of laboratory tests, 53.33% (n=8) of patients suffering from endemic goiter and 57.14% (n=20) of the healthy population have vitamin D deficiency (the average level of 25-hydroxy vitamin D is 8±3 ng/mL and 9±4 ng/mL respectively). Analyzing the long-term outcomes of post-operative vitamin D administration in the target population (those suffering from both vitamin deficiency and endemic goitre), we concluded that the latter increased fat graft volume retention compared to the endemic goiter-only and vitamin-D-deficient-only patients.

CONCLUSION: Based on our study vitamin D administration seems to be an effective drug for improving long-term AFG outcomes among patients suffering with endemic goiter and vitamin D deficiency. We suggest to conduct more detailed research among patients suffering from thyroid disorders to assess the effectiveness of vitamin D depending on the methods of fat procurement/placement and recipient zone and to study its influence on ADSC in a laboratory manner.

REFERENCES:

1. WHO, UNICEF, ICCIDD. Progress Towards Elimination of IDD. Geneva, WHO; 1999.
2. ICCIDD. About ICCIDD, ICCIDD Mandate. Middle East / Eastern Mediterranean Region. Southeast Asia Region. West / Central Europe. 20 Aug 2002. Available at: http:/www.people.virginia.edu/~jtd/ iccidd/abouticciddhome.htm. Accessed August 21, 2003.
3. Rohrich RJ. The American Society of Plastic Surgeons' procedural statistics: what they really mean. Plast Reconstr Surg. 2003;112:1389–92.
4. Loder S, Wang S, Amurgis C, DeSanto M, Stavros AG, Patadji S, Olevian D, Lee P, Guerrero D, Gusenoff JA, Rubin JP, Kokai LE. Active Vitamin D3 (Calcitriol) Increases Adipose Graft Retention in a Xenograft Model. Aesthet Surg J. 2023 Jan 6:sjad001. doi: 10.1093/asj/sjad001. Epub ahead of print. PMID: 36611261.
5. Laboratory Procedure Manual. Available: http://www.cdc.gov/nchs/data/nhanes/nhanes_07_08/THYROD_e_met_Thyroid_Stimulating_Hormone.pdf. Accessed on March 08, 2021.

Evaluating the use of indocyanine green-assisted (ICG) sentinel lymph node biopsy in melanoma patients

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BACKGROUND & AIMS: Our tertiary skin cancer service had to adapt rapidly to limited availability of 99Tc radionuclide and evaluate the use of indocyanine green (ICG) with near-infrared fluorescence as an alternative. ICG has several advantages over other tracers used in SLN localisation, including its rapid uptake by lymphatic vessels and its low risk of allergic reactions. The tracer is routinely used in SLN localisation in other cancers such as breast cancer and gastrointestinal tumours.
This study aims to evaluate the feasibility of ICG for SLN localisation in melanoma patients at a tertiary skin cancer unit.

METHODS: Prospective case series of melanoma patients undergoing SLN biopsy with either triple localisation technique (99Tc + blue dye + ICG) or dual localisation technique (patent V blue dye + ICG) were reviewed for accuracy in sentinel lymph node (SLN) detection. All patients received a single intradermal injection of 2.5mg (1ml) ICG dye.

RESULTS: 34 patients were included in this prospective case series: 23 patients had triple localisation technique (99Tc + blue dye + ICG), 11 patients had dual dye localisation technique (blue dye + ICG).

In the triple localisation group, primary melanoma sites were mostly in the head and neck region (n=15); followed by truncal (n=4) and the extremities (n=4), respectively. 45 SLNs were visualised via lymphoscintigraphy, 3 of which were echelons. 62 tissue samples were obtained for histopathological analysis. Sixty-three SLNs were identified from these samples but 5 tissue samples harvested were found to be non-lymph nodes. Only 2 SLNs were melanoma positive and were localised by all three tracers (99Tc + blue dye +ICG). 43 lymph nodes were identified by all 3 tracers. 13 lymph nodes were positive for 99Tc + ICG dye; 2 lymph nodes were only positive for 99Tc and 5 lymph nodes were negative for all three techniques. Of the 5 non-lymph node samples: 1 stained for ICG, 2 were identified via gamma probe and 2 were positive for both blue dye + ICG.

In the dual localisation group (blue dye + ICG), all primary melanoma sites were situated in the extremities. Twenty-one individual samples were collected of which 15 were lymph nodes. Six lymph nodes stained positive for both dyes with the remaining 9 stained positive for ICG only. Two lymph nodes tested positive for melanoma and both stained for ICG only. Of the 6 non-lymph node specimens 50% of samples stained of both dyes and the remaining stained of ICG only. There were no intra- or postoperative complications in both study groups.

CONCLUSIONS: There is a clear learning curve when utilising ICG for SLN localisation. In the dual dye localization group, melanoma positive SLNs were detected by ICG dye but not patent V blue dye. The finding correlates with previous studies that directly compared both dyes with ICG being more sensitive than patent V blue dye in SLN detection. Although dual tracer technique with lymphoscintigraphy and blue dye is the gold standard, clinicians should learn alternative techniques in order to maintain service resilience.

Creation of Human Digit Decellularized Composite Allografts for Non-Immunogenic Biologic Transplantation

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BACKGROUND: Vascularized composite allograft (VCA) transfers multiple tissue types, such as skin, muscle, and blood vessels, to reconstruct body parts missing that autologous surgery cannot be addressed. VCA transplantation has been achieved with penile, hand, and facial tissues. However, the need for life-long immunosuppressive therapy is a major contributor to recipient morbidity and mortality. Decellularization and recellularization of the composite allografts is one method to circumvent the recipient's immune response. Decellularization protocols remove all cellular material from the grafts, leaving only the extracellular matrix (ECM). Decellularized composite allografts (DCAs) can then be recellularized with the recipient's cells, resulting in non-immunogenic biologic grafts

METHODS: In this study, we have decellularized five whole human digits, which had been in cold storage for four months. In brief, digits were thawed and continuously perfused with PBS (1 hour), 0.2% SDS (120 hours), Distilled Water (24 hours), 1% Triton 100-x (24 hours), and PBS (48 hours). Flow rates were adjusted to maintain pressures of 50-60mmHg. Three human digits taken from cold storage served as controls.

RESULTS: There was a visible decrease in digit opaqueness. X-ray of the digits with contrast agent showed an intact vascular network. Additionally, the intrinsic function of the extensor and flexor tendons was preserved. DNA quantification of the digits showed significantly lower DNA content in DCA skin (101.99±99 vs. 28.53±16.26, $p<0.01$), muscle(74.65±44.79 vs. 26.55±18.04, $p<0.01$), bone (42.00±49.66 vs. 5.28±2.96, $p<0.01$), vessels (83.46±39.88 vs. 21.84±14.27, $p<0.0001$), and nerves (49.32±39.51 vs. 18.82±16.06, $p<0.05$). Notably, tissue is accepted as decellularized with DNA content of less than 50ng/mg.

DISCUSSION: Our results indicate that decellularization of whole digits from long-term freezer storage is feasible and represents an essential step in developing non-immunogenic VCA transplantation. Future work will focus on histologic and microscopic analysis of DCAs, comparison of ECM-bound growth factors to native tissue, and recellularization with primary human cells.

Custom 3D-Printed External Cranial Orthotic for Prevention and Treatment of Syndrome of the Trephined

Abstract Presenter
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INTRODUCTION: Syndrome of the Trephined (SoT) is an underdiagnosed and misunderstood result of decompressive craniectomy. After undergoing decompressive craniectomy, patients can display symptoms ranging from headaches, dizziness, altered behavior to changes in sensation, difficulty with ambulation, coordination, and activities of daily living. These are frequently misattributed to sequelae of traumatic brain injury.
Currently, the only treatment for SoT is cranioplasty. However, there is no method for prevention or treatment for patients in the months between craniectomy and definitive cranioplasty. We present the case of a patient with SoT whose symptoms were treated with a custom, 3D printed external orthotic to re-establish the pressure gradient between his intracranial contents and the atmosphere.
Methods

Digital Surface imaging (DSi TM) technology is utilized to obtain a preliminary imaging to craft a mold. This imaging is applied in CAD/CAM to craft the custom polycarbonate orthotic. Informed consent was obtained, including provisional IRB approval, and adherence to all

FDA expanded access protocols.

RESULTS: A 49-year-old man underwent decompressive craniectomy for a traumatic subdural hematoma. He had a lengthy inpatient hospitalization after leaving the ICU due to debilitating headaches, difficulty with ambulation/coordination, and intermittent behavioral issues which inhibited his safe discharge to a long-term acute care facility.
The device was applied with patient in Trendelenburg position to re-expand the scalp flap. The device was then applied achieving a water-tight seal using a hydrocolloid paste at the edge of the craniectomy defect. Any slight imperfections in contour of device to scalp were corrected using a heat gun.
The device-maintained seal and was removed at the time of cranioplasty. Pre-operative/post-device application CT demonstrated an achievement of 3% brain re-expansion on analysis using Brain Lab (Munich, Germany). The patient reported improvements in his headache consistent with decreased pain medication requirements specifically during Valsalva maneuvers.

DISCUSSION: By placing the patient in the Trendelenburg position, his scalp flap was able to

be passively re-expanded, which was maintained through an air-tight seal of the device. This expansion can protect the scalp soft tissue itself, by counteracting the tension and relative ischemia at the skin superficial to the edges of the craniectomy defect. Patients with sunken scalp flaps are at increased risk for serious post-cranioplasty complications including hematoma and fluid collection due to increased dead space creation. We propose that if scalp skin and intracranial volume can be maintained near their pre-surgical volumes through external tissue expansion, less dead space will be created at the time of cranioplasty and improved surgical outcomes will result.
Ideally, the device would be placed about 2 weeks post-craniectomy to establish a seal prior to onset of sinking of the scalp flap and maintain scalp expansion. We hypothesize that placement of an external cranial orthotic at this time would mitigate symptoms associated with SoT.
This demonstrates a proof-of-concept study of the potential utility for a 3D-printed external cranial orthotic to treat and ideally prevent SoT in post-craniectomy patients. Further study is required to better understand ideal patient selection, timing, safety, and impact on neurocognitive recovery.

Perceptions of Mentorship Barriers in Plastic Surgery Trainees: Focus on Diversity, Equity, and Inclusion

Abstract Presenter
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BACKGROUND: In graduate medical education, mentorship has been correlated with improved career satisfaction and reduced burnout. Women and underrepresented minorities (URM) commonly report difficulty in developing and maintaining successful mentorship relationships. We sought to identify factors associated with successful mentorship.

METHODS: We conducted an electronic survey of graduate medical education trainees at a single academic institution, including demographic factors [age, gender, race /ethnicity, language, sexual orientation, and family history of professional education] and mentorship factors [number of mentors, satisfaction, attributes, and perceptions of strengths and barriers]. Open-ended comments were collected for thematic analysis.

RESULTS: 108 responses were received for 22.9% response rate. 55% were from surgical residents (including 8 integrated Plastic Surgery trainees). 57% were from female residents; 45.7% of non-responders were female. 23.1% were from URM compared to 14.3% of non-responders. 70% are the first physician in their family. 81% had at least one mentor with an average of 2.6 mentors per respondent. Males were more likely to strongly value professional characteristics in their mentors ($p < 0.05$). Female respondents were less likely to strongly identify with mentors ($p<0.05$). URM were more likely to strongly value personal and relational

characteristics ($p<0.05$). Both URM and non-URM residents valued professional and demographic characteristics similarly.

CONCLUSION: Gender, race, and ethnicity may help identify trainees at risk for poorly perceived mentorship. Targeted mentorship programs may improve perceived mentorship quality in at-risk groups and improve the academic trajectory of residents.

Establishing Novel Transcriptome-Based Predictive Biomarkers of Skeletal Muscle Injury in the Setting of Ex Vivo Normothermic Limb Perfusion

Abstract Presenter
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PURPOSE: Muscle viability remains the primary focus of ex vivo limb preservation. We hypothesized that genes associated with the pathophysiology of tissue injury are differentially expressed during Ex Vivo Normothermic Limb Perfusion (EVNLP) compared to static cold storage (SCS), the current gold standard for limb preservation.

METHODS: Bilateral forelimbs were procured from Yorkshire pigs and randomly allocated to EVNLP (n=4) or static sold storage groups (SCS, n=4). EVNLP was carried out for up to 24 hours or until one of the termination criteria (perfusate pressure >110mmHg, weight gain ≥5%, or decrease in tissue oxygen saturation >20%) were encountered. The perfusate consisted of a colloid solution with HBOC-201 (HbO2 Therapeutics LLC, Cambridge, MA) as an oxygen carrier to generate a hematocrit of 10% -15%. Limb weight, contractility, hemodynamic parameters, perfusate electrolytes, metabolites, and gases were recorded. Skeletal muscle specimens were taken from both groups before limb procurement and at 0, 12, and 24 hours and preserved in RNAlater. Biopsies collected before limb procurement were used as controls to represent gene expression in physiologic conditions. All muscle samples were used for RNA sequencing.

Analysis of differential gene expression was performed with reverse transcriptase PCR to obtain fold changes. Samples were multiplexed and sequenced on an Illumina NovaSeq 6000 system. Gene-level counts were merged and summarized as length-scaled counts per million (CPM) with R package tximport (version 1.22.0). Graphs were made using log-transformed normalized CPM mapped reads, normalized units of gene expression were plotted, and summary statistics (mean ± standard deviation) were calculated for each gene of interest.

Alignment to the porcine genome was performed using Salmon 1.9.0. Transcripts were summarized as gene-level transcripts per million abundances with tximport. Differential expression analysis was performed using DESEQ2. Pathway enrichment by significant genes (adj-p<.05) was performed using Panther Classification System and Gene Set Enrichment Analysis.

RESULTS: A total of 2,283 genes were differentially expressed in EVNLP ($p<0.01$) compared to SCS. The top enriched pathway in both EVNLP and SCS limbs was TNF-α signaling via NF-kB.

Compared to baseline, perfused limbs exhibited enrichment of pathways involved in wound healing, inflammatory response, regulation of cellular stress, negative regulation of T-cell proliferation, negative regulation of apoptotic pathways and response to fluid shear stress (adj-p <0.05). SCS limbs exhibited a different transcriptome signature, primarily enriching for positive regulation of chemotaxis and anabolic metabolism pathways.

At 6 hours, both perfused and SCS limbs expressed 62 genes differentially, as compared to time point 0. However, when comparing samples from >16 hours and 0 hours, EVNLP showed 419 differentially expressed genes, while SCS had 37 differentially expressed genes (adj-p <0.05).

CONCLUSION: Divergent gene expression was identified during EVNLP compared to SCS. Increased genetic transcription in the setting of EVNLP is consistent with increased metabolic activity and reactive inflammation. Identification of these evoked pathways is a necessary precursor to development of a genetic test for real-time muscle viability assessment in reconstruction and transplantation. Ongoing analyses relate the transcriptome signature with physiologic outcome parameters and markers of limb viability.

Gender Bias in Plastic Surgery YouTube Content

Abstract Presenter
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OBJECTIVE: Plastic surgery, specifically aesthetics, is a field where a majority of procedures are performed on female patients by a predominantly male surgical workforce. Notably, 2021 was the first cycle where more females matched into a plastic surgery residency than males according to Whisonant et al.1 As such, it is essential to minimize the gender bias of content regarding plastic surgery educational topics. We sought to identify bias in YouTube videos

describing common plastic surgery search terms based on narrator gender, channel type, and language patterns.

METHODS: Terms were searched on YouTube using a cache-cleared browser to identify the top 30 videos for the search terms gynecomastia, hair implantation, blepharoplasty, rhinoplasty, mastopexy, and augmentation mammoplasty. These search terms were chosen to represent two male-dominated, two female-dominated, and two more gender-neutral plastic surgery procedures. Using the Linguistic Inquiry and Word Count program (LIWC) softwares, video transcripts were analyzed for 20 word categories. Video characteristics were subsequently compared by narrator gender and plastic surgery topic using Fisher's exact test, chi-square test, Student's t-test, and Welch's ANOVA. The threshold for significance was set at $p < 0.05$.

RESULTS: Videos regarding gynecomastia had the fewest views, likes, comments, and subscribers, whereas nose reshaping had the most views, likes, comments, and subscribers. There was a significant difference in the proportion of male speakers among channel types ($p = 0.001$), with medical professional personal channels having the highest relative proportion of male speakers (48 male vs. 7 female). Similarly, a significant difference in the proportion of male speakers was identified between search topics ($p = 0.001$), with gynecomastia (23 male vs. 2 female), hair implantation (19 male vs. 4 female), and mastopexy (20 male vs. 7 female) having fewer female speakers. Conversely, greater parity in the gender of speakers was noted for videos concerning rhinoplasty (11 male vs. 7 female) and blepharoplasty (14 male vs. 12 female). Linguistic pattern analysis through the LIWC tool demonstrated that female speakers were more likely to use language that was more authentic ($p = 0.01$) and express greater feeling ($p = 0.012$) and was less analytic ($p = 0.006$) and certain ($p = 0.001$).

CONCLUSION: The number of male speakers outweighed female speakers, reflecting the overall male to female plastic surgeon ratio. These findings demonstrate the need for adequate female representation in both the operating room and on educational platforms, like YouTube. Patient preferences regarding surgeon choice are not well characterized and are difficult to generalize. The linguistic pattern analysis results indicate that female surgeons use more authentic and emotional language, potentially enabling them to relate more to female patients than male colleagues. Both male and female surgeons alike should be aware of the quality and characteristics of publicly-accessible patient education resources on platforms such as YouTube, particularly as social media trends may reflect patient interests and may correlate with in-person office visit discussions and procedures.

REFERENCE

Whisonant CT, Shahriari SR, Harrison J, et al. Evaluating the integrated plastic surgery residency match during the novel coronavirus pandemic. Cureus. 2021;13:e16988

Socioeconomic Status Diversity of Trainees and Faculty in Residency Programs: A Pilot Study in Plastic Surgery

Abstract Presenter

Cynthia Yusuf

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INTRODUCTION: Diversity in medicine is crucial to ensure that important demographic characteristics of physicians reflect those of the populations they serve and increase healthcare access. The socioeconomic diversity of residents, fellows, and faculty members in any medical or surgical specialty is currently unknown making it difficult to understand socioeconomic status (SES) disparities and create programs to improve diversity. Additionally, the career trajectories of residents and faculty members who come from different SES backgrounds have not been explored. We have performed a survey-based research study to understand the SES composition and career trajectories of residents and faculty members within U.S. Plastic and Reconstructive Surgery (PRS) residency programs.

METHODS: An anonymous online survey was administered to 754 recipients of U.S. PRS programs. Self-reported SES information such as household family income prior to age 18 and parental education-occupation level was collected. Career trajectory data was obtained through questions about away rotations and research productivity.

RESULTS: Overall, 195 residents, fellows, and faculty members participated in the study, with an estimated survey respondent rate of 10.2%. Only 9.9% (10/101) of residents and fellows reported a household family income less than $40,000; however, in 2010, more than 40% of U.S. households had an annual income less than $40,000. When analyzing parental education and occupation (EO-status), 42.6% (43/101) of residents and fellows had at least one parent in an executive, managerial, or professional position with a doctorate/professional degree. Low-income and low EO-status were associated with increased utilization of federal and state assistance programs (p=0.0001) and approval for AAMC's Fee Assistance Program (FAP) (p=0.0001). Residents and fellows who identified as White were not as likely to be from low EO-status households as those who identified as Asian (OR 0.3 and p=0.015 vs. OR 2.9 and p=0.038). Residents and fellows from low EO-status backgrounds were more likely to take a gap in education (87% vs. 65.4%, p = 0.047) compared to their high EO-status peers. Notably, more current residents and fellows performed away rotations and had first-author publications during or before medical school compared to full professors (p=0.0001).

CONCLUSION: Understanding the backgrounds and career trajectories of trainees and faculty in medicine is essential, yet it has not been performed at the resident or faculty level. Despite its low response rate, this survey demonstrates the lack of SES diversity in PRS residency programs and identifies variation in career trajectories among those from different SES backgrounds. Incoming trainees into PRS programs continue to arise from wealthier backgrounds, of whom a significant percentage identify as White. Individuals in plastic surgery are publishing at an earlier timeline, having earlier first clinical experiences, and taking a greater number of away rotations.

Large-scale research efforts are necessary to study current SES diversity and learn about the barriers encountered by trainees and educators from low-SES backgrounds in all medical and surgical specialties.

Virtual Surgical Planning and Fresh Tissue Dissection: Application in Residency Training for Complex Microsurgery Procedures

Abstract Presenter
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PURPOSE: Surgical simulation provides resident surgeons with high-fidelity operative experience to master complex procedures outside the operating room1. The osteocutaneous fibula free flap is a microsurgical procedure for mandibular defects among patients with tumors in the region. It is taught to surgical residents, but the procedure is challenging in terms of understanding and execution. This study describes an innovative approach to microsurgical education using virtual surgical planning (VSP) and free fibula cadaveric dissection for mandibular reconstruction. We also aim to review the literature for applications of VSP in a simulated environment for resident education.

MATERIALS AND METHODS: A systematic review was conducted using the following databases: PubMed, Scopus, Embase, Web of Science, and Cochrane. Search terms included "virtual surgical planning", "education", curriculum", "residency", "surgical training", and "surgical simulation". An index class of junior plastic surgery residents participated in a two-day simulation experience on VSP and free fibula harvest. The first day included a didactic lecture on VSP, followed by plating of model mandibles as with VSP guides. The second day of the experience involved a fresh tissue dissection and plating of the free fibula flap in a cadaver per the VSP guide.

RESULTS: Our search criteria identified 1869 articles, 23 of which met the inclusion criteria. Simulation model topics included free fibula flap (8.7%), orbital fracture (4.3%), and a range of procedures related to various surgical fields. Three (13.0%) models discussed procedures related to plastic surgery. Only one article applied VSP to a cadaveric model on temporal bone dissection. Regarding the cadaveric free fibula model, all residents thought that their surgical technique, anatomical knowledge, and perceived confidence improved due to the simulation. All residents believed that the VSP experience with a free fibula dissection was better than standard preparation methods.

B VSP has continued to evolve patient care in plastic surgery, but there is a unique opportunity to apply it to resident training. We demonstrated successful completion of a VSP-guided mandibular reconstruction simulation. The simulation improved resident confidence and technical skill. Early adoption of such education strategies may prove beneficial when introducing complex reconstructive procedures to early trainees.

A 12-year Analysis of the Racial Distribution of Authors in Plastic Surgery Research and the Impact of Minority Mentorship on Authors of Color

Abstract Presenter
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INTRODUCTION: Recent calls for enhancing racial and ethnic diversity in the field of plastic and reconstructive surgery (PRS) have yet to achieve the desired representation of individuals who identify as underrepresented in medicine (URiMs). Defined by the AAMC as coming from Black, Hispanic, or Indigenous backgrounds, PRS has amongst the lowest percentages of URiMs compared with all other medical specialties. This study aims to reveal the racial distribution of authorship within PRS research, but also evaluate the impact that URiM mentorship has on increasing racial representation of URiM trainees contributing to PRS publications.

METHODS: A cross-sectional study was performed to evaluate racial diversity among authorship in seven high-impact PRS journals over the last 12 years (2010-2022). Our team downloaded every single PRS publication in the Web of Science in the last 12 years. The data recollection provided ~25,000 publications from which ~8250 were from the U.S.A. A ~10% random sample was identified for a total of 778 publications. We analyzed distribution of first and senior author race by publication year, total distribution of race by first and senior authorship for the 7 journals, and distribution of citations by author race.

RESULTS: The study found that across all journals, 64.48% of senior authors were white, 29.86% were Asian, 4.63% were Hispanic, and 1.03% were Black. In contrast, 59.46% of first authors were white, 32.82% were Asian, 5.15% were Hispanic, and 2.57% were Black ($p=<0.0001$). The study also found that the presence of minority senior authors increased the likelihood of a first author being a minority. The likelihood of a first author being Hispanic was 10.8 times more likely if there was a Hispanic senior author ($p=<0.0001$) , and the likelihood of a first author being Black was 26.5 times more likely if there was a Black senior author ($p=<0.0001$). There was no statistically significant difference in the total citation count with regards to authorship race. The Aesthetic Surgery Journal had the highest percentage of white senior authors at 73.61%, while Microsurgery had the highest percentage of Black senior authors

at 8.7%. Across all journals, the percentages of white senior authors ranged from 47.83% to 73.61%, while the percentages of Asian senior authors ranged from 20.41% to 40.91%. The percentages of Hispanic and Black senior authors ranged from 0% to 8.7%. The percentages of white first authors ranged from 54.55% to 71.43%, while the percentages of Asian first authors ranged from 20.41% to 38.98%. Lastly, the percentages of Hispanic and Black first authors were lower, ranging from 0% to 8.87%.

CONCLUSION: Our study is the first to enumerate the scarcity of racial representation within PRS literature. It is also one of the first to quantify the positive impact that URiM mentorship has on minority trainees successfully publishing in our field. The findings of this study should prompt a multifaceted response to enhance URiM trainees into plastic surgery via various efforts which emphasize mentorship, system-level changes, and diversity recruitment.

Assessment of Gender Diversity among First and Senior Author Publications within Plastic and Reconstructive Surgery

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PURPOSE: The purpose of this project is to evaluate gender diversity in authorship among high-impact plastic surgery journals over the past 10 years using an accurate and validated platform, Gender-API, and to identify trends and disparities in female representation as first and senior authors. The study aims to shed light on the existing gender gap in plastic surgery literature and highlight the need for future efforts to address this gap and promote gender diversity in the field while ensuring optimal patient care. This is the first project to recollect this information and provide insights into the state of gender diversity amont high-impact plastic surgery journals authorship.

METHODS: A cross-sectional study was performed to evaluate gender diversity among authorship in seven high-impact journals over the last 10 years. The prevalence of female, first and senior, authorship publications were examined using a platform, Gender-API, an accurate-validated-interface program that assigned binary genders to authors based on their first name, full name, and location.

RESULTS: Among the journals analyzed,23.1% of all publications had female first authors, which was generally, one third to one fourth the frequency of male first authorship. Across journals the Aesthetic Surgery Journal had 20.6% female first authors; the Annals of Plastic Surgery and Plastic and Reconstructive Surgery, both were 22.9% female, the Journal of Craniofacial Surgery were 21.1% female. The Journal of Reconstructive Microsurgery had 20.5% female first authorship: while Microsurgery had 15.3%. Each journal had a significantly lower percentage of female first authors versus male first authors except the Cleft Palate-Craniofacial Journal which had near parity with a total of 49.8% female first authors. During the 10-year period there was significantly lower number of females, senior authors when compared to male senior authors; 15.1% of all senior authors were female. Female senior author groups comprised 13.4 % in the Annals of Plastic Surgery 14.3% authors in the Plastic and Reconstructive Journal, 14.6 % of the authorship in the Aesthetic Surgery Journal, and 15% of authors in the Journal of Craniofacial surgery. The frequency is somewhat less at 9.32% of all authors published in Microsurgery, and 10.6% of authors whose works were published in the Journal of Reconstructive Microsurgery. Between 2012 and 2021, overall, the percent of female first authors increased from 18.4% in 2012 to 29.5% in 2021. The percent of female senior authors increased from 12.5% in 2012 to 16.1% in 2021. Across all journals, there was an increase in the proportion of female first authors and female senior authors from 2012-2021.

CONCLUSION: Despite women comprising over half of medical students and PRS residents, their representation as authors in plastic surgery literature is lower than other specialties due to barriers such as lack of mentors, family responsibilities, and institutional bias. This research project is the first to provide a comprehensive analysis of gender diversity among authorship in seven high-impact PRS journals over the past decade, highlighting significant gender disparities and the urgent need for interventions to promote diversity for first and senior authors.

REFERENCES:

1. Ysseldyk, R., et al., A Leak in the Academic Pipeline: Identity and Health Among Postdoctoral Women. Front Psychol, 2019. 10: p. 1297.
2.Sugrue, C.M., C.W. Joyce, and S.M. Carroll, Levels of Evidence in Plastic and Reconstructive Surgery Research: Have We Improved Over the Past 10 Years? Plast Reconstr Surg Glob Open, 2019. 7(9): p. e2408.
3. Silvestre, J., et al., Gender Authorship Trends of Plastic Surgery Research in the United States. Plast Reconstr Surg, 2016. 138(1): p. 136e-142e.
4. Llorens, A., et al., Gender bias in academia: A lifetime problem that needs solutions. Neuron, 2021. 109(13): p. 2047-2074.
5. Hart, K.L., et al., Trends in Female Authorship in High Impact Surgical Journals Between 2008 and 2018. Ann Surg, 2022. 275(1): p. e115-e123.

Comparing the Breast Microbiome of Cancer Patients and Prophylactic Risk-Reduction Patients Before and After Mastectomy

Abstract Presenter

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INTRODUCTION: Post-mastectomy implant infections range from 2- 28%,[1–2] occurring much more frequently than the 1-2% infection rate reported in cosmetic breast augmentation.[3] With the evolution of microbiome science, we can now examine and define the unique composition of microorganisms in one's body and how it may play a role in a person's health outcomes. Previous studies have suggested a significant difference in the breast microbiome between cancer and non-cancer patients,[4–5] and this may have the potential to influence infection rates. We present our pilot study using 16s rRNA sequencing to characterize the breast microbiome in mastectomy patients both intraoperatively and post-operatively, comparing cancer patients to those undergoing prophylactic risk-reducing mastectomy.

METHODS: A prospective randomized-controlled trial was designed for mastectomy patients undergoing two-stage implant-based breast reconstruction. Intraoperatively, a 1cm breast tissue specimen was collected, and post-operatively the peri-prosthetic space was sampled via expander aspiration or drain output at two time points (1-2 weeks and 3-4 weeks). Microbial analysis was performed with 16S rRNA microbiome sequencing. The top represented species and relative abundance percentage of various microbial signals in each sample were recorded.

RESULTS: Of the 37 enrolled patients with intra-operative breast tissue and post-operative aspirate samples, 23 (62%) patients had invasive cancer, 6 (16%) had carcinoma in situ, and 8 (22%) patients underwent prophylactic risk-reducing mastectomies. The most represented genus in the breast at time of surgery varied significantly between cancer patients, in situ patients, and non-cancer patients($p=0.045$), but the peri-prosthetic breast aspirates did not post-operatively ($p=0.593$). Pseudomonas was the top species in 50% of prophylactic tissue samples, compared to 43% of invasive cancer patients, and 33% of in-situ patients. However post-operatively, Pseudomonas was the top represented species in only 12.5% of prophylactic samples, compared to 43.5% and 66.7% of carcinoma and carcinoma in situ patients respectively. When comparing invasive carcinoma and carcinoma in situ patients to non-cancer patients, the mean relative abundance percentage of each signal in the sample showed no difference for Pseudomonas, Staphyloccocus, Cornyebacterium, Bradyrhizobium and Streptococcus ($p>0.05$). However, in surgery there was a significantly lower abundance of Acinetobacter in non-cancer patient tissue (1.1% vs 6.0%, $p=0.005$), and Burkholderia (0.5% vs 3.9%, $p=0.037$) compared to cancer patients. This changed post-operatively when there was higher Acinetobacter in non-cancer patients at 1-2 weeks (9.2% vs 2.5%, $p=0.023$).

CONCLUSION:
We present the first study to look at the local breast microbiome at time of mastectomy and post-operatively. After surgery, there were different species represented as the top species between

prophylactic patients and cancer patients, which may reflect cancer-related immune changes to the balance of the breast microbiome in response to stress and surgery. Further studies are critical to understanding the implications of these differences and how to potentially optimize the balance of microorganisms for improved outcomes.

REFERENCES:

1. Frey JD, Choi M, Salibian AA, Karp NS. Comparison of Outcomes with Tissue Expander, Immediate Implant, and Autologous Breast Reconstruction in Greater Than 1000 Nipple-Sparing Mastectomies. Plast Reconstr Surg. Jun 2017;139(6):1300-1310. doi:10.1097/PRS.0000000000003340
2. Poppler LH, Mundschenk MB, Linkugel A, Zubovic E, Dolen UC, Myckatyn TM. Tissue Expander Complications Do Not Preclude a Second Successful Implant-Based Breast Reconstruction. Plast Reconstr Surg. 01 2019;143(1):24-34. doi:10.1097/PRS.0000000000005131
3. Pittet B, Montandon D, Pittet D. Infection in breast implants. Lancet Infect Dis. Feb 2005;5(2):94-106. doi:10.1016/S1473-3099(05)01281-8
4. Campbell MJ, McCune E, Johnson B, et al. Breast cancer and the human oral and gut microbiomes [abstract]. Proceedings of the American Association for Cancer Research Annual Meeting 2019; Atlanta, GA Philadelphia (PA): AACR; . Cancer Res 2019;79(13 Suppl): Abstract nr 2830.2019.
5. Tzeng A, Sangwan N, Jia M, et al. Human breast microbiome correlates with prognostic features and immunological signatures in breast cancer. Genome Med. Apr 16 2021;13(1):60. doi:10.1186/s13073-021-00874-2

Generative Pre-Trained Transformers (GPT) Artificial intelligence – Assessing the accuracy of ChatGPT as an adjunct for peri-operative care.

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PURPOSE: As artificial intelligence (AI) innovation blossoms, minimal advancements have occurred in its integration within plastic surgery; this is especially disadvantageous given AI's potential for improved patient outcomes and experience. Most recently, a novel machine learning (ML) model using Generative Pre-Trained Transformers (GPT) has been making headlines for its ability to pass the United States Medical Licensing Exam (USMLE) and its capability to

converse with the public on a wide array of topics. Chat GPT3 developed by OpenAI and released in late 2022 utilizes a deep learning model through neural networks to recognize data patterns, and through supervised and reinforced human learning is able to answer a broad range of questions. With the US healthcare system facing a physician shortage, increasingly shorter clinical visits, and a substantial administrative burden, we investigated Chat GPT's capability and accuracy in addressing common peri-operative questions by plastic surgery patients, with the ultimate goal of utilizing a GPT model as an adjunct to assist surgeons in peri-operative care.

METHODS: Misconceptions on various common plastic surgery procedures and plastic surgery as a field among the public were identified using a literature search. Surveys on breast reconstruction, silicone implants, bariatric surgery, and preconceptions of cosmetic versus plastic surgery were adapted into questions for the Chat GPT platform (1-4). Chat GPT answers were then assessed for accuracy and compared to published literature addressing these misconceptions.

RESULTS: In addressing questions on common misconceptions regarding various plastic surgery procedures including risks and complications, Chat GPT answered 100% of the questions correctly. However, when answering questions on PRS procedure costs Chat GPT accuracy dropped to 30% and was at the lower range of price estimated when compared to ASPS. Lastly, in addressing differences between plastic and cosmetic surgery, it answered 62.8% of questions correctly, and frequently confused the term plastic and cosmetic surgeons, which may lead to further public confusion. The model did have a preference towards plastic surgeons relative to other providers and surgical sub-specialties when asked to decide between subspecialties for common plastic surgery procedures such as breast implants and rhinoplasty.

CONCLUSION: ChatGPT's ability to answer common perioperative questions and misconceptions with 100% accuracy illustrates its broad medical knowledge. While the model was able to answer most questions accurately, its answers were often basic and not nuanced. Regardless, a GPT AI model has significant potential to be a clinical adjunct to aid patients in answering peri-operative questions to allow for more enhanced and efficient patient care.

REFERENCES:

1. Gusenoff JA Pennino RP, Messing S et al. Post-Bariatric Surgery Reconstruction: Patient Myths, Perceptions, Cost, and Attainability Strategies. Plastic and Reconstructive Surgery. 2008;122(1)
2. Schneider LF, Mehrara BJ. De-Mythifying Breast Reconstruction: A Review of Common Misconceptions about Breast Reconstruction. Journal of the American College of Surgeons. 2015;220(3)
3. Shah A, Patel A, Smetona J, Rohrich RJ. Public Perception of Cosmetic Surgeons versus Plastic Surgeons: Increasing Transparency to Educate Patients. Plastic and Reconstructive Surgery. 2017;139(2)
4. Rohrich RJ, Kaplan J, Dayan E. Silicone Implant Illness: Science versus Myth? Plastic and Reconstructive Surgery. 2019;144(1)

Mental skills and emotion regulation education within surgical training programs: A systematic review

Abstract Presenter
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PURPOSE: A groundswell of research demonstrates that emotions impact memory, decision-making attention, and risk tolerance. However, the psychological management of emotions (i.e., emotional regulation [ER]) is missing from surgical education discourse and surgical training curricula. Although emotions were long thought to be a hindrance to cognition, literature demonstrates that they are not easily suppressed; indeed, suppressed emotions come at the cost of individual self-esteem, growth, and environmental mastery.1

Conversely, stress, is frequently found within surgical literature.2–4 One study found that 80% of surgeons surveyed felt the need for stress management training.3 Further, stress has been shown to decrease technical and non-technical skills, both in the operating room and simulations.2,4 Mental skills training (MST) has been shown to help professionals attain higher levels of mental and technical performance. MST includes cognitive and behavioral techniques that focus on learning about the effects of acute stress on performance, acquiring and rehearsing coping strategies to optimize performance, and applying these strategies to real-world, stressful situations.5 However, MST does not incorporate ER despite the potential for emotions' impact on surgeon performance.

We aimed to review the presence and effectiveness of ER and MST in postgraduate surgical training programs. Future research will be conducted to survey North American plastic and reconstructive program directors regarding the current use of ER or MST training in surgical curricula.

METHODS: A systematic search was conducted on Medline, Embase, and APA PsychInfo from January 1 2000 to February 3 2023 following PRISMA guidelines. MeSH terms and keywords included"surgical education," "emotional regulation," and "mental skills training." Articles were selected based on predetermined eligibility criteria.

RESULTS: The initial search yielded 1528 articles. After duplicate removal, 1345 articles were screened by title and abstract. A total of 89 articles proceeded to full-text review; of those, 50 articles were included. The majority of studies were conducted amongst general surgery residents (28% of studies), undergraduate medical students (20%), or surgical residents' sub-speciality unspecified. MST was found to be positively associated with decreased anxiety (n=8 studies), improved technical skills (n=14), and improved problem-solving ability (n=6). Only one study evaluated the integration of MST within formal curricula, while no studies mentioned the use of ER training. Many studies evaluated the benefit of ER and MST in the context of surgical simulations, only one of which evaluated ER training within a plastic and reconstructive

surgery (PRS) program.

CONCLUSIONS: MST is an effective method to manage stress and improve performance amongst surgical residents. While this is a notable advance in improving surgeon performance and wellbeing, it is yet to be adopted throughout PRS training programs in North America. Further, the use of ER remains absent from MST and formal surgical education leaving a further missed opportunity to improve performance and wellbeing. The results of this systematic review represent a static picture of an evolving landscape. Future research is needed to directly survey surgical educators regarding the formal incorporation of MST and ER within surgical programs.

REFERENCES

[1] LeBlanc VR, McConnell MM, Monteiro SD. Predictable chaos: a review of the effects of emotions on attention, memory and decision making. Adv Health Sci Educ Theory Pract. 2015;20(1):265-282. doi:10.1007/s10459-014-9516-6
[2] Bajunaid K, Mullah MAS, Winkler-Schwartz A, Alotaibi FE, Fares J, Baggiani M, et al. Impact of acute stress on psychomotor bimanual performance during a simulated tumor resection task. J Neurosurg. 2017;126(1):71-80. doi:10.3171/2015.5.JNS15558
[3] Anton NE, Montero PN, Howley LD, Brown C, Stefanidis D. What stress coping strategies are surgeons relying upon during surgery? Am J Surg. 2015;210(5):846-851. doi:10.1016/j.amjsurg.2015.04.002
[4] Anton NE, Athanasiadis DI, Karipidis T, Keen AY, Karim A, Cha J, et al. Surgeon stress negatively affects their non-technical skills in the operating room. Am J Surg. 2021;222(6):1154-1157. doi:10.1016/j.amjsurg.2021.01.035
[5] McDonald J, Orlick T, Letts M. Mental readiness in surgeons and its links to performance excellence in surgery. J Pediatr Orthop. 1995;15(5):691-697. doi:10.1097/01241398-199509000-00027

Sex-related differences in lymphedema in the mouse tail model

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Background: The mouse tail model is frequently used to study post-surgical lymphedema. We have anecdotally observed that male mice have significantly more inflammation and swelling compared with female mice. Although primary lymphedema is more common in females, the effect of sex on secondary lymphedema remains largely unknown. The purpose of this study was, therefore, to study the effect of sex on tail lymphedema in the mouse tail model. Because females are protected from reactive oxygen injury and research studies suggest that lymphatic

injury can increase the concentration of reactive oxygen and reactive nitrogen species (ROS and RNS, respectively), we also tested the hypothesis that these changes also contribute to increased inflammation and swelling in male mice.

Methods: We performed microsurgical tail lymphatic excision on male and female wildtype (WT) and constitutive iNOS knockout (iNOS-KO) mice. To assess the progression of the lymphedema phenotype, we performed weekly tail diameter measurements over a 6-week period. Each week, we also recorded the number of necrosed tails in each group. To analyze histological changes associated with lymphedema progression, we performed H&E staining to measure fibroadipose thickness. Additionally, we assessed immune cell tissue infiltration using immunohistochemistry and flow cytometry with anti-CD45 antibodies.

Results: WT male mice had markedly increased tail swelling shortly after surgery compared with female mice. Using Kaplan-Meier survival analysis, we found higher rates of tail necrosis (due to extreme swelling) in WT male mice compared to females. In addition, WT male mice that did not have tail necrosis tended to have increased swelling at each time point after surgery and this effect was most notable 6 weeks postop. Interestingly, we found that iNOS knockout males had decreased rates of necrosis compared with WT mice; although tail volumes did not significantly differ in the tails that did survive until 6 weeks postoperatively. The loss of iNOS in female mice had no effect on tail necrosis or tail volumes over the course of the experiment. Histological analysis revealed that iNOS KO male mice had decreased dermal fibroadipose deposition at 6 weeks postop compared with WT males. These changes correlated with decreased numbers of CD45+ (pan-leukocyte marker) cells on immunohistochemistry and flow cytometry in male iNOS-KO mice versus male WT controls.

Conclusions: Our preliminary findings suggest that male mice have an increased propensity for developing inflammation and oxidative stress after lymphatic injury. It is possible, therefore, that hormonal agents used for treatment of breast cancer may have an effect on the development of lymphedema. Our findings further suggest that anti-oxidative treatments may have some efficacy for preventing/treating lymphedema. Finally, our findings suggest that other mechanisms may be responsible for the increased rates of primary lymphedema in females. Future studies will determine how oxidative stress injures lymphatics, and how sex-related differences contribute to primary or secondary lymphedema.

Evaluation of functionality in hand and wrist pathology patients using geometric features extracted from shape drawings

Abstract Presenter
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PURPOSE: Our group has developed a custom digital application to assess objective hand function using an Apple pen and iPad to extract geometric drawing features from specific drawing modules. We performed an initial validation study of this novel technique by assessing the ability: (1) To differentiate patients from controls for both dominant and non-dominant hands, and (2) To assess the correlation of geometric drawing features with previously validated patient-reported outcome scores of upper extremity and global function.

METHODS: This is a prospective study of patients with both hand-wrist and non-hand-wrist pathologies. Participants were asked to draw multiple shapes on an Apple iPad with a digital pen. The drawings from 142 hands in 73 participants were categorized into four groups (dominant/non-dominant hand and patient/control). The raw data collected by the app included pen coordinates, pressure, azimuth, and altitude over time. We calculated kinematic and pressure-based features that generalize to any drawn shape from the raw data. Machine learning models were then used to statistically classify patients and controls, and to create composite scores. Model performance for classification was assessed using accuracy, precision, recall, F1 score, and area under the curve (AUC). Model performance for predicting composite scores was assessed using absolute error.

RESULTS: Patients and controls could not be differentiated by simple visual inspection of drawings; however, many geometric features were significantly different ($p<0.01$) between patients and controls for both dominant and non-dominant hand drawings. The circle drawings were the most informative and pressure features were the most important. The dominant and non-dominant hand classification metrics for discriminating patients from controls were similar (AUC = ~ 0.85, Accuracy = ~0.75, F1 = ~0.80). Composite geometric drawing features were significantly correlated ($p < 0.001$) with PRWE, SF12, and qDASH scores.

CONCLUSION: We developed a novel technique to objectively measure hand function using a drawing app
- Geometric drawing features could differentiate patients with hand pathologies from controls without hand pathologies, regardless of hand dominance
- Geometric drawing features are correlated with validated patient-reported outcomes scores.

Using Deep Learning Neural Networks to Improve the Robustness and Efficiency of Abstract Screening in Plastic Surgery Systematic Reviews

Abstract Presenter

Moaath Saggaf MD

INTRODUCTION: Abstract screening in systematic reviews requires expertise and a considerable amount of time. Machine learning models can learn from examples during the abstract screening and expedite the process. The study aimed to validate a machine learning model in plastic surgery systematic reviews.

METHODS: We used the abstracts of two recent plastic surgery systematic reviews that were completely screened by at least two reviewers to build the structure of the model. Then, we applied the model on a new systematic review. We built a recurrent neural network with long short-term memory and tuned the hyperparameters of the network based on the validation subset. We randomly split the data into two equal parts. The first half was further divided into a training subset (60%) and a validation subset (40%), while the second part was used for testing the model for abstracts that were never used in the model training or tuning. The model screened the second half of the abstracts in less than 1 minute. We compared the model predictions with two independent reviewers that were blinded to the model predictions. All the conflicts were resolved by a human reviewer, and all the reasons for mispredictions were explored.

RESULTS: The prospective systematic review had 4628 abstracts. The receiver operatic characteristic curve had an area under the curve of 96%. The sensitivity and specificity of the model were 75% and 98%, respectively. The accuracy was 97%. The model improved the efficiency of abstract screening by 25% (30 hours). The model was used as a validity check to re-evaluate the misclassified abstracts between the model and the reviewers to improve the robustness of the results. The model was correct in 82% of all the conflicts. The most common reason for misprediction by the model was the identification of published protocols from eligible studies.

CONCLUSION: Deep learning using recurrent neural networks can improve the efficiency and robustness of abstract screening in plastic surgery systematic reviews. Recurrent neural networks are versatile and can be used to improve efficiency, combined with traditional abstract screening to ensure accuracy, and promptly screen new abstracts.

Impact of ACGME-Accredited Fellowship Training on Leadership in Plastic Surgery

Abstract Presenter
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PURPOSE: While there are numerous fellowship pathways for plastic surgery residents to pursue after completion of their training, only two are accredited by the ACGME: hand and craniofacial surgery. However, little is known about the role that these ACGME accredited fellowships have on attaining leadership positions at the institutional and national level in the field of plastic and reconstructive surgery.

METHODS: The ABPS Newsletter to Diplomates was used to identify plastic surgeons who received board certification between 2002 and 2013. A web search of all surgeons was performed to identify those who pursued at least one ACGME-accredited fellowship (craniofacial or hand surgery). Further data on these surgeons were collected to include their fellowship training, business education (MBA), and leadership positions held. The leadership positions documented included chair/chief, program director, and national leadership positions within plastic surgery societies. A logistic regression model was used to identify the predictors of holding different leadership positions according to probabilities calculated from expected values.

RESULTS: There were 2190 plastic surgeons identified who received board certification between 2002 and 2013. A total of 551 plastic surgeons pursued a craniofacial (191) and/or hand surgery (332) fellowship after plastic surgery residency. A total of 578 plastic surgeons pursued non-ACGME plastic surgery fellowships. The model found 2 significant factors that increased the probability of surgeons holding a Chair or Chief position in an institution including an MBA degree (37% increase, $p = .0006$) and craniofacial fellowship (9%, $p = .0113$). The model found 3 significant factors that increased the probability of surgeons holding a Vice Chair or Vice Chief position in an institution including otolaryngology training (18% increase, $p = .0205$), an international fellowship (13% increase, $p = .0420$), and not otherwise specified fellowship (18% increase, $p = .0205$). The model did not find significant factors that impacted the probability of surgeons holding a Program Director position in an institution. The model found 1 significant factor that increased the probability of surgeons holding plastic-surgery specific positions in an institution including craniofacial fellowship (19% increase, $p < .0001$). The model found one significant factor that increased the probability of surgeons holding other institutional positions including an MBA degree (11% increase, $p = .0195$). The model found one significant factor that increased the probability of surgeons holding a plastic surgery national society position including an MBA (6% average increase, $p = .0380$).

CONCLUSIONS: Craniofacial fellowship training is a strong predictor of plastic surgeons holding institutional leadership positions, which may be attributed to craniofacial surgery being performed primarily in academic teaching hospitals, rather than community and private practice settings. Having an MBA degree is the most consistent predictor of plastic surgeons holding leadership positions at both the institutional and national level. This study highlights the factors that may influence leadership roles in plastic surgery and may serve as a guide for trainees interested in holding these positions in their career.

Diagnosing Acute Rejection Following Vascularized Composite Allotransplantation: Utilizing Machine Learning to Highlight Potential Issues with Banff Criteria

Abstract Presenter
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PURPOSE: The gold standard for diagnosis of acute rejection (AR) in vascularized composite allotransplantation (VCA) is skin biopsy followed by dermatohistopathologic evaluation and grading via the Banff criteria. Informed largely by experience in solid organ transplantation, the Banff criteria emphasizes inflammatory infiltrate, as well as epithelial and adnexal involvement. However, recently there has been growing concern regarding the validity of the Banff criteria for AR diagnosis in VCA (1). In this study, we trained a machine learning model called a convolutional neural network (CNN) to classify images of VCA skin biopsies as either rejecting or not-rejecting. After which, class activation mapping (CAM) was employed to generate heatmaps highlighting areas of interest identified by the CNN. These areas were assessed for congruency with areas of interest identified by the Banff criteria.

METHODS: Digital skin biopsy slides from face transplant recipients were sourced. Images of multiple non-overlapping segments were taken from each slide. These Images were tagged as rejecting or not-rejecting based on Banff grade and composite clinical diagnosis. This data was used to train a CNN, with a train/dev/test split of 70/20/10. CAM was utilized to visualize the relative importance of each pixel in the images. Two reviewers independently examined the CAM overlay images and identified both the total number of areas of focus emphasized by the CNN as well as which of the areas of focus coincided with regions of importance according to the Banff criteria.

RESULTS: A total of 307 images, 179 not-rejecting and 130 rejecting, were taken from 57 biopsies in three face transplant recipients. Following model development, 172 (96.1%) not-rejecting images and 120 (92.3%) rejecting images were correctly identified for a precision of 94.5% and a recall of 94.5%. Mean model confidence on rejecting and non-rejecting images correctly identified was 93.7% and 97.0%, respectively. Alternatively, on rejecting images that were incorrectly classified as not-rejecting, mean confidence was 88.5%, while on not rejecting images that were classified as rejecting, confidence was 68.9%. Following the evaluation of the CAM heatmaps, the two reviewers found 771 areas of interest across 307 slides (2.51 area/slide).

Of these areas, 470 (61.0%) overlapped with Banff Criteria identified regions, with epithelia being more commonly highlighted than adnexal or perivascular structures.

CONCLUSION: This study demonstrated a highly accurate CNN could identify rejection in VCA recipients despite emphasizing regions largely different than those identified by the Banff criteria. While this model is not for clinical translation, it identifies considerable discordance between regions highlighted by this CNN and those emphasized by the Banff criteria. These findings contribute to the growing body of evidence highlighting the potential limitations of Banff grading as the sole approach to AR diagnosis in VCA, and the importance of a more holistic, and multimodal approach to AR diagnosis in these patients.

REFERENCES:
(1) Schneider M, Cardones AR, Selim MA, Cendales LC. Vascularized composite allotransplantation: a closer look at the banff working classification. Transpl Int. 2016;29(6):663-671. doi:10.1111/tri.12750

Livestreaming Microsurgery Education: An Opportunity to Expand Global Plastic Surgery

Abstract Presenter
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INTRODUCTION: Microsurgery is a highly technical and resource-intensive subspecialty within the field of plastic surgery that is often not accessible in many hospital systems. This lack of accessibility is particularly prevalent in foreign nations which do not have access to expert microsurgical training. Surgeons and trainees around the world often have access to microscopes but lack the microsurgical guidance to complete the complex maneuvers associated with operations such as free flaps and peripheral nerve repairs. Here, we propose a highly accessible and low-cost method to livestream microsurgical education over popular online platforms in order to lift the current barriers associated with microsurgical education.

METHODS: A three camera system was developed to provide a complete and seamless view of the microsurgical field, instruments, and microsurgeon to livestream on any platform. These included a camera tethered to a cam link for a direct view of the microsurgical field, a second camera to view the microsurgeon's hands and instruments, and a third camera to view the microsurgeon's face. A microphone was also placed near the microsurgeon to enable clear audio during the operation. Open Broadcasting Software was used to compile this system onto one

page to share over any streaming platform.

RESULTS: Six microsurgical livestreams were completed at the University of Wisconsin-Madison over Zoom and Instagram platforms. These events were shared one day prior on Facebook and Instagram. A total of 96 surgeons and trainees tuned into the livestreams representing 28 countries worldwide.
Conclusions: Microsurgery education is a highly complex and specialized field within plastic surgery that is often overlooked due to lack of proper equipment and training opportunities. Here, we propose an accessible and low-cost method to deliver virtual microsurgery education in order to overcome many of the educational barriers associated with this field.

POSTERS

Close

14-YEAR EXPERIENCE IN BURN EYELID SURGERY: A SINGLE CENTER RETROSPECTIVE COHORT STUDY

BACKGROUND: It is rare for burn traumas to directly involve the eye. This is largely because of the protective blink reflex.(1,2)However, loss of vision and other ocular defects are a concern with eyelid burn sequelae. This most commonly progresses from eyelid contracture to cicatricial ectropion and lagophthalmos. When left untreated, these may lead to exposure keratitis, ulceration, infection, perforation, and loss of vision.(1)
In the case of full thickness eyelid burns, release and grafting are required. However, there is a paucity of studies on outcomes in eyelid burn surgery treatment (3,4), despite concern for permanent ocular damage or loss of vision. This study aims to describe the complication rates in burn eyelid reconstruction at a single center over 14 years.

METHODS: We conducted a retrospective study to review outcomes of eyelid burns undergoing plastic surgery reconstruction between April 2009 and February 2023. Medical records were obtained from patients' charts. Gathered data include demographics, past medical history, type of injury, indication for surgery, procedure performed and complications.

RESULTS: A total of 15 patients and 26 eyelids were treated by the plastic surgery team for eyelid reconstruction out of the 901 total patients with burn-related injuries requiring plastic surgery reconstruction from April 2009 until February 2023. These patients underwent 56 eyelid surgeries with a mean follow-up time of 13.1±16.6months. Patients were 73.3% male and 26.7% female, with a mean age of 45.7±15.7 years. In 55.4%(n=31) of the cases, the simultaneous reconstruction of both the upper and lower eyelids was necessary. The reconstruction of the upper and lower eyelid alone represented a smaller percentage (25% and 19.6%, respectively). Acute eyelid burn treatment represented 39.3% of the cases(n=22), while in 60.7% of the cases chronic burn sequelae were addressed. The eyelid procedures performed included: full thickness skin graft (50%, n=28), flap reconstruction (14.3%, n=8), debridement (12.5%, n=7), Integra (8.9%, n=5), split thickness skin graft (7.1%, n=4), canthoplasty (7.1%, n=4), TheraGenesis (7.1%, n=4), and fractional lasering (1.8%, n=1). On average, the patients received 3.7±3.4

eyelid surgeries. Half of all eyelid surgeries included temporary tarsorrhaphy (n=28) that remained in place for an average of 7.9±4.5 days. While only one case received permanent tarsorrhaphy (1.8%). The overall complication rate was 57.7% (n=30). The most common complication was ectropion (32.1%, n=18). Other complications included: lagophthalmos (17.9%, n=10), eye injury (16.1%, n=9), contracture (17.9%, n=10), eyelid infection (10.7%, n=6), sepsis (7.1%, n=4), total graft loss (3.6%, n=2), and partial graft loss (3.6%, n=2).

CONCLUSION: Full thickness skin graft remains the standard of care for patients with eyelid burns. However, there is a high incidence of ectropion that may require reoperation. Further studies examining the conditions of successful eyelid burn procedures may provide guidance on when patients may benefit from eyelid reconstruction during their burn treatment.

REFERENCES:

1. Bouchard CS, Morno K, Perkins J, McDonnell JF, Dicken R. Ocular complications of thermal injury: A 3-year retrospective. The Journal of Trauma: Injury, Infection, and Critical Care. 2001;50(1):79-82. doi:10.1097/00005373-200101000-00014
2. Cabalag MS, Wasiak J, Syed Q, Paul E, Hall AJ, Cleland H. Early and late complications of ocular burn injuries. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2015;68(3):356-361. doi:10.1016/j.bjps.2014.10.031
3. Egeland B, More S, Buchman SR, Cederna PS. Management of difficult pediatric facial burns. Journal of Craniofacial Surgery. 2008;19(4):960-969. doi:10.1097/scs.0b013e318175f451
4. Spencer T, Hall AJ, STAWELL RJ. Ophthalmologic sequelae of thermal burns over ten years at the Alfred Hospital. Ophthalmic Plastic & Reconstructive Surgery. 2002;18(3):196-201. doi:10.1097/00002341-200205000-00008

A Comprehensive Review of Occipital Nerve Decompression: An Analysis of Surgical Drain Effectiveness and One-Year Patient-Reported Outcomes

Abstract Presenter
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BACKGROUND: Headache surgery has been proven to be an effective treatment modality for migraine and chronic headaches in a subset of patients. Drains have been traditionally used in occipital nerve decompression, yet there is no evidence to suggest whether their use will decrease complication rates. In this study, we present patient reported outcomes after undergoing occipital nerve decompression at our institution, and we compare post-operative complications between drain versus no drain groups.

METHODS: Patients who underwent occipital nerve decompression between July 2019 and

October 2022 were included in this study. Patients completed a prospective headache questionnaire preoperatively and at one-year following surgery. A migraine headache index (MHI) was calculated for each patient by multiplying headache duration, intensity, and frequency. Surgery was considered successful if there was at least 50% improvement in MHI. Additionally, post-operative complications were compared between the drain versus no drain groups using a retrospective chart review.

RESULTS: For the prospective analysis, 36 patients completed the survey. The response rate was 24%. Of all participants, 78% had at least 80% improvement in their MHI, 16% had a MHI improvement between 50% and 80%, and 6% had a MHI improvement of less than 50%. Improvement was significant in headache duration, intensity, and frequency from baseline (all $p<0.05$). For the retrospective analysis, 151 patients were included. Twenty-three percent (n=35) of patients had a drain placed and 77% (n=116) had no drain. There were no differences in demographics between groups. Overall, complication rate was 4.6%. Incision and drainage was reported in 7 patients. There were no differences in rates of wound infection, dehiscence, seroma, hematoma, or other complications between the two groups (all $p>0.05$).

CONCLUSION: Our study demonstrates that occipital nerve decompression is effective in improving patient outcomes and decreasing headache frequency, duration, and intensity. Drain placement does not seem to decrease complications such as seroma, hematoma, or infection in patients undergoing occipital nerve decompression.

A Critical Examination of Antibiotic Administration in Septorhinoplasty and Endoscopic Sinus Surgery: A Systematic Review

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BACKGROUND: Septorhinoplasty (SRP) is the most common otolaryngologic (ENT) procedure performed, often alongside Endoscopic Sinus-Surgery (ESS). Due to the infectious potential of the natural nasal flora, it is thought that procedures that expose the underlying tissue to bacteria necessitate antibiotic use to prevent infection. The objective of this review is to evaluate the available evidence for the use of antibiotics in these settings and explore the trends

of antibiotic administration among physicians.

METHODS: A systematic review using PubMed, OVID, and Web of Science databases through Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (PRISMA) yielded 475 papers. Based on the inclusion criteria, information focusing on the use of antibiotics during SRP and ESS procedure was extracted from 9 studies.

RESULTS: Of the nine studies selected, three (33%) concluded that prophylactic antibiotics were not necessary. Subsequently, these studies were reviewed and it was found that 7 contained data relevant to preoperative use of antibiotics during SRP or ESS procedure, and two were used for a longitudinal analysis of ENT physicians' opinions on antibiotic use for surgery. Two (22%) of the studies stated that prophylactic antibiotics were only indicated for complicated rhinoplasty procedures, with one of these advising use of culture-directed antibiotics only; one (11%) recommended antibiotic prophylaxis in patients with pre-existing risk factors such as immunosuppression and valvular heart disease; one (11%) study asserted that single-shot prophylactic antibiotics are useful in preventing infections and are safer than traditional postoperative regimens. Lastly, a 2001 study surveying the American Rhinologic Society (ARS) found that 77% of ENT physicians endorse the use of postoperative antibiotics for infectious postoperative prophylaxis. However, a 2018 survey of the ARS revealed that 62% of ENT physicians endorse a postoperative antibiotic regimen.

CONCLUSION: The findings of our systematic review imply that routine antibiotic use in low-risk patients is not supported by current evidence. This lies in direct opposition to other findings, which show that a majority of ARS surgeons use antibiotics in this manner. Furthermore, the downward trend established by the series of ARS studies can most likely be explained by the lack of evidence showing any efficacy of such an antibiotic regimen, along with growing concerns in the larger scientific community regarding antibiotic resistance. Our systematic review highlights that additional research is warranted to redirect clinical practice guidelines for ESS and cosmetic rhinology. In the meantime, motivating factors and evidence-based decisions should be considered in the use of prophylactic antibiotics during septorhinoplasty and endoscopic sinus surgery.

A Novel Pathway to Reestablish Functional Skin in Chronic Lower Extremity Wounds

Abstract Presenter
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PURPOSE: Chronic lower extremity (LE) wounds frequently require significant interventions to close. Success of any method depends on an adequately prepared wound bed, while factors such

as wound size, perfusion, contamination, or exposed tissue structures can thwart efforts. Split-thickness skin grafts (STSG) have long been used to cover large skin defects. However, skin grafting alone does not allow for redevelopment of a functional dermis. We propose a standardized three-part algorithm of care utilizing both an acellular dermal matrix and STSG for the treatment of LE wounds.

METHODS AND MATERIALS: This was a single center, retrospective cohort study examining patients who underwent LE wound debridement and placement of fetal bovine dermis (FBD) between February 2016 to January 2022. The primary outcome was wound closure, while secondary outcomes were wound infection and amputation-free survival. Unique patient variables and comorbidities were additionally evaluated.

RESULTS: Twenty patients (mean age 59, M:F 12:8), including 24 LE wounds, underwent debridement and placement of FBD followed by STSG. The wounds were venous ulcers (29.4%), amputation sites (29.4%), diabetic foot ulcers (25.0%) and atypical wounds (16.7%), with an average area of 39.15 cm2. Initially, 55% of patients had acute osteomyelitis or a soft tissue infection, treated with surgical debridement and antibiotics prior to grafting. In the cohort, 80% had poorly controlled diabetes with a mean HbA1c of 9.6, which did not significantly correlate with percent engraftment. Many diabetics however, remained on perioperative antibiotics for least 14 days depending upon their surgical margins. STSGs were performed at a median of 61 days after FBD placement, after which 83.3% of patients received 4 days of negative pressure therapy (NPWT), while the remaining 15.6% received a bolster dressing. Patients who received bolster dressings had an average of 80% closure, whereas patients who received NPWT had an average of 86% closure. Ninety two percent of wounds that received a STSG within two months of FBD placement had successful engraftment. The 8.3% failed because of primary chronic vasculitis and perhaps too large of a surface area (140cm2). In the deep diabetic foot wounds post STSG, 20.8% of patients developed recurrent acute osteomyelitis or an abscess requiring antibiotics and/or amputation. 12.5% patients ultimately had amputations proximal to STSG for critical limb ischemia or recurrent infection. Insurance difficulties and follow-up scheduling issues delayed most patients whose STSG was more than 4 weeks after successful FBD placement.

CONCLUSION: By following a protocolized three-step treatment plan including 1) initial debridement/amputation and treatment of any infection 2) application of FBD to well debrided wound bed with 4 days of NPWT and 3) placement of an autologous STSG within two months of FBD application with 4 days of subsequent NPWT, chronic wounds will have an increased rate of successful re-epithelialization, even in those patients with poor glucose control or initial active infection. Many cases had a delay from FBD engraftment until STSG application due to schedule and insurance impediments. Therefore, a protocol that involves scheduling the placement of STSG four weeks after successful engraftment of FBD has been adopted.

A systematic review of the morphologic and electrodiagnostic changes of nerve compression in the upper extremities after stroke

Abstract Presenter

Eva Hale

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INTRODUCTION: The Global Burden of Disease study reports stroke as the single most burdensome neurological disorder with respect to disability-adjusted life-years throughout the United States.[1] Families of these patients face a high financial burden due to post-stroke complications and necessitation of chronic care. The annual cost of stroke to the US healthcare system was estimated at $75.2 billion for 2013, and indirect costs estimated at $34.4 billion due to lost productivity.[2] A systematic review suggests opioids are not effective for the treatment of post-stroke pain.[3] One source of this pain may be nerve compression amenable to surgical decompression. Other patient populations who commonly suffer from spasticity (i.e., due to severe burns or cerebral palsy) have demonstrated benefits of nerve decompression.[4][5] This systematic review aims to assess the prevalence of peripheral nerve compression in stroke patients.

METHODS & MATERIALS: A systemic review was performed in accordance with PRISMA guidelines across five databases (PubMed, Embase, Scopus, Web of Science, CINAHL), using the title and abstract fields. Two reviewers conducted a blinded screening at title/abstract and full text levels, standardized by Covidence. Inclusion criteria were: post-stroke patients with hemiplegia, English language, morphologic and/or electrodiagnostic evaluation. Case studies and animal studies were excluded. Data abstraction and content analysis was performed.

RESULTS: 1176 articles were screened at the title/abstract level. 37 full text studies were assessed, 13 of which were excluded. All 20 included articles analyzed median and ulnar nerves via various combinations of ultrasonographic and electrophysiologic studies including cross-sectional area (CSA), nerve conduction velocity (NCV), compound motor action potential (CMAP), sensory nerve action potential (SNAP), distal motor latency (DML), and F-wave latency. Varied duration since CVA were studied: acute (<72 hours), subacute (2 weeks to 6 months), and chronic (6 months to 5 years). Several findings were unanimous. DML and F-wave latency were prolonged in the affected limb compared to both the non-paretic limb and the control group. Conversely, NCV, CMAP, and SNAP were lower in the hemiplegic limb. Five studies found increased likelihood of entrapment neuropathies in post-stroke patients compared to control group, and an increased risk in the paretic vs. non-paretic limb. This correlation was still apparent in subclinical presentation as well as in patients without evident muscle wasting. Two studies found median CSA thickening in the affected limb, two studies found decreased CSA in the affected limb, yet all four studies attributed these changes to chronic nerve compression.

CONCLUSIONS: Our results demonstrate the evidence of nerve compression in the paretic

limb of some post-stroke patients. Subclinical presentation was common and could contribute to this source of post stroke pain being overlooked, as many of these patients suffer impairments in communication and/or cognition. These patients may be candidates for nerve decompression, but further studies are necessary. If effective, decompression may reduce dependence on pain medication and improve quality of life.

REFERENCES

1. GBD 2017 US Neurological Disorders Collaborators. Burden of Neurological Disorders Across the US From 1990-2017: A Global Burden of Disease Study. JAMA Neurol. 2021;78(2):165–176. doi:10.1001/jamaneurol.2020.4152
2. Gooch, C.L., Pracht, E. and Borenstein, A.R. (2017), The burden of neurological disease in the United States: A summary report and call to action. Ann Neurol., 81: 479-484. https://doi-org.access.library.miami.edu/10.1002/ana.24897
3. Scuteri D, Mantovani E, Tamburin S, Sandrini G, Corasaniti MT, Bagetta G, Tonin P. Opioids in Post-stroke Pain: A Systematic Review and Meta-Analysis. Front Pharmacol. 2020 Nov 27;11:587050. doi: 10.3389/fphar.2020.587050. PMID: 33424596; PMCID: PMC7793939.
4. Frascarelli M, Frascarelli F, Gentile MG, Serrao M, De Santis F, Pierelli F, Santilli V. Entrapment neuropathy in patients with spastic cerebral palsy. Acta Neurol Scand. 2005 Sep;112(3):178-82. doi: 10.1111/j.1600-0404.2005.00468.x. PMID: 16097960.
5. Wu C, Calvert CT, Cairns BA, Hultman CS. Lower extremity nerve decompression in burn patients. Ann Plast Surg. 2013 May;70(5):563-7. doi: 10.1097/SAP.0b013e31827aef9c. PMID: 23542842.

Addressing Melanoma Screening Disparities in Low Income Rural Communities

Abstract Presenter
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INTRODUCTION: Early detection of melanoma remains the best way to prevent death in those who develop the cancer. For many who have access to a doctor and health insurance, yearly skin screenings are performed at the dermatologist's or plastic surgeon's office. For many with socioeconomic stability, these screenings provide a level of comfort in knowing that there are no malignant lesions present because early detection could be lifesaving. This comfort and lifesaving screening is robbed from those with less access to healthcare. The populations most at risk due to a lack of dermatologists or plastic surgeons include low-income rural individuals. Many blue-collar jobs also take place outside, increasing one's UV exposure which is a risk factor for melanoma. These individuals are often not educated on the importance of avoiding UV exposure and the risks of skin cancer.

DISCUSSION: In an effort to combat this health disparity among low-income rural individuals,

our team has developed a screening tool that can be made easily accessible to this population. After searching the literature, we created a screening card using language that can be understood by those with low health literacy. The card is printed on a durable PVC plastic the size of a credit card. The tool introduces users to the ABCDEs of melanoma by asking questions in a straightforward manner. Each question relates to the 6 mm circular window at the top of the card. By relating each screening question to this round window, simplicity is maintained without mentioning convoluted or alarming verbiage. For example, we ask "can the spot be divided equally by the line above?" Here we use "spot" instead of "lesion" and instead of asking about "asymmetry," we ask if the lesion can be "divided equally."

CONCLUSION: While transforming the U.S. healthcare system remains a lofty goal, there are ways to address health disparities one initiative at a time. Here we present a solution for the lack of melanoma screening in low-income rural communities. Our solution is inexpensive, and patient-driven while targeting the education level, and understanding of those in the communities we describe. We see our screening tool as more than a card with screening questions; we see this as a movement that demands exposure as we fight for the health of the patients our society often overlooks.

Adverse Events Associated with Craniofacial Distractor Use

Abstract Presenter
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PURPOSE: Distraction osteogenesis is used to correct a variety of congenital malformations of the cranial vault, midface, and mandible. However, published reports on adverse events associated with distractors are limited. In this study, we evaluate the adverse events associated with craniofacial distractors using the Food and Drug Administration's Manufacturer and User Facility Device Experience (MAUDE) database.

METHODS: The MAUDE database was queried on March 1, 2023 for adverse events related to use of cranial vault, midface, and mandibular distractors from January 2013 – December 2022. Of 525 reported events, 217 met inclusion criteria after removal of duplicates and reports unrelated to craniofacial distractors. Adverse events were then categorized to assess problem types and frequencies.

RESULTS: Mandibular distractors had the most reported adverse events (159), followed by midface distractors (41), and cranial vault distractors (17). The most common device problem for mandibular and midface distractors was malfunction (37.1%, 31.7% respectively), specifically difficulty advancing the distractor (72.9%, 84.6% respectively). Cranial vault distractors were most associated with component breakage (76.5%). Infection rates were also similar for mandibular (12.6%) and midface (14.6%) distractors, though debridement was required more often for mandibular (25.0%) compared to midface distractors (6.3%). The most reported intervention for all adverse events was early removal of the distractor (20.7%). However, adverse events overall often did not have any impact on the patient (41.0%).

CONCLUSION: Mandibular and midface distractors had similar rates of infection, though mandibular infections often required a higher level of care. Infection rates were notably low despite the percutaneous nature of craniofacial distractors. Adverse events often did not affect the patient or were commonly resolved with earlier removal of the distractor. These findings can be used by craniofacial surgeons to foresee and manage patient expectations on complications associated with distraction osteogenesis.

An Analysis of Medical Malpractice Litigation Involving Gender Affirmation Surgery

Abstract Presenter
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BACKGROUND: Gender affirmation surgery has been increasingly performed over the past decade. The present study sought to analyze malpractice cases related to gender affirmation surgery to provide information to physicians as it may serve to minimize the risk of malpractice suits. Specifically, the aim was to focus on the reasons a suit is brought, the outcomes, and the compensatory damages of litigation.

METHODS: The Westlaw and Lexis Nexis databases were searched for jury verdicts and settlements related to gender affirmation surgery malpractice lawsuits. The keywords "gender affirming", "confirmation surgery", "gender& reassignment w/malpractice", "transgender w/malpractice" were searched in the Lexis Nexis database. The keywords "gender affirming", "confirmation surgery", "gender & reassignment w/malpractice" and "transgender

w/malpractice" were searched in the Westlaw database. Cases that did not meet the inclusion criteria, duplicate cases, and those for which enough information was not available were excluded. The data included reasons, outcomes, and compensatory damages of litigations, as well as defendant specialty, location, year, and plaintiff demographics.

RESULTS: A total of 26 cases were identified in Westlaw and Lexis Nexis databases. Following review of the cases, five between 2007 and 2020 were included. Three of the 5 cases (60%) involved surgeons. The surgical first case involved a urologist who was sued for a negligently performed male to female reassignment surgery which caused permanent and painful injuries to the defendant. The second case involved a plastic surgeon who performed a penile inversion vaginoplasty. The defendant claimed urethral stricture and misalignment, loss of the vaginal cavity, protruding proboscis, labial scar tissue and clitoral sensitivity, infection, and inability to engage in sexual intercourse, psychological trauma, and gender dysphoria. The third case involved a gynecologist and plastic surgeon. The plaintiff accused the defendants of bilateral compartment syndrome and bilateral foot drop that was caused by a gender reassignment procedure The two remaining cases (40%) involved non-surgical specialties. The first case was brought against a radiologist and oncologist and involved the excessive use of radiation during a transgender operation which later led to cancer of the vulva and neovagina. In the second case, an endocrinologist was sued for failing to provide a transgender patient with hormone treatment. All 5 of these cases were decided in favor of the defendant physician(s) and all compensatory damages were $0.

CONCLUSIONS: Between 1970 and 2020, there were only 5 resolved malpractice cases that involved gender affirmation surgery. This is a surprisingly low number of cases and could be related to the fact that gender affirming surgeries have only become more common of late. In addition, the low number of resolved cases could also have to do with the fact that patients understand and accept the possible complications and outcomes of undergoing these kinds of procedures. Based on the complaints presented in these cases as well as the outcomes, physicians should thoroughly explain the possible complications of surgery to patients undergoing gender affirming procedures and should thoroughly evaluate patients requesting hormonal gender affirming treatment.

Are Gender Affirming Plastic Surgeons Adequately Compensated? An Analysis of Relative Value Units

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PURPOSE: Gender affirming surgery (GAS) has a complicated history within the United States healthcare system and reimbursement procedures.1,2 As GAS has become more widespread and reimbursement availability continues to uptrend,3 the present study aims to investigate whether compensation is equitable between GAS procedures as compared to general plastic surgery procedures.

METHODS: The National Surgical Quality Improvement Program database was queried for all surgeries performed by plastic surgeons from 2016 to 2020. Cases were either assigned to the GAS cohort (cases with a postoperative diagnosis relating to gender affirming care) or the non-GAS cohort (plastic surgery cases performed more than 200 times). Duplicate Current Procedural Terminology (CPT) codes were removed for analysis. Physician work relative value unit (wRVU) data were obtained from the 2020 US Centers for Medicare and Medicaid Services fee schedule. Operative time, total wRVUs, wRVUs per hour (wRVU/h), reoperation/readmission rate, and number of concurrent procedures were compared between GAS and non-GAS cases using Welch's t-tests and X2 tests.

RESULTS: A total of 132,902 cases were identified, 132,319 non-GAS and 3,583 GAS. Upon removal of duplicate CPT codes, 299 cases remained in the GAS cohort and 20,022 in the non-GAS cohort. There were 21 unique CPT codes in the GAS cohort and 37 unique CPT codes in the non-GAS cohort. Operative time was significantly higher in the GAS cohort (262.9 vs. 120.7 min, $p<0.001$), as were total wRVUs (59.4 vs. 21.6, $p<0.001$), and number of concurrent procedures (1.5 vs. 1.2, $p<0.001$). Reoperation/readmission rate (7.0% vs. 6.0%) and wRVU/h (15.8 vs. 15.1) were not significantly different (all $p>0.05$). There was a positive correlation between total operative time and total wRVUs ($p<0.001$) and a negative correlation between total operative time and wRVU/h ($p<0.001$).

CONCLUSIONS: The 2020 Physician wRVU scale does allocate proportional wRVUs to gender affirming plastic procedures. However, the wRVU scale does not allocate proportional wRVUs to longer operative times for both GAS and general plastic surgeries. The compensation for gender affirming plastic surgeries is higher than that of general plastic surgeries, however there is no difference in wRVUs per hour on comparison.

REFERENCES:
1. Coleman E, Bockting W, Botzer M, Cohen-Kettenis P, DeCuypere G, Feldman J, et al. Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People, Version 7. Int J Transgenderism. 2012 Aug;13(4):165–232.
2. Almazan AN, Keuroghlian AS. Association Between Gender-Affirming Surgeries and Mental Health Outcomes. JAMA Surg. 2021 Jul 1;156(7):611.
3. Arnold JD, Nelson AE, Loubier EM. Trends in Insurance Coverage for Gender-Affirming Surgeries. JAMA Surg. 2018 Oct 1;153(10):972.

Bite Worse Than Their Bark? Pediatric Facial Nerve Injuries Secondary to Dog Bites

Abstract Presenter
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BACKGROUND: Traumatic facial injuries secondary to dog bites can have longstanding negative implications for pediatric patients. While injuries to the facial nerve (FN) because of dog bites are rare, they can be difficult to manage. Their complexity is compounded by the limited volume of literature, and lack of consensus in the management of these injuries. Herein, we review our own institutional experience to dog bite-related facial nerve injuries.

METHODS: A retrospective review was conducted of all patients referred to the plastic and reconstructive surgery service between 2012 and 2022 at a single Pediatric Level 1 Trauma Center for facial nerve injuries resulting from dog bites. Data pertaining to surgical timing, perioperative findings, Sunnybrook facial nerve grading system (SB), surgical technique, and postoperative outcomes was recorded and analyzed using descriptive statistics.

RESULTS: Of 939 patients with craniofacial involvement, 199 were managed operatively while 740 were managed in the acute setting. 246/740 patients underwent laceration repair, of which there were no missed FN injuries nor scar revision procedures. Of 199 surgically managed facial injuries, 15 patients underwent FN exploration with 8/15 positive for FN injury. Out of these 8 patients (mean age = 5yrs, pre-op SB = 77.5, post-op SB = 92.5), 5 underwent primary nerve repair, 1 primary nerve graft, 1 no primary repair due to lack of distal targets, and 1 no primary repair due to extent of structural and nerve injury, requiring secondary reanimation. One case of postoperative wound infection required additional intervention (6.7%). Primary nerve repair demonstrated full functional recovery in 80% of the patients. Primary nerve graft demonstrated partial recovery with residual deficit. 80% of the patients with facial nerve injury demonstrated preoperative findings. An algorithm is proposed based upon location of laceration, extent of facial nerve injury and wound condition.

CONCLUSION: FN injuries secondary to dog bites present unique challenges, particularly in the pediatric population. As majority of cases occur in the very young, preoperative examination is frequently hindered by lack of cooperation and intraoperative explorations can be difficult due to both the diminutive nerve size and the traumatized field. Successful management requires a high index of suspicion combined with meticulous and judicious surgical exploration and repair.

Breast Cancer Hormone Therapy Modulates Breast Implant Capsular Contracture

Abstract Presenter
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BACKGROUND: Capsular contracture, an excessive fibrotic response to breast implants, results in significant morbidity for patients with implant-based breast reconstruction by causing pain, implant deformation, and the need for revision operations. Preclinical studies have shown that hormone therapy, such as tamoxifen, may mitigate capsule formation.1 We analyzed capsular contracture rates in breast cancer patients already on hormone therapy who had undergone implant-based reconstruction to determine if hormone therapy reduced these rates.

METHODS: A retrospective analysis reviewed patients with a previous breast cancer diagnosis and breast implant surgery who underwent a capsulectomy between February 2013 and December 2021. Demographics, cancer treatments including hormone and radiation therapies, and surgical details were collected. Univariate analysis compared capsular contracture rates among treatment groups.

RESULTS: Of the 924 patients who received capsulectomies, 274 patients had capsulectomies specifically for capsular contracture. There were 169 patients who received tamoxifen and 350 patients who received any form of hormone therapy. Patients who received tamoxifen or any hormone therapy were associated with a 36% decrease in the odds of having capsular contracture compared to patients who received no hormone therapy (OR 0.64, p=0.024 and OR 0.64, p=0.003, respectively). When compared to patients who had no hormone therapy, patients who received aromatase inhibitors were associated with a 39% decrease in the odds of having capsular contracture (OR 0.61, p=0.003). Patients who received radiation therapy had 1.47 times the odds of having capsular contracture than patients who received no radiation therapy (OR 1.47, p= 0.091).

CONCLUSIONS: Our preliminary analysis shows that patients with a history of breast cancer who underwent implant-based reconstruction had reduced rates of capsular contracture if they had tamoxifen, aromatase inhibitors, or any hormonal therapy compared to their counterparts who received no hormone therapies. These findings coincide with preclinical models and may indicate a role for local-delivery hormone therapy around implants to deliberately reduce capsular contracture occurrence.

REFERENCE:

1. Blum KM, Mirhaidari GJ, Zbinden JC, Breuer CK, Barker JC. tamoxifen reduces silicone implant capsule formation in a mouse model. FASEB BioAdvances. 2022;4(10):638-647. doi:10.1096/fba.2022-00036

Breast Reduction as an Alternative Route to Chest Masculinization in Patients with Gender Dysphoria

Abstract Presenter
Kalyn Compton

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Mastectomy or "top surgery" in transgender males is one step toward physical masculinization.1,2 Mastectomy is often the first surgical intervention that transgender males will undergo. 3,4 In one surgeon's practice, some women with gender dysphoria have presented for breast reduction surgery in lieu of mastectomy. The incidence of transgender male patients seeking breast reduction surgery as an alternative route to chest masculinization is not well published. We searched our electronic medical record (EMR) for adult transmasculine patients with a history of any breast surgery who sought care for gender dysphoria and were seen between June 2019 and June 2022 in the Transgender and/or Plastic Surgery Clinics. The search returned a list of 862 patients, which was narrowed down to those whose sex assigned at birth was female or unspecified, and differed from their sex and/or gender identity. The EMR search and manual filtering based on gender incongruity was still unsuccessful in identifying all patients in the target population. Therefore, we queried our patients who had mastectomy for gender identity disorder at our institution during the same time period. We reduced the first collection of 862 patients to 84 patients who fit the criteria for this study. Our second search yielded 113 additional patients who fit our criteria, for a total of 197 patients. Of those, 177 directly underwent mastectomy, 13 patients underwent breast reduction alone, 7 had breast reduction prior to mastectomy. The inadequacy of the EMR in querying this patient population hindered our investigation. We discovered discrepancies between sex assigned at birth, gender identity, and sex documentation in patient charts, which underscores the difficulty in querying this population. The inaccuracy in the EMR may be attributable to patients' willingness to reveal information about their sex/gender that may be incongruent with their gender identity and the EMR's lack of more gender-fluid designations. Our EMR software was initially developed for cisgendered individuals. Some patients in this study identified as third gender or gender nonconforming. Our findings indicate that some transmasculine patients have sought alternative routes to chest masculinization. We hypothesize that a combination of factors may be involved in this decision, such as a desire to conceal their gender identity, a desire to delay the transition process, or fear of prejudice and discrimination. In addition, some payors may not cover mastectomy for gender affirmation, which in our institution costs just over $13K when paid out of pocket. Through this research, plastic surgeons can be cognizant of those with gender dysphoria who may be seeking breast reduction surgery as an alternative route to chest masculinization. Further studies should be done to reveal what factors would lead to this choice of surgery. In addition, EMR software may need to be updated in order to more accurately identify these individuals.

Building a Multidisciplinary Gender-Affirmation Center: Plastic Surgeons Can Lead the Way

Abstract Presenter
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PURPOSE: There has been tremendous growth in specialty clinics to serve the transgender and non-binary population.1 Given the multifaceted needs of these patients, the demand for comprehensive multidisciplinary transgender care programs is greater than ever. Many gender-affirming surgical clinics have been developed across the country at major academic institutions, yet there are few published roadmaps that interested surgeons can use to develop more comprehensive care centers. We present our granular, plastic surgeon-led approach to developing a multidisciplinary, gender-affirming care center for adults, known as the Gender Pathways Program (GPP).

METHODS: The GPP was conceptualized in August 2018 at Northwestern Memorial Hospital in Chicago, Illinois. With surgeon-led efforts, the program underwent rigorous pre-launch, launch, and post-launch design. Pre-launch, we performed a needs assessment via community focus groups and developed a Community Advisory Board to establish a patient-centric mission. Program design considered varying degrees of care integration and required building the necessary electronic medical record (EMR) infrastructure to ensure compatibility between providers and systems to support multidisciplinary workflows.2 We established critical personnel with defined roles inclusive of a program coordinator, clinical oversight committee, provider network, and system administrators, and subsequently solidified our organizational chart to clearly demarcate the appropriate leaders, reporting lines, and silos of work necessary to help the GPP run. Monthly meetings were held among providers, external advisors, hospital administrators, and human resources representatives. Five "Gender Affirming Summit Trainings", for hospital staff in a variety of patient-facing roles were completed leading up to the launch. Three months prior to full launch, we completed a "soft launch" during which all roles became active, and we held our first multidisciplinary surgical clinic. We established a web presence and ensured central scheduling tools were appropriately funneled to GPP providers and corresponding clinics. We facilitated necessary trainings for subspeciality providers on topics including hormone treatment, mental health screenings, formal gender affirmation readiness assessments, surgical standards, and fertility preservation. Post-launch, we have devoted our focus towards continually measuring patient volume, quality and outcomes, and patient satisfaction. Frequent assessment intervals both internally and with the community have also proven critical to our mission. A strong relationship with our data analytics team allows us to capture and interpret data for continuous, iterative improvements.

RESULTS: The GPP is led by the senior author (S.W.J.) and consists of more than 30 core

providers across 13 disciplines. We serve patients across the gender spectrum, with a majority transmasculine (41.3%), transfeminine (37.0%), and non-binary (19.4%) patients. We have fielded 813 surgical consultations yielding 534 gender affirming surgeries to date.

CONCLUSIONS: Any program seeking to extend beyond a narrow surgical focus will face numerous challenges and victories which can serve as a springboard for excellence. With intentional design, broadening to a comprehensive center extends the scope of plastic surgery and those of other health system specialties to best serve this population. We hope our experience gives tangible, specific advice on how plastic surgeons can lead when it comes to aligning a large system, enforcing standards, and measuring quality when designing and implementing a multidisciplinary gender program.

REFERENCES

1. Chen D, Hidalgo MA, Leibowitz S, Leininger J, Simons L, Finlayson C, et al. Multidisciplinary Care for Gender-Diverse Youth: A Narrative Review and Unique Model of Gender-Affirming Care. Transgend Health. 2016;1(1):117-23. Epub 2016/07/01. doi: 10.1089/trgh.2016.0009. PubMed PMID: 28861529; PubMed Central PMCID: PMCPMC5549539.
2. Doherty WJ, McDaniel SH, Baird MA. Five levels of primary care/behavioral healthcare collaboration. Behav Healthc Tomorrow. 1996;5(5):25-7. Epub 1996/09/04. PubMed PMID: 10161572

Cellular Antimicrobial & ImmuNomodulator (CAIN) Molecule: The Plastic Surgery experience

Abstract Presenter
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BACKGROUND: Multiple antiseptic solutions have been proposed as co-adjuvants for use in skin and mucosae, however, strong evidence regarding its use have not yet been published. Stabilized Hypochlorous Acid (S-HOCl) has been subject to multiple human studies and has been reported as a successful formulation to treat diverse infections, although cohort studies and small randomized clinical trials remain as the best evidence
support.

PURPOSE: We are presenting the Colombian experience of S-HOCl use (patented formula) and its multiple applications in plastic surgery: A protocol for COVID-19 prevention (in-vitro tested), antiseptic solution for intraoperative wash/cleansing, and also immunomodulatory properties (in-vitro tests).

METHODS: We conducted a systematic review about local studies (Colombian journals and databases) and those on international databases (EMBASE, PubMed, Medline, Cochrane) about

the use of S-HOCl in any healthcare field including dentistry, plastic, cardiothoracic and other surgical specialties. We developed an inhibition test through an in-vitro model with samples from 5 patients who tested positive for SARS-Cov-2/COVID-19 and treated them with S-HOCl. We also cultured adipose cells in a S-HOCl-rich media at different dilutions to measure it potential cytotoxic effect. Based on this, we began its utilization for Fat graft washing prior to injection, cannula, and intraoperative body surface cleansing, to clean cannulas and to wash implants before their lodging.

RESULTS: Our study reports the safety profile of a stabilized molecule of Hypochlorous acid (S-HOCl) and its multiple uses in medicine and dentistry. Scientific evidence and our current in-vitro model support its efficacy (99.5%) against emerging pathogens while also considers its cell protective condition at usual concentrations of 500 ppm. In terms of outcomes, we analyzed data of the S-HOCl fat graft washing protocol before injection, with a zero-rate of infections after its implementation. In-vitro of cultured adipose cells showed no evidence of cytotoxicity.

CONCLUSION: Since the advent of new multi-resistant bacteria and the catastrophic implications of postoperative infections, in addition to the burden of other types of complications after aesthetic plastic surgery, we started an initiative at our department to reach zero rate of complications, infections included. We searched evidence about a harmless molecule with the potent effect of a disinfectant and found out the extraordinary properties of a Colombian-developed but internationally known molecule: Stabilized Hypochlorous acid (S-HOCl). We found in our in vitro studies that the molecule was effective against COVID-19 and since then started to investigate with it thoroughly. Adipose-cell cultures, Interleukin expression and fibroblast stimulation was some of the properties that we found exhilarating and worth to prove in the clinical setting. We implemented a protocol for COVID-19 prevention in our patients by micro-nebulizing S-HOCl immediately before intubation. We also added 500 cc of 500 ppm S-HOCl to the liposuction harvesting cannister, to wash the on-to-be adipose graft. We believe S-HOCl
is a safe and efficient molecule for the treatment of multiple skin and mucous disorders caused by emergent pathogens. It also serves as a safe solution for tissue, surface and instrument cleansing and washing. Further studies need to be carried out to further support our findings.

REFERENCES

1. Gold MH, Andriessen A, Bhatia AC, et al. Topical stabilized hypochlorous acid: The future gold standard for wound care and scar management in dermatologic and plastic surgery procedures. Journal of Cosmetic Dermatology. 2020;19(2):270-277. doi:10.1111/jocd.13280.
2. Wang L, Bassiri M, Najafi R, Najafi K, Yang J, et al. Hypochlorous acid as a potential wound care agent: part I. Stabilized hypochlorous acid: a component of the inorganic armamentarium of innate immunity. J Burns Wounds. 2007 Apr 11;6:e5.
3. Calderon JL. PATENT: Method of producing and Applications of composition of Hypochlorous Acid. Aquilabs SA Co. United States Patent Publication Application, US2009/0258083A1. Oct 15, 2009.
4. Wongkietkachorn A, Surakunprapha P, Wittayapairoch J, Wongkietkachorn N, Wongkietkachorn S. The Use of Hypochlorous Acid Lavage to Treat Infected Cavity Wounds. Plastic and Reconstructive Surgery - Global Open. 2020;8(1). doi:10.1097/gox.0000000000002604.

5. Del Rosso JQ, Bhatia N. Status Report on Topical Hypochlorous Acid: Clinical Relevance of Specific Formulations, Potential Modes of Action and Study Outcomes. J Clin Aesthet Dermatol. 2018 Nov;11(11):36-39. Epub 2018 Nov 1.

Collagen Type I/III Ratio as a Predictor of Scar Formation Undergoing Immediate Reconstruction with the Round Block Technique after Breast-Conserving Surgery: A Quantitative Analysis

Abstract Presenter
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PURPOSE: Scarring is a common concern among patients undergoing breast-conserving surgery, as it can significantly affect their quality of life and self-esteem [1, 2]. The purpose of this study was to investigate the correlation between collagen type I/III ratio and scarring in patients who underwent immediate reconstruction with the round block technique (RBT) after breast-conserving surgery. The aim was to gain insight into the underlying mechanisms that contribute to scarring and to identify potential interventions to improve scar appearance.

METHODS: Seventy-eight patients who underwent breast-conserving surgery and immediate reconstruction with the RBT technique were included in this study. The collagen type I/III ratio was measured by a quantitative method using digital scanning and image analysis [3, 4]. Scarring was evaluated by two independent plastic surgeons using the Vancouver Scar Scale (VSS). Pearson's correlation analysis and multiple linear regression analysis were performed to identify factors influencing scar formation.

RESULTS: The mean age of the patients was 48.77±9.40 years, and the mean body mass index was 23.76±3.92 kg/m^2. The mean weight of resected breast tissue was 25.79±11.98 g. Ductal carcinoma in situ (DCIS) was the most common type of cancer found in 40 patients (51.3%). The collagen type I content was 31.63±18.22 μg/g, the collagen type III content was 11.41±6.27 μg/g, and the collagen type I/III ratio was 3.85±3.72. The mean VSS scores were 1.92±2.01 and 1.79±1.89, respectively, as evaluated by two independent plastic surgeons. Pearson's correlation analysis showed that collagen type I/III ratio had a significant positive correlation with collagen type I content and a significant negative correlation with collagen type III content. VSS showed a significant positive correlation with collagen type I content and collagen type I/III ratio, and a significant negative correlation with collagen type III content. Multiple linear regression analysis showed that collagen type I/III ratio had a significant positive effect on VSS, whereas collagen type I and collagen type III had no significant effect.

CONCLUSION: This study suggests that the collagen type I/III ratio is related to the degree of scarring in patients undergoing breast-conserving surgery and immediate reconstruction with the RBT technique. The lower the collagen type I/III ratio, the better the cosmetic outcome of the

scar. The use of multiple linear regression analysis allowed a better understanding of the complex relationships between different variables affecting scar formation. These findings may have implications for the development of interventions that can improve the appearance of scars in patients and may lead to the development of patient-specific scar prediction models based on genetic testing. Further research is needed to validate these findings and to determine the long-term effects of collagen type I/III ratio on scar formation. In conclusion, this study provides valuable insights into the relationship between collagen type I/III ratio and scar formation, which may help clinicians to predict the degree of scarring and improve patient outcomes after breast-conserving surgery and immediate reconstruction using the RBT technique.

REFERENCES:

1. Brown BC, McKenna SP, Siddhi K, McGrouther DA, Bayat A. The hidden cost of skin scars: quality of life after skin scarring. J Plast Reconstr Aesthet Surg. 2008;61:1049-58.
2. Ogawa R. The most current algorithms for the treatment and prevention of hypertrophic scars and keloids: a 2020 update of the algorithms published 10 years ago. Plast Reconstr Surg 2022;149:79e-94e.
3. Langenbach MR, Lisovets R, Varga-Szabo D, Bonicke L. Decreased collagen ratio type l/lll in association with hemorrhoidal disease. J Transl Sci. 2018;5:1-4
4. Peeters E, Hertogh GD, Junge K, Klinge U, Miserez M. Skin as marker for collagen type l/lll ratio in abdominal wall fascia. Hernia. 2014;18:519-25.

Combining Biologic Mesh and Gracilis Myocutaneous Flap for Pelvic Reconstruction in Extralevator Abdominoperineal Excision (ELAPE): A Case Series

Abstract Presenter
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INTRODUCTION: Anorectal cancer is a potentially fatal diagnosis with almost 5% of people being diagnosed with it in their lifetime. Advanced low-rectal and recurrent anal cancers are treated with a combination of surgical intervention and chemotherapy/radiotherapy. Historically a conventional abdominopelvic resection (cAPR) was used for oncologic resection, however due to increased rates of positive circumferential resection margins and intraoperative tumor perforation, extralevator abdominoperineal excision (ELAPE), is becoming more common (1). However, ELAPE has a significantly higher risk for perineal hernias and wounds; especially when combined with neoadjuvant radiation therapy (2).
Optimal reconstructive technique for resultant perineal defect from an ELAPE is of great debate.

Closure methods for perineal defects include biologic mesh placement, flap placement, and/or primary closure of defect. Despite these methods, patients experience high perineal wound morbidity and development of perineal hernias. Literature suggests that closure with biologic mesh following an ELAPE reduces long term perineal hernia rates (3). Furthermore, research indicates myocutaneous flaps have better perineal wound healing rates compared to primary closure (4).
To our knowledge, there are no studies examining a combined gracilis myocutaneous flap with biologic mesh for the perineal defect. In this case series, we discuss 4 cases in which patients were subject to such reconstruction while assessing perineal wound healing and development of perineal hernias in post-operative state.

METHODS: This is a single institution study with reconstruction performed by a single plastic and reconstructive surgeon, Dr. Michael Johnson, M.D. between January 2016 and December 2021. We conducted a 6-year retrospective case series of all patients undergoing pelvic reconstruction with a combined mesh and myocutaneous gracilis flap in setting robotic ELAPE. Patients who were included underwent closure with Strattice Mesh and myocutaneous gracilis flap immediately after following oncologic resection of locally advanced rectal adenocarcinoma and/or anal squamous carcinoma. All patients received neoadjuvant chemoradiation prior to surgery. Specific data on perineal wound dehiscence, SSI's, pelvic abscess/hematoma/seroma, radiation changes, flap viability, donor site abscess and perineal hernia were analyzed.

RESULTS: The charts of four patients, three males and one female, were reviewed in this study. Patients had a mean age of 60.5 and a BMI of 26.3. Half of patients had underlying COPD and HTN, 25% had HLD and history of CABG in setting of prior myocardial infarction, 25% had type II DM and CKD, and 75% of patients had extensive smoking history. The patients had a mean follow-up time of 41 months after their oncologic and reconstructive procedure. One patient had a reducible perineal hernia appreciated on physical exam, not appreciated on imaging, at 1 year follow-up. Three out of four patients had donor site abscesses. One patient developed pre-sacral radiation fibrosis. No patients demonstrated pelvic abscesses. None of the patients demonstrated superficial perineal wound dehiscence, perineal fistula, flap congestion or necrosis.

CONCLUSION: Perineal Defect closure with both biologic mesh and gracilis flap reconstruction following neoadjuvant chemoradiation and ELAPE has shown to be a promising method in preventing perineal hernias and promoting perineal wound healing. Further investigation with a larger sample size is recommended.

REFERENCES:
1. Habr-Gama A, São Julião GP, Mattacheo A, et al. Extralevator Abdominal Perineal Excision Versus Standard Abdominal Perineal Excision: Impact on Quality of the Resected Specimen and Postoperative Morbidity. World J Surg. 2017;41(8):2160-2167. doi:10.1007/s00268-017-3963-1
2. Musters GD, Buskens CJ, Bemelman WA, Tanis PJ. Perineal wound healing after abdominoperineal resection for rectal cancer: a systematic review and meta-analysis. Dis Colon Rectum. 2014;57(9):1129-1139. doi:10.1097/DCR.0000000000000182
3. Blok RD, Sharabiany S, Stoker J, et al. Cumulative 5-year Results of a Randomized Controlled Trial Comparing Biological Mesh With Primary Perineal Wound Closure After

Extralevator Abdominoperineal Resection (BIOPEX-study). Ann Surg. 2022;275(1):e37-e44. doi:10.1097/SLA.0000000000004763
4. Yang XY, Wei MT, Yang XT, et al. Primary vs myocutaneous flap closure of perineal defects following abdominoperineal resection for colorectal disease: a systematic review and meta-analysis. Colorectal Dis. 2019;21(2):138-155. doi:10.1111/codi.14471

Comparative Outcomes Of The Transareolar Approach: Systematic Review And Case Series

Abstract Presenter
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BACKGROUND: Breast augmentation is a popular surgical procedure worldwide. In the United States alone, there were 364,753 augmentation procedures performed in 2021 and an additional 147,684 removal replacements. While several techniques exist for breast implant exchange, the transareolar approach has the cosmetic advantage of minimal scar formation with the added benefit of direct access to breast tissue for pocket creation. Direct access through the nipple prevents scarring elsewhere on the body (e.g., axilla or inframammary fold) which may compromise the aesthetic outcome.

METHODS: Two methods were employed in construction of this paper. First, a systematic review was conducted using PRISMA guidelines. Eight articles comprising 1,194 patients were identified and reviewed. These patients had an average implant size of 256cc with placement in either the subfascial or submuscular planes. Separately, a retrospective chart review was performed of a single board-certified plastic surgeon's patient who had undergone implant exchange utilizing the transareolar approach over a period of four years. Seven patients were identified. Clinic patients had an average implant size of 255cc with placement in the submuscular plane. All patients had an areolar diameter of greater than 2cm, smaller than the patients identified in the systematic review with an areolar diameter of greater than 2.5cm.

RESULTS: Clinic patients reported 100% satisfaction with their scars, maintenance of nipple-areolar-complex sensation, and preserved vascularity at an average follow-up of 12 months, which was comparable to that found in the literature (95%, 100%, 100%, respectively). One patient (14%) in our cohort had Baker III/IV capsular contracture and one (14%) experienced hypertrophic scarring, above the incidence found in literature (1%, 3%, respectively). The hypertrophic scarring resolved with triamcinolone injection. While percentage of capsular contracture and hypertrophic scarring differed greatly, it is likely due to small sample size. There were no reports of implant failure, hematoma, seroma, infection, malposition, or reoperations in

our cohort, comparable to literature (0-1%).

CONCLUSION: The transareolar approach has the advantage of scar concealment in a naturally striated and irregular tissue, and the pigmentation of the areola serves to better conceal scars in individuals who experience scar hyperpigmentation. This technique of breast implant exchange is safe and provides aesthetically beneficial outcomes through minimizing scar formation while preserving sensation and vascularity of the nipple-areolar-complex.

Complications of Medical Tourism in Aesthetic Surgery: A Systematic Review and Case Series

Abstract Presenter
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INTRODUCTION: As medical cost continues to rise, so has the use of medical tourism by patients as a more cost-effective alternative. While the upfront cost savings lure many unsuspecting patients from their country of origin, there are significant patient safety issues surrounding short and long-term follow-up and the management and cost of complications.

METHODS: A systematic review was conducted in accordance with Preferred Reporting Items for Systematic reviews and Meta-analyses PRISMA. Additionally, three cases from our institution are presented demonstrating complications from cosmetic procedures performed abroad.

RESULTS: 589 patients were identified in the literature who presented with complications after having a cosmetic procedure abroad. Infection was the most prevalent complication in this study followed by wound dehiscence, seroma/ hematoma, and tissue necrosis. 98% of the infectious organisms were bacterial, and 81% of them were from the Mycobacterium genus. Two of the patients we encountered underwent their initial surgery in the Dominican Republic and the third, in Colombia. The three patients presented with nontuberculous mycobacteria (NTM) infections.

CONCLUSIONS: Medical tourism is a rapidly growing industry, and it is important to report on risks associated with seeking aesthetic surgery abroad. This systematic review highlights the

nature of complications following cosmetic tourism, the surgeries that resulted in complications, the countries that primary procedures took place in, and the countries of origin of the patients. While cost savings is a large motivator for patients to travel for surgeries, the financial burden and psychological impact of potential complications can be devastating. More awareness and resources are necessary to protect patients and empower them in making educated medical decisions when seeking care.

Connective Tissue Disease and its Impact on Outcomes Following Cosmetic Surgery

Abstract Presenter
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PURPOSE: Connective tissue disease (CTDs) and medications used for treatment can impair wound healing and increase risk of infection. This study sought to elucidate whether CTDs are associated with higher post-operative complications in cosmetic surgery.

METHODS: Patients with Rheumatoid Arthritis (RA), Lupus, or Scleroderma that underwent aesthetic surgery at a single institution were reviewed and matched to controls without CTD. Demographics, comorbidities, medications, and post-operative outcomes were recorded. Post-operative complications were divided in minor and major (requiring re-operation). To reach 80% power, a sample size of at least 96 patients was estimated.

RESULTS: Hundred-twenty-eight CTD patients 131 and non-CTD patients were included. Eighty patients had RA, 40 lupus, and 8 scleroderma. The average age in CTD and control groups was 59±13, and 57±12 years. Mean follow-up time in the CTD group and non-CTD group was 7+13 months and 5+8 months. CTD cohort underwent 65 facial procedures, 49 body contouring, and 14 breast procedures. Non-CTD cohort had 84 facial procedures, 35 body contouring, and 13 breast procedures. Seventy CTD patients were on DMARDs/steroids: 16 discontinued medications prior to surgery (as indicated), and 8 continued medications (against indications). Seventeen (6 major/11 minor) complications occurred in the CTD group compared to 9 (3 major/ 6 minor) complications in the control group (p=0.913). Patients that did not interrupt DMARDs/steroids did not experience a post-operative complication.

CONCLUSION: Patients with CTD diagnosis and who are on anti-rheumatologic medications may not be at greater risk for post-operative complications compared to the general population seeking cosmetic surgical interventions.

Demographic, Comorbidity, and Operative Differences Between Adult and Pediatric Cases of Salivary Gland Malignancy, a Comparative Study of 2,034 Cases

Abstract Presenter
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PURPOSE: Salivary gland malignancy (SGM) is a rare surgical pathology in the pediatric population, with complications capable of generating significant morbidity. (1) Currently, surgical management of SGMs is ambiguous, largely due to the lack pediatric-specific management guidelines. Furthermore, foundational knowledge regarding pediatric SGMs also lacking. Therefore, we aim to use a national database to provide demographic and episode-of-care comparisons between the adult and pediatric population suffering from SGMs, with the interest of discovering baseline characteristic differences and outcomes, in addition to assessing the overall level of reporting at a national scale.

METHODS: The 2012-2019 American College of Surgeons' National Surgical Quality Improvement Program Adult and Pediatric (ACS NSQIP, NSQIP-P) databases were queried to identify diagnoses of salivary gland malignancies based on postoperative ICD-10 codes C07, C08.0, C08.1, and C08.9 for SGM. Age was stratified into adult (age ≥22 years) or pediatric (age <22 years). Each age-based cohorts were then further stratified based on cancer site (parotid, submandibular, sublingual, or other major salivary gland). Complications present at time of surgery were excluded. Demographics, comorbidities, and complications were compared between adults and children.

RESULTS: Overall, 1,967 adult and 67 pediatric cases had met inclusion and exclusion criteria. Parotid gland malignancy comprised the majority of both adult (1,678, 85.3%) and pediatric (58, 86.6%) cases. Within cases of parotid gland malignancies, there were proportionally more adults (58.3%) compared to pediatric males (34.5%). A lower comorbidity burden was also noted across pediatric cases. Operative time was slightly lower for pediatric cases compared to adult (199.57 vs. 242.05 minutes), with roughly one day less of total hospital stay (1.26 vs. 2.36 days). Complication rates were similar between adult and pediatric cases (17.8%, 17.2%). There were overall fewer adult (184, 9.35%) and pediatric (9, 7.46%) cases of submandibular gland malignancy. Within this subgroup, notable differences were a faster average operative time of 124.4 minutes in the pediatric cases compared to adult (173.34 minutes). Although there were 49 total adult complications, there were no pediatric complications reported. There were 9 adult and 1 pediatric case of sublingual gland malignancy and 96 adult and 3 pediatric cases of other major salivary gland malignancy, both without clinically significant differences.

CONCLUSIONS: Documentation of surgical outcomes in children with SGMs is severely lacking and continued reporting is imperative in order to improve outcomes of both oncologic

surgery and the necessary reconstructive surgery. This would also benefit from investigations to track long term outcomes, including aesthetic changes as the child matures. Optimal management of pediatric SGM demands use of a longitudinal multidisciplinary approach by surgeons cross-trained in head and neck surgery and plastic surgery. This is a burgeoning field with a need for studies aimed at developing guidelines specific for children.

REFERENCES:

1. Sultan I, Rodriguez-Galindo C, Al-Sharabati S, Guzzo M, Casanova M, Ferrari A. Salivary gland carcinomas in children and adolescents: a population-based study, with comparison to adult cases. Head Neck. 2011;33(10):1476-1481. doi:10.1002/hed.21629

Development of Opioid Use Disorder Following Breast Reconstructive Surgery: Effects of Nicotine Dependence

Abstract Presenter
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BACKGROUND: After undergoing breast reconstructive surgery, patients are typically prescribed opioids as part of the multimodal analgesic regimen. Smoking tobacco increases rate of opioid metabolism and is associated with development of opioid use disorder (OUD). The aim of this study is to determine whether patients with a history of smoking have an increased risk of OUD following breast reconstructive surgery. The secondary aim is to assess risk of diseases associated with OUD following breast reconstruction.

METHODS: A retrospective cohort analysis was conducted using TriNetX, a multi-institutional database of de-identified electronic medical records from health systems across the United States. All individuals eligible for inclusion underwent a breast reconstructive surgery and received postoperative opioid treatment. The exposed group included patients with nicotine dependence and the control group was comprised of patients without nicotine dependence. Risk of developing opioid use disorder (OUD), hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) from 12 to 36 months after surgery was compared between groups. Cohorts were matched utilizing a biopsychosocial model to control for confounding factors including age, sex, race, and mental health history.

RESULTS: There were 8,648 patients included in the analysis. After matching, 4,324 patients comprised the nicotine dependence group and 4,324 patients remained in the non-nicotine dependence group. Nicotine dependence was significantly associated with increased risk of OUD

at 12, 24 and 36 months after breast reconstruction (36mo: OR 1.99; CI 1.278-3.099). Nicotine dependence was also associated with increased risk of HIV and HCV at all time points after surgery (36mo HIV: OR 2.614; CI 1.977,3.458; 36mo HCV: OR 3.718; CI 2.268-6.375) and increased risk of HBV beginning at 24 months after surgery (36mo HBV: OR 2.722; CI 1.502-4.935).

CONCLUSIONS: Individuals with nicotine dependence may be at increased risk of developing opioid use disorder, HIV, HCV and HBV following breast reconstructive surgery relative to patients who do not smoke. This risk persists for at least 3 years after surgery. Additional research and clinical interventions focusing on early identification of OUD, prevention efforts, and harm reduction strategies for patients undergoing breast reconstruction with nicotine dependence is warranted.

Differences in Management of Hand Infections and Associated Outcomes among People who Inject Drugs at an Urban Safety Net Hospital

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BACKGROUND: The ongoing drug-related overdose epidemic in the United States is a significant public health problem and cause of hand and upper extremity infections in the community. People who inject drugs (PWID) are at a higher risk of acquiring hand infections (1), particularly more serious polymicrobial and antibiotic-resistant infections (2). The purpose of this analysis was to characterize epidemiological factors and treatment of hand infections at a safety net hospital in order to inform their management among high-risk patient populations like PWID.

METHODS: We conducted a retrospective chart review of all Emergency Department (ED) consults for hand infections in adults ages ≥ 18 to a hand surgery service at an urban safety net hospital in San Francisco in 2022 (n = 132). Pearson's chi-squared and Fisher's exact tests for categorical variables and Student's t-tests for continuous variables were used to assess differences in sociodemographic characteristics, clinical presentations, and treatment approaches for PWID and non-PWID.

RESULTS: The study sample had a median age of 41(IQR = 33-54) and was racially diverse (39% White, 26% Black/African American, 20% Latino/Hispanic, and 15% Mixed/Other). 71 (55%) patients had a history of injection drug use, with the most commonly injected drug being

methamphetamine. PWID and non-PWID were similar with respect to age, race, and gender, but PWID were more likely to be homeless ($\chi2 = 40.71$; $p = 0.000$). PWID trended toward having more complex clinical presentations, such as multi-site infections ($\chi2 = 3.17$; $p = 0.075$). Additionally, PWID trended towards receiving more aggressive ED workup, including being more likely to have blood cultures obtained ($\chi2 = 3.50$; $p = 0.061$) and computed tomography scans ($\chi2 = 5.31$; $p = 0.021$). Blood and wound culture results, ED antibiotic regimens, and requirement for an operation didn't substantially differ between groups. Bedside incision and drainage trended towards being more commonly performed among non-PWID ($\chi2 = 3.54$; $p = 0.060$). In Bonferroni-adjusted post hoc analyses, PWID were more likely to self-direct discharge than to be discharged by a provider from the ED compared to non-PWID ($\chi2 = 10.98$; $p = 0.001$). After discharge, PWID were significantly more likely to return to the ED for the same or similar problem within 30 days ($\chi2 = 6.54$; $p = 0.011$) and less likely to attend a follow-up appointment ($\chi2 = 22.27$; $p = 0.000$).

CONCLUSION: The ongoing drug epidemic in the United States is significantly felt by the plastic surgery community with regard to hand infection consultations from the ED. PWID with hand infections may be more likely to undergo more aggressive workup in the ED, often directed by a hand surgery specialist, despite similar treatment and surgical courses as non-PWID. The disproportionately high rate of patient-directed discharge among PWID may partially explain their higher rate of recidivism. More research is needed to understand how injection drug use status can inform the targeting of initial ED diagnostic testing for hand infections and their subsequent management to improve outcomes for PWID.

REFERENCES

1. Jackson KA, Bohm MK, Brooks JT, et al. Invasive Methicillin-Resistant Staphylococcus aureus Infections Among Persons Who Inject Drugs - Six Sites, 2005-2016. MMWR Morb Mortal Wkly Rep. 2018;67(22):625-628. doi:10.15585/mmwr.mm6722a2
2. Tosti R, Trionfo A, Gaughan J, Ilyas AM. Risk factors associated with clindamycin-resistant, methicillin-resistant Staphylococcus aureus in hand abscesses. J Hand Surg Am. 2015;40(4):673-676. doi:10.1016/j.jhsa.2014.12.044

Differential Oxylipin profile in the Peri-prosthetic tissue of Breast Implant Illness Patients

Abstract Presenter
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INTRODUCTION: Breast implant illness (BII) is a systemic complication associated with breast implants. BII is poorly understood, and the etiology is unknown. The surgical injury at the implant site initiates a local inflammation, creates a multitude of factors that impacts adipose tissue (increased inflammation, decreased adipose-derived hormone expression). These acute stress responses activate pathways that are involved in lipid peroxidation generating oxylipins, that are involved in inflammatory, nociceptive, and vascular responses to injury. Here we report the changes in oxylipin profile in the BII patients and the correlations of these changes with Breast Implant Illness.

MATERIALS & METHODS: The study comprised of 120 subjects across three cohorts consented via protocol approved by IRB. Cohort-I comprised of BII subjects who went through explantation of breast implants (N=46). Cohort-II (non-BII) included patients (N=29) with breast implants without BII symptoms but went through explantation. Cohort-III (N=45, normal) was comprised of women without an implant, whose breast tissue was removed as an unrelated clinically indicated surgical procedures. Metabolite profiling of 14 oxylipins using targeted liquid chromatography mass spectrometry (LC-MS/MS) from the peri-prosthetic breast adipose tissue was performed. Identification of the metabolite was mediated by deuterated internal standard (heavy isotope). Concentrations in pg/mg of tissue were obtained by normalizing by the weight of the sample.

RESULTS: Kruskal Wallis test with Dunn's correction showed increased abundance of four oxylipins in the BII cohort compared to the non-BII or normal cohort ($p<0.05$). The four oxylipins comprised of 9(10)-Di HOME, 9-HODE, 12-HETE and 13-HODE. The oxylipins also exhibited a positive correlation with the duration of implant when compared between the implant cohort (BII and non-BII) and non-implant cohort (normal). Relative abundance of these oxylipins was also positively associated to the common manifestation exhibited by the BII patients (viz. fatigue, myalgia and brain fog) obtained as part of the patient reported outcome.

DISCUSSION: This study demonstrates that BII subjects exhibit an altered oxylipin profile. As oxylipins are known to be immunogenic in nature, this could be a possible underlying etiology that could lead to or exacerbate the systemic manifestations associated with BII. Further research in this direction is required to elucidate the mechanistic pathway(s) involved in the process.

Diversity of Leadership and its Influence on Diversity of Integrated Plastic Surgery Residency Cohorts: A Study in the Virtual Era

Abstract Presenter
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Background: In the aftermath of COVID-19, the residency application process has largely remained in the virtual space, introducing a new challenge to prospective integrated plastic surgery residents.1 Many programs enhanced their online presence to address this challenge, but both programs and applicants are still limited to a virtual snapshot when determining "fit". An important influence of "fit" is the ability to racially, ethnically, and/or culturally identify with the program.2,3 The aims of this study are (1) to better understand the online information that residency programs are making available to prospective applicants and to (2) characterize racial diversity of integrated plastic surgery program directors and investigate its influence on the corresponding residency cohorts.

Methods: A cross-sectional study of U.S. integrated plastic surgery residency programs was performed in August 2022. Data on race and ethnicity were collected for residency program directors and resident cohorts by photogrammetric analysis of online material. Relationships between these groups were analyzed. Available demographic data was also collected from the Association of American Medical Colleges (AAMC) for comparison and validation.

Results: A total of 87 integrated plastic surgery residency programs were identified from the AAMC website. Five programs were excluded due to inactive status or incomplete data. A total of 1,174 residents were evaluated across the 82 included programs. Interrater reliability was determined with $\kappa=0.97$ ($p<0.001$), indicating almost perfect agreement. The racial composition of programs is displayed in Table 1 alongside self-reported race/ethnicity data from the 2021 AAMC report. Of note, self-reported percentages add up to over 100%, allowing for selection of more than one race/ethnicity. Black/African American (3.4%) and Hispanic (4.2%) represent the smallest proportions of residents (Figure 1).
Program directors were evaluated for each of the 82 included residency programs. Table 2 displays the program director race in comparison to the race of corresponding residents by percentage. Though not statistically significant, more residents of a given race are in programs with a program director of the same race.

CONCLUSIONS: The racial diversity of a residency cohort is positively associated with racial diversity of program directors. Awareness of racial and ethnic disparities in plastic surgery residencies and implementation of interventions to increase recruitment and retention would help to minimize these disparities. Increasing diversity in academic plastic surgery and graduate medical education will result in a more equitable and innovative field.

REFERENCES

1. Chinedozi I, Martin O, Hays N, Kubicki NS, Kidd-Romero S, Kavic SM: Love at First Click: Surgery Residency Websites in the Virtual Era. J Surg Educ. 2021, 78:2088-2093. 10.1016/j.jsurg.2021.04.016
2. Smith BT, Egro FM, Murphy CP, Stavros AG, Nguyen VT: An Evaluation of Race Disparities

in Academic Plastic Surgery. Plast Reconstr Surg. 2020, 145:268-277. 10.1097/prs.0000000000006376
3. Roberts SE, Shea JA, Sellers M, Butler PD, Kelz RR: Pursing a career in academic surgery among African American medical students. Am J Surg. 2020, 219:598-603. 10.1016/j.amjsurg.2019.08.009

Effects of Reduction Mammaplasty on Weight Loss in Obese and Overweight Adolescents: A 7-Year Review

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BACKGROUND: Recent studies show less than one third of adolescent women with macromastia fall within the normal body mass index (BMI) range, yet the causality between obesity and macromastia remains incompletely understood.1 While an increased capacity for physical activity and regular exercise are cited benefits of reduction mammaplasty, reports of significant change in BMI are rare.2,3 The objective of this study was to measure changes in weight and BMI in a sample of obese and overweight adolescent patients after undergoing reduction mammaplasty.

MATERIALS AND METHODS: We retrospectively reviewed the charts of patients aged 10–24 years with a BMI ≥ 25 kg/m2 who underwent reduction mammaplasty at our institution between 2014–2021. Records were reviewed for preoperative weight, BMI, weight of breast tissue removed, comorbidities, and demographic information. Only patients a minimum postoperative follow-up time of 1 year were included in the study.

RESULTS: Fifty-eight patients meeting eligibility criteria were identified. The average age was 18.9 ± 3.5 years ranging from 12 to 24 with 81 percent of patients identifying as African American. The mean follow-up time was 14.4 ± 3.0 months. Using two-tailed sample-t tests assuming equal variances, no significant changes to weight or BMI were found one year after reduction mammaplasty in overweight or obese patients.

CONCLUSION: We found no significant difference between mean preoperative and postoperative weight or BMI among overweight and obese adolescent women who underwent reduction mammaplasty in a seven-year review from our institution. Our results suggest that while reduction mammaplasty may decrease physical limitations to exercise, substantial postoperative weight loss or reduction in BMI solely from removal of excess breast tissue is

unlikely to occur.

REFERENCES:

1. Koltz PF, Sbitany H, Myers RP, et al. Reduction mammaplasty in the adolescent female: the URMC experience. Int J Surg. 2011;9(3):229-32. doi: 10.1016/j.ijsu.2010.12.001. Epub 2010 Dec 10. PMID: 21146642
2. Nuzzi LC, Firriolo JM, Pike CM, et al. The effect of reduction mammaplasty on quality of life in adolescents with macro- mastia. Pediatrics 2017;140: pii: e20171103.
3. Chao JD, Memmel HC, Redding JF, et al. Reduction mammaplasty is a functional operation, improving quality of life in symptomatic women: A prospective, single-center breast reduction outcome study. Plast Reconstr Surg. 2002;110:1644–1652

Enhanced Recovery After Surgery (ERAS) for Patients with Free Fibula Flap in Oro-mandibular Reconstruction: Propensity-Matched Retrospective Study

Abstract Presenter
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INTRODUCTION: In 1975, Taylor et al harvested and transferred the first free fibula through a posterior approach, and the technique was further improved by Gilbert, who described the lateral approach, which was later further developed by Wei et al, who popularized the osteomyocutaneous fibular flap.[1][2] In 1994, Hidalgo further expanded indications for fibular free tissue transfer by describing osteotomy techniques that permit shaping the fibula to mimic that of the mandible, making the fibula the workhorse for head and neck reconstruction that it is today.[3]Therefore, it is urgent to optimize perioperative management in order to reduce the occurrence of complications and improve the quality of life of patients.The aim of this study was to evaluate the effects implementation of the enhanced recovery after surgery (ERAS) program on postoperative recovery and the patients who underwent free fibula flap surgery in oromandibular reconstruction.

METHODS: This retrospective study enrolled patients who underwent free fibula flap surgery in oromandibular reconstruction between January 2012 to December 2022. The ERAS protocol has been implemented for patients who underwent free fibula flap surgery. The primary outcome was the length of stay (LOS) days. Secondary outcomes were flap complications, unplanned reoperation, 30-day readmission, surgical site infections, lower limb comorbidities, and morbidity parameters.

RESULTS: A total of 188 patients were enrolled in this study. After propensity score matching (PSM), the study included 72 patients. There were 36 patients in the ERAS group and 36 patients

in the non-ERAS group. There was no significant difference in patients' demographic characteristics. The significant decreases were observed in the ERAS group in the length of stay (LOS) days (8.66 ± 3.90 days in the ERAS group vs. 11.64 ± 5.42days in the non-ERAS group, P = 0.027) and postoperative ventilator use days (1.08 ± 0.28 days in the ERAS group vs. 2.03 ± 1.05 days in the non-ERAS group, P <0.001). The secondary outcomes were no significant difference in two group. In addition, the patients in ERAS group had lower postoperative morbidity parameters like the PONV, urinary tract infections, and pulmonary complications were significantly decreased (P = 0.044).

CONCLUSION: ERAS program could be beneficial and safe applied to patients who underwent free fibula flap in oromandibular reconstruction surgery hereby improving their recovery and not increase flap complication and 30-day readmission.

REFERENCE

1. Bumbasirevic M, Stevanovic M, Bumbasirevic V, Lesic A, Atkinson HD. Free vascularised fibular grafts in orthopaedics. Int Orthop. 2014 Jun;38(6):1277-82. doi: 10.1007/s00264-014-2281-6. Epub 2014 Feb 22. PMID: 24562850; PMCID: PMC4037521.
2. Chuang DC, Chen HC, Wei FC, Noordhoff MS. Compound functioning free muscle flap transplantation (lateral half of soleus, fibula, and skin flap). Plast Reconstr Surg. 1992 Feb;89(2):335-9. doi: 10.1097/00006534-199202000-00024. PMID: 1732905.
3. Hidalgo DA. Fibula free flap mandibular reconstruction. Clin Plast Surg. 1994 Jan;21(1):25-35. PMID: 8112010.

Epidemiology and Risk Factors of Pediatric Metacarpal Fractures

Abstract Presenter
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INTRODUCTION: Metacarpal fractures are considered to be "common" injuries in the pediatric population, but the epidemiology and injury patterns for this group are not well described in the current literature. This study examines our local pediatric hand trauma population and injury characteristics to identify risks associated with metacarpal fractures.

METHODS: This was a retrospective cohort of pediatric hand trauma patients during a 10-year period (2010-2020) at UPMC Children's Hospital of Pittsburgh. Patients were grouped into metacarpal fracture and non-metacarpal fracture cohorts. All charts were abstracted for demographic and clinical details. Population estimates and socioeconomic data were obtained from the United States Census Bureau. Summary statistics were computed, and a binomial

regression was used to compute relative risks (RR). Significance was assessed at alpha=0.05.

RESULTS: 1,311 patients sustained hand trauma, with 215 (18%) patients sustaining metacarpal fractures. The most common mechanisms were sports-related injuries (n=61, 28%), violence (n=40, 19%), self-inflicted injuries (n=31, 14%), and falls (n=22, 10%). Violent, self-inflicted, and motor vehicle crash mechanisms were associated with greater risk of metacarpal fracture (RR 8.74, CI 5.17-14.77, p<0.001; RR 25.73, CI 10.13-65.39, p<0.001; RR 4.15, CI 1.35-12.74, p=0.007, respectively). In contrast, door slam mechanism was associated with reduced risk of metacarpal fracture (RR 0.09, CI 0.04-0.25, p<0.001). 39 patients (18%) required surgery, and operative intervention was associated with increased risk of metacarpal fracture (RR 1.44, CI 1.03-2.00, p=0.03). Displaced fractures were the most common (n=115, 53%), and had a greater risk of occurring with metacarpal fractures (RR 1.59, CI 1.37-1.86, p=0.001). Rotational abnormalities also had increased risk of metacarpal fractures (RR 2.11, CI 1.18-3.77, p=0.01). Metacarpal fractures were more likely to be treated with ORIF, or reduction and splinting (RR 3.28, CI 1.49-7.22, p=0.002; RR 2.36, CI 1.64-3.41, p<0.001, respectively). Male gender, African American race, and age >12 years had greater risk of metacarpal fractures (RR 1.22, CI 1.11-1.34, p<0.001; RR 1.45, CI 1.16-1.81, p=0.002; RR 1.77, CI 1.56-2.00, p<0.001, respectively).

CONCLUSION: This study represents the largest reported cohort of metacarpal fractures in the pediatric hand trauma literature to date, and our findings highlight several risk factors. Teenage African American males are at highest risk for metacarpal fractures. In addition, displaced fractures and rotational abnormalities were more likely to occur with metacarpal fractures. These findings have important implications for the prevention and early evaluation of metacarpal fractures for timely referral to hand surgeons.

Epidemiology of Concomitant Head Injuries with Facial Trauma: A Study of the NEISS Database

Abstract Presenter
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BACKGROUND: Facial injuries are commonly concomitant with cranial injuries due to spatial proximity and mechanism of injury.1,2 This study aims to provide a broad overview of the concurrent nature of facial and head injuries, including the most common location, diagnosis, and mechanism of injury. Specifically, by exploring the association between facial to head injuries, the study aims to uncover the true burden of concurrent cranial trauma.

METHODS: The NEISS database was queried from 2019 – 2021. The database was filtered for encounters relating to the head, face, and both head & facial injuries. Extracted variables included patient demographic information, diagnosis, disposition, location, and products causing the injury. Descriptive analyses were conducted, and all analyses were done on weighted national estimates. Chi-squared with Rao & Scott second order correction was used to assess differences between categorical variables. Unpaired T-test and Analysis of Variance (ANOVA) were used to evaluate differences between continuous variables in two or more groups.

RESULTS: A total of 10,939,340 weighted encounters met the study inclusion criteria. There was a bimodal distribution of incidence across age categories, and facial injuries were most likely to occur in younger patients less than 10 years old. In comparison, head injuries were most likely in older patients greater than 65 years old. Facial injuries had concurrent head injuries in approximately 1 in 6 encounters. Inversely, head injuries had concurrent facial injuries in approximately 1 in 9 encounters. The most common location across all groups was at home (66.9%), and household furniture was the most common product resulting in injury (24.7%).

CONCLUSION: A high incidence of facial injury occurs concurrently with head injury, predominantly in the home setting from household furnishings. As providers treating facial wounds, it is critical to consistently evaluate for the presence of head trauma, which may initially be less evident. From a public health perspective, education on the risks of at-home fall prevention, particularly for children and the elderly, may be beneficial in lowering the incidence of facial and head trauma.

REFERENCES:

1. Su P, Paquet C, O'Dell K, et al. Trends in Operative Complex Middle and Upper Maxillofacial Trauma: A 17-Year Study. Laryngoscope. 2021;131(9):1985-1989. doi:10.1002/lary.29442
2. Moses H, Powers D, Keeler J, et al. Opportunity Cost of Surgical Management of Craniomaxillofacial Trauma. Craniomaxillofac Trauma Reconstr. 2016;9(1):76-81. doi:10.1055/s-0035-1566160

Evaluation of Complications After Pediatric Fronto-orbital Advancement Surgery: Review of National Billing Database

Abstract Presenter
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PURPOSE: Frontoorbital advancements (FOA) for craniosynostosis is the gold-standard of treatment to prevent future neurological deficits from restricted calvaria growth. Due to many centers operating in isolation, FOA complications and reoperation rates have limited studies completed on a national level. This retrospective analysis aims to use a multicenter billing database with more recent data to identify the current demographics of patients undergoing FOA, evaluate the short-term and long-term reoperation rates, and identify intra- and post-operative complication rates.

METHODS: Consecutive patients needing forehead advancement between 2010 and 2020 were identified from a PearldiverTM, a national deidentified aggregate database. Patients were eligible for inclusion if they underwent operative treatment of a FOA and were billed with CPT-21175 between the ages 0 and 5 years old. Intra and post-operative complications were queried using CPT, ICD-9, and ICD-10 codes. Post-operative complications were identified 0, 30, 90, 180, and 365 days after surgery and identified based on need for reoperation.

RESULTS: A total of 1,905 patients between 0 to 5 years old were identified to have received FOA based on CPT-21175. Hemorrhage and hematoma of the nervous system was the most common intraoperative complication (0.32%). Hardware complications (2.37%) and wound dehiscence (2.37%) were the most common postoperative complications one year after surgery based on ICD-9 and ICD-10 codes identified. Removal of the implant after one year (3.37%) was the most common cause of a reoperation with an overall return to surgery rate of 7.15%.

CONCLUSION: FOA surgical repair was found to be a safe procedure with a 1.1% re-operation rate 365 days after surgery, and an overall return to surgery rate of 7.15% 365 days after surgery. This poster provides a resource for families to reference when concerned about FOA complications.

Evaluation of Obesity as a Risk Factor for Complications and Revisions in Gender Affirming Mastectomy

Abstract Presenter
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PURPOSE: Gender-diverse patients often have limited access to health care and endure stigma associated with their gender identity. This often impacts their quality of life and contributes to both mental and physical health, including depression and obesity.1 Gender-affirming mastectomies have been shown to significantly improve quality of life for transmasculine patients by improving anxiety, depression, body image, and psychosocial functioning.2 As the number of gender-affirming mastectomies has increased 13-fold over the past decade, a better understanding of post-operative complications and risk factors is needed to improve surgical outcomes and patients' quality of life.3

Previous studies have indicated a need for further assessment for patients with a BMI >40 kg/m2. Additionally, there is no literature assessing the association between body surface area (BSA) and postoperative complications and revisions. Therefore, we aim to evaluate postoperative mastectomy complications as a function of 1) BMI and 2) BSA.

METHODS: A retrospective review of patients undergoing gender affirming mastectomy was conducted over 32 months. Surgical and demographic information were collected by manual chart review using a standardized data collection tool. The primary outcomes of interest were complications post-surgery and revisions.

RESULTS: 227 patients who underwent gender affirming mastectomy were identified. The average BMI was 31.1 (SD, 8.6), and average BSA was 1.91 (SD, 0.3). There was a total of 27 complications (8.8% of patients), and 19 revisions (8.1%). When controlling for testosterone use, smoking, past medical history, and psychological diagnosis, we found no difference in occurrence of complications ($p=0.3$) or revisions ($p=0.4$) between BMI categories. Similarly, there was no difference in mean BSA between patients who had complications (vs no complications, $p=0.6$) or revisions (vs no revisions, $p=1.0$).

CONCLUSIONS: Our results add to growing evidence that there is no significant association of BMI or BSA on gender-affirming mastectomy complications or revisions. Therefore, we suggest that obesity (increased BMI/BSA) should not be used as a standalone contraindication to these life-improving procedures. Continued evidence is needed, including further research into other risk factors for postoperative complications and revisions and potential meta-analyses to compare results across a wide range of patients, surgeons, and hospital environments.

References:
1. White Hughto JM, Reisner SL, Pachankis JE. Transgender stigma and health: A critical review of stigma determinants, mechanisms, and interventions. Soc Sci Med. 2015;147:222-231. doi:10.1016/j.socscimed.2015.11.010
2. Lane M, Kirsch MJ, Sluiter EC, et al. Gender Affirming Mastectomy Improves Quality of Life in Transmasculine Patients: A Single-center Prospective Study. Ann Surg. 2023;277(3):e725-e729. doi:10.1097/SLA.0000000000005158
3. Tang A, Hojilla JC, Jackson JE, et al. Gender-Affirming Mastectomy Trends and Surgical Outcomes in Adolescents. Ann Plast Surg. 2022;88(4 Suppl):S325-S331.

Examining the Efficacy of Bone-Anchored Maxillary Protraction to Correct Class III Malocclusion in Patients with Clefts: A Case Series

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INTRODUCTION: Maxillary hypoplasia is associated with several craniofacial anomalies, including cleft lip and palate. Bone-anchored maxillary protraction (BAMP), which involves constant maxillomandibular elastic forces exerted on Bollard plates, has potential utility in correcting maxillary hypoplasia.(1–3) The purpose of this study is to evaluate efficacy of BAMP in advancing the maxilla, to determine whether the effects reduce or eliminate the need for LeFort I procedures, and if the benefits outweigh risks of complications, revisions, and difficulty with compliance.

METHODS: This case series included patients who underwent BAMP therapy at a single institution from July 1, 2014, to September 31, 2022. Demographic information and BAMP therapy characteristics were extracted from the electronic medical record. All patients included had class III malocclusion, and pre-Bollard plate placement and post-Bollard plate removal lateral cephalogram or cone-beam computed tomography imaging. Cephalometric measurements were made using these images. Descriptive statistics were calculated using two-tailed t tests with a significance cutoff of $p<0.05$.

RESULTS: Ten patients were included in the study. Seven patients also had unilateral cleft lip and palate. The mean age at time of Bollard plate placement was 11.6 years and the mean length of BAMP therapy was 21.2 months. Five patients were compliant with wearing elastics full-time. Two patients were not compliant with wearing elastics and three additional patients had variable compliance secondary to Bollard plate loosening in the maxilla. Three patients had Bollard plate loosening requiring surgical fixation to continue BAMP therapy, and three patients were found to have loosened Bollard plates at the time of removal. One patient had a fractured Bollard plate in the maxilla at the time of removal. Three patients with good compliance with elastics and no Bollard plate loosening had an average +2.07° increase in SNA. Nine patients had plans for LeFort I surgery following BAMP therapy.

CONCLUSIONS: There was a high prevalence of hardware loosening and poor compliance with wearing elastics in our sample. One patient with good compliance with elastics and no hardware loosening had sufficient maxillary advancement to avoid LeFort I repair, further supporting the importance of these factors in the success of BAMP therapy. Additionally, patients without hardware complications and good compliance with elastics exhibited forward

protrusion of the maxilla, but still required LeFort I repair. However, the high complication rate makes the utility of BAMP therapy questionable. To avoid future hardware loosening and fracturing, our institution is creating a new Bollard plate that will have better fixation in the maxilla and a lower fracture rate.

REFERENCES:

1. Faco R, Yatabe M, Cevidanes LHS, Timmerman H, De Clerck HJ, Garib D. Bone-anchored maxillary protraction in unilateral cleft lip and palate: a cephalometric appraisal. European Journal of Orthodontics. 2019;41(5):537-543. doi:10.1093/ejo/cjz005
2. Ren Y, Steegman R, Dieters A, Jansma J, Stamatakis H. Bone-anchored maxillary protraction in patients with unilateral complete cleft lip and palate and Class III malocclusion. Clin Oral Invest. 2019;23(5):2429-2441. doi:10.1007/s00784-018-2627-3
3. Van Hevele J, Nout E, Claeys T, Meyns J, Scheerlinck J, Politis C. Bone-anchored maxillary protraction to correct a class III skeletal relationship: A multicenter retrospective analysis of 218 patients. Journal of Cranio-Maxillofacial Surgery. 2018;46(10):1800-1806. doi:10.1016/j.jcms.2018.07.007

Expanding Applications of the Inferior Dermal Pedicle in Breast Reconstruction: Beyond the Goldilocks Procedure

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BACKGROUND: Goldilocks closure following mastectomy is a surgical technique in which the inferior dermal pedicle (IDP) is de-epithelialized and shaped to form a breast mound. Since it's original description for large breasted patients, IDP closure has evolved to be used with serial fat grafting and implants for breast reconstruction. We report the increasing application of IDP with and without implant based reconstruction and evaluate peri-operative outcomes and final reconstruction type.

METHODS: An IRB-approved retrospective review was conducted of patients who underwent skin-sparing mastectomy with immediate reconstruction using Goldilocks (IDP only) or IDP with tissue expander or implant (IDP+TE) at our institution (2012-2022). Patient demographics,

initial and final reconstructive technique and outcomes were collected. Complications included any seroma requiring aspiration, hematoma, surgical site infection, wound dehiscence requiring surgical intervention, implant malposition requiring intervention, or unplanned TE explantation following primary surgery.

RESULTS: 469 breasts (266 patients) were included, with 50.1% breasts reconstructed with IDP alone and 49.9% with IDP+TE. The IDP alone cohort was older than the IDP+TE cohort (mean age 55.7 versus 52.5 years, p=0.0174), and had higher mean BMI (36.5 versus 31.2, p<0.001). Median follow up was 31 months for IDP alone and 37 months for IDP+TE. Major complication occurred in 35/235 (14.9%) breasts following IDP alone and in 44/234 breasts (18.8%) following IDP+TE (p=0.258). The interquartile range for number of days before the first major complication was 12 to 37 days after mastectomy. In the IDP alone cohort, 64 breasts underwent fat grafting alone, 14 had delayed implant reconstruction (all underwent fat grafting), 7 underwent autologous reconstruction (all underwent fat grafting) and 150 had no further procedures. Amongst the IDP+TE cohort, 14 breasts were direct to implant (6 breasts had further fat grafting), 137 breasts underwent implant exchange (109 breasts had further fat grafting), 42 breasts underwent autologous reconstruction (29 breasts had further fat grafting), and 20 breasts had only serial fat grafting with removal of the tissue expander, 21 breasts have not finished reconstruction, or are lost to follow-up. Fat grafting was utilized in 85/235 (36.1%) of IDP alone breasts and 144/234 (61.5%) of IDP+TE breasts.

CONCLUSIONS: We demonstrate the increasing application of the IDP in post-mastectomy breast reconstruction. Both IDP alone (Goldilocks) and IDP+TE have acceptable post-operative complications.

Fat Grafting for Temporal Hollowing Augmentation Following Craniectomy

Abstract Presenter
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PURPOSE: Temporal hollowing is a common sequela affecting patients who have undergone craniectomy and other neurosurgical procedures. This can be one of the most lasting visible stigmata after major cranial injury. Free fat grafting has been proven beneficial as a secondary reconstructive modality, serving as a cost-effective and reliable technique, with a low incidence of graft rejection or infection. [1] However, this usually requires an additional surgical procedure. We have instituted fat grafting at the time of primary cranioplasty to address the cosmetic deformity of temporal hollowing while avoiding the need for an additional surgical procedure.

METHODS: Temporal hollowing augmentation via free fat grafting broadly encompasses the following steps: abdominal fat is harvested via manual liposuction through an umbilical incision into a 10 mL syringe, processed via Telfa rolling and loaded into 1 cc syringes.[2] The refined fat is injected as microdroplets via a 20-gauge needle on retropulsion into the elevated temporalis muscle and subcutaneous tissue of the scalp (not directly on the avascular implant). Three patients with an average of 1.1 year follow up underwent cranioplasty with adjunctive fat grafting under the neurosurgical and plastic surgery services. An average of 15.6 cc (12 – 20 cc) of fat was injected into and above the temporalis muscle, and into the adjacent subcutaneous fat at the time of cranioplasty. Retropulsion was performed to avoid intra-arterial injection especially around the superficial temporal artery. Harvesting, processing and injecting the fat was performed at the end of the procedure, after incision closure, and added an average of 9 minutes to the surgical procedure.

RESULTS: The procedures were successful, and the patients did not suffer from any complications associated with the fat grafting. Patient satisfaction with respect to overall cosmetic outcome was high in the experimental group even one year later despite mild absorption.

CONCLUSION: Fat grafting has long been used to correct temporal hollowing in craniofacial surgery, with improved cranial symmetry, playing a role in increased self-perception and patient satisfaction.[3] There is also evidence that supports immediate fat grafting for refining scar appearance with craniofacial procedures.[4] With any surgical procedure, it is important to recognize and account for potential complications that may develop especially when pertaining to the temporal region of the head. Such complications related to temporal hollowing augmentation may include the risk for infection, headache/dysesthesias, skin irregularities, and overcorrection.[5] Fortunately, low complication rates have been observed, indicating an overall high safety profile. Of note, this procedure was only offered to patients with high functional status and overall health which may show a selection bias. However, these patients are also most likely to see real benefit in improved cosmesis in their daily lives.

Adjunctive fat grafting at the time of primary cranioplasty is an efficient technique that allows for cooperative workflow between the neurosurgical and plastic surgery teams. This incorporated reconstruction is not associated with additional complications. Volumetric defects are improved, though secondary treatment may still prove beneficial. Adjunctive fat grafting at the time of cranioplasty in our hands has been an effective neuroplastic tool in improving patient outcomes.

REFERENCES:

1. Ackerman, P. D., Hammers, R., Ibrahim, T., & Origitano, T. C. (2012). The use of abdominal free fat for volumetric augmentation and primary dural closure in supratentorial skull base surgery: Managing the stigma of a temporal defect. Journal of Neurological Surgery Part B: Skull Base, 73(02), 139-144.
2. Pfaff M, Wu W, Zellner E, Steinbacher DM. Processing technique for lipofilling influences adipose-derived stem cell concentration and cell viability in lipoaspirate. Aesthetic Plast Surg. 2014 Feb;38(1):224-229. doi: 10.1007/s00266-013-0261-7. Epub 2014 Jan 8. PMID: 24399146.
3. Denadai, R., Raposo-Amaral, C. A., Buzzo, C. L., Ghizoni, E., Cendes, F., & Raposo-Amaral,

C. E. (2019). Anatomical fat grafting for reconstruction of frontotemporal contour deformities after neurosurgical and craniofacial surgical interventions: a symmetry outcome study. World Neurosurgery, 127, e1064-e1082.
4. Zellner EG, Pfaff MJ, Steinbacher DM. Fat grafting in primary cleft lip repair. Plast Reconstr Surg. 2015 May;135(5):1449-1453. doi: 10.1097/PRS.0000000000001187. PMID: 25919258.
5. Choi J, Choi H, Shin D, Kim J, Lee M, Kim S, Jo D, Kim C. Autogenous fat grafting for mild-to-moderate postoperative temporal hollowing after decompressive craniectomy: One-year follow-up. Arch Plast Surg. 2018 Jan;45(1):69-73. doi: 10.5999/aps.2017.01088. Epub 2017 Oct 27. PMID: 29076327; P

Fixation of Distal Radius Fractures Using WALANT: A National Analysis of Reimbursement and Thirty-Day Adverse Events

Abstract Presenter
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PURPOSE: Wide-awake local anesthesia no tourniquet (WALANT) technique is now being used for larger surgeries such as fracture fixation. WALANT is reported to decrease costs and improve patient experience without increasing adverse events, but evidence for fixation of distal radius fractures (DRF) is limited due to small sample sizes.1 The current study uses national data to compare DRF fixations performed using local anesthesia to those performed using general or regional anesthesia in terms of reimbursement and adverse events.

METHODS: PearlDiver, a national database with administrative data on 157 million patients from January 2010 to August 2021, was used to identify DRF fixations using Current Procedural Terminology (CPT) codes 25607, 25608, and 25609. Exclusion criteria were concomitant treatment of other upper extremity fracture, office-based surgery, <30 days of follow-up, and age <18 years. Patients were stratified by type of anesthesia (general/regional or local) and matched based on age, sex, Elixhauser Comorbidity Index (ECI) score, and geographic region. Insurance coverage (commercial, Medicaid, Medicare) was also extracted.

Total reimbursement for surgery was determined, as well as 30-day readmissions, emergency department (ED) visits, surgical site infections (SSI), and filled narcotics prescriptions. Age, ECI score, and mean reimbursement were compared with t-tests. Categorical variables were compared using chi-squared tests.

RESULTS: Matched cohorts included 16,524 patients with general/regional anesthesia and 16,524 patients with local anesthesia. Patients were, on average, 60 years old, and most were female (82%). Mean ECI score was 3, and patients were distributed throughout the country (41% South, 27% Midwest, 18% Northeast, 15% West). There were no statistically significant

differences in these characteristics. The distribution of insurance coverage was significantly different between the two cohorts (general/regional with 74% commercial, 6% Medicaid, 18% Medicare; local with 69% commercial, 5% Medicaid, 27% Medicare; $p<0.001$).

Compared to surgeries with general/regional anesthesia, total reimbursement for local-only surgeries was significantly lower in patients with commercial insurance ($2,141 local vs $2,603 general/regional, $p<0.001$) and significantly higher with Medicare ($785 vs $732, $p=0.044$). There was no difference in total reimbursement with Medicaid ($979 vs $894, $p=0.103$).

Within 30 days of surgery there was no difference in the incidence of readmission (1.5% vs 1.6%, $p=0.45$) or SSI (0.1% vs 0.1%, $p=0.879$). Fewer local patients had a 30-day ED visit (3.8% vs 4.9%, $p<0.001$). There was no difference in the number of patients who filled a narcotics prescription within 30 days of surgery (63.4% vs 62.8%, $p=0.294$).

CONCLUSIONS: As the role for local-only surgery expands, we must consider its impact on healthcare value. In the current study, local-only fixation of DRF in the ambulatory setting was not associated with increased adverse events or narcotics prescriptions, but total reimbursement for local-only surgery varied by payor type, with reduced costs for commercially insured patients but increased costs for those with Medicare. Local-only surgery provides the opportunity to move surgeries into the office rather than the ambulatory surgery setting. It's possible that more consistent reductions in cost may be realized by doing so, and this will be an important area for future study.

Frequency, etiology, and pattern of acute traumatic lesions of the extra-temporal portion of the facial nerve in the Mexican population, review, and five-year experience in a reference center: Manuel Gea González General Hospital.

Abstract Presenter
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INTRODUCTION: Injury to the extra-temporal portion of the facial nerve can cause important aesthetic and functional sequelae. The time of evolution, location and mechanism of injury will determine the recovery and the surgical procedure of choice.

OBJECTIVE: To describe the frequency, etiology, and pattern of acute traumatic injuries of the extra-temporal portion of the facial nerve.
Material and method: A descriptive, retrospective, and cross-sectional study of patients with

acute traumatic injury of the extra-temporal portion of the facial nerve was carried out at the Dr. Manuel Gea Gonzalez hospital from January 2017 to July 2022.

RESULTS: 37 cases were obtained, 92% male. The mean age was 24.7 years. Seventy percent of cases were secondary to sharp trauma. The median time from injury to treatment was 6 hours (SD=63). The most affected Seckel zone was zone II in 29%, followed by zone IV in 22%. The frontal branch and the buccal branch were the most affected in 28% each, followed by the temporal branch with 27%. 54% presented injury to other structures (45% was associated with facial fracture). Regarding treatment, 91% underwent primary neurorrhaphy, nerve grafts in 3%, and conservative management in 3%.

CONCLUSION: Traumatic injuries to the facial nerve can significantly diminish quality of life. It is important to know their frequency, etiology, and pattern to provide adequate management. In our study, primary neurorrhaphy was the most frequently performed surgical procedure.

REFERENCES:

KITAMURA, Takeshi, et al. Extratemporal facial nerve surgery. Archives of Otolaryngology, 1972, vol. 95, no 4, p. 369-375.
HUMPHREY, Clinton D.; KRIET, J. David. Nerve repair and cable grafting for facial paralysis. Facial Plastic Surgery, 2008, vol. 24, no 02, p. 170-176.
WHITE, Hilliary; ROSENTHAL, Eben. Static and dynamic repairs of facial nerve injuries. Oral and Maxillofacial Surgery Clinics, 2013, vol. 25, no 2, p. 303-312.
TELICH-TARRIBA, Jose E., et al. Upper extremity patterns of injury and management at a plastic and reconstructive surgery referral center in Mexico City. Annals of Plastic Surgery, 2018, vol. 80, no 1, p. 23-26.
CHÁVEZ-SERNA, Enrique, et al. Parálisis facial, causas y tratamiento quirúrgico en un centro de referencia en cirugía plástica y reconstructiva en México. Cirugía y cirujanos, 2021, vol. 89, no 6, p. 718-727.

Gender And Ethnicity Trend in Integrated Plastic Surgery Residency Matching

Abstract Presenter
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PURPOSE: Gender and ethnicity diversity in surgical related fields has been shown to improve the quality of mentorship, training and patient care. Realizing gender and ethnicity equity remains a goal in academic plastic and reconstructive surgery1. The objective of this study is to evaluate trends, race/ethnicity, and gender of applicants to integrated plastic and reconstructive surgery residency programs.

MATERIALS & METHODS: Data from the Accreditation Council for Graduate Medical Education (dated from 2008 to 2021) was analyzed to identify demographic trends among residents in integrated plastic surgery programs. Information on the "number of active residents by plastic surgery-integrated" was extracted, particularly in gender and ethnicity.

Historically in the field of plastic surgery, the dominant ethnic groups have been white and Asian1. Although a relatively young specialty program, integrated plastic surgery programs showed a similar trend1. Therefore, residents who identified as white or Asian were grouped together, and the rest including Hispanic, African American, Native American/Alaskan, and unreported were grouped as non-white/Asian for a clearer trend demonstration. Direct comparison of the percentage of female residents from 2008-2011 vs 2012-2010, and ethnicity group from 2011-2019 vs 2020-2021 was performed via Pearson's Chi-square test. P value < 0.05 is considered statistically significant.

RESULTS: Since integrated plastic and reconstructive surgery program was established in 2008, the total number of programs has increased from 30 to 86 (65% increase) from 2008 to 2020. The total number of residents has increased from 312 to 1009 (69% increase). In the first two years, female trainees represented less than 30% (72/296, 24.3% in 2008, 86/319 27% in 2009), however, this has been steadily increasing annually and now around 40% (403/954, 42.2% in 2019, 434/1005, 43.2% in 2020). The percentages of female residents from 2008-2011 vs 2012-2020 were 29.1% and 41.3% (380/1304 vs 2679/6479), with $X2=31.4117$, $p<0.0001$

Although the percentage of URM who are not white or Asian remained around 8-10% of the total active residents, The percentages of White and Asian resident from 2011-2019 vs 2020-2021 were 64.7% and 81.0% (3876/5988 vs 817/1009), with $X2=19.0332$, $p=0.000013$. Noticeably, there is a 54% increase in active residents who identify as Hispanic in the cycle of 2020-2021. (32 to 70, 2020-2021). Nonetheless, the percentage of white and Asian trainees remained steady between 82-87% for the past ten cycles.

CONCLUSION: Based on available data, the absolute number and percentage of females in integrated plastic surgery programs increased, whereas there has been a limited increase regarding the percentages of underrepresented minorities despite the effort of diversification. However, the results could be blunted by the amount of unknown ethnicity in the survey. In conclusion, continuing the diversification effort in the selection process and diversifying faculty members could help improve the future URM representation in the field.

REFERENCES:

1. Dekhou A, Jahshan A, Aoun M, Folbe A. The Representation of Women and Ethnic Minorities among Integrated Plastic Surgery Trainees: A Persistent Need for Diversification. J Natl Med Assoc. 2021;113(5):576-579. doi:10.1016/j.jnma.2021.05.002

Azoury SC, Kozak GM, Stranix JT, et al. The Independent Plastic Surgery Match (2010-2018): Applicant and Program Trends, Predictors of a Successful Match, and Future Directions. J Surg Educ. 2020;77(1):219-228. doi:10.1016/j.jsurg.2019.07.018

Gender Disparities in Plastic Surgery Publication Citations

Abstract Presenter
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BACKGROUND: In plastic and reconstructive surgery (PRS), there is a prevalence of male to female surgeons. Gender disparities in residency, authorship, and surgeon leadership have been substantiated and well-documented in the literature.1,2 On the contrary, there is a paucity of literature describing gender disparities in regards to the frequency of citations of published literature.3,4 This paper aims to analyze the current citation trends in four high ranking PRS journals to further elucidate any gender disparities.

METHODS: A cross-sectional analysis of publications from four top-ranking PRS journals between 2017 and 2020 was conducted. The four journals include Plastic and Reconstructive Surgery, Aesthetic Surgery Journal, Journal of Reconstructive Microsurgery, and Journal of Plastic, Reconstructive and Aesthetic Surgery. To determine first author gender, the Genderize.io program was utilized.3 Articles published by "male" and "female" first authors with a Genderize.io accuracy greater than 0.6 were included. 3498 articles met inclusion criteria (of which 991 were female authors). Exclusion criteria included authors without full first or middle names or Genderize.io accuracy less than 0.6. Publication characteristics were compared between first author genders with Wilcoxon rank-sum tests for continuous variables and chi-square tests for categorical variables.

RESULTS: Of 5713 publications from four top-ranked PRS journals, 3498 were included for analysis. Our results yielded no observed difference in citation rates between male and female authors. After accounting for citation accumulation over time and confounding variables, including the number of authors per article, gold open access status, and document type (article vs review), the adjusted incidence rate ratio (IRR) for male to female author citations was 0.95 (95% CI 0.87, 1.03). A sensitivity analysis with a 100% gender assignment probability demonstrated an adjusted IRR of 0.93 (95% CI 0.84, 1.03).

CONCLUSIONS: Based on our analysis, equitable citations may reflect improving trends in academic plastic and reconstructive surgery; however, our results may also suggest that gender bias is less prevalent in the post-publication period and more so an obstacle to accessing publication opportunities. Further exploration of these findings is essential to improving opportunities for women to excel in academic plastic and reconstructive surgery.

REFERENCES:

1. Paik AM, Mady LJ, Villanueva NL, et al. Research productivity and gender disparities: a look at academic plastic surgery. J Surg Educ. 2014;71(4):593-600. doi:10.1016/j.jsurg.2014.01.010
2. Chen K, Ha G, Schultz BD, et al. Is There Gender Inequality in Plastic Surgery? Evaluation of Society Leadership and Composition of Editorial Boards. Plast Reconstr Surg. 2020;145(2):433e - 437e. doi:10.1097/PRS.0000000000006503
3. Sasor SE, Cook JA, Duquette SP, et al. Scholarly activity in academic plastic surgery: the gender difference. J Surg Res. 2018;229:332-336. doi:10.1016/j.jss.2018.04.031
4. Maisner RS, Cadwell JB, Mansukhani PA, et al. Trends in Female Plastic Surgery Resident Authorship - Signs of Changing Times?. J Surg Educ. 2022;79(2):543-550. doi:10.1016/j.jsurg.2021.09.021
5. Santamaría L, Mihaljević H. Comparison and benchmark of name-to-gender inference services. PeerJ Comput Sci. 2018;4:e156. doi:10.7717/peerj-cs.156

Gender-Affirming Surgery Reimbursement Rates: Trends Under Medicare

Abstract Presenter
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BACKGROUND: Awareness of Medicare reimbursement is important for gender-affirming surgeons who treat transgender patients with Medicare. In 2014, Medicare began to provide coverage for medically necessary transition-related surgery. The purpose of this study is to analyze trends in Medicare reimbursement rates for gender-affirming surgery (GAS) procedures from 2014 to 2022.

METHODS: According to the Centers for Medicare and Medicaid Services, the 43 medically necessary transition-related surgeries covered under Medicare were identified and Current Procedural Terminology (CPT) codes were obtained. Gender-affirming procedures were categorized into transgender groups, including 30 transgender male and 13 transgender female surgeries. Monetary units, conversion factors, and Relative Value Units (RVUs) for work, facility, and malpractice costs were analyzed. Descriptive statistics were performed to account for inflation and to determine the relative differences between 2014 and 2022.

RESULTS: For all GAS procedures covered by Medicare, the average relative difference of monetary units decreased by 2.99% between 2014 and 2022. On average, there was a 3.97% decrease in work-based RVU charges for transgender male procedures and a 1.73% decrease in work-based RVU charges for transgender female procedures.

After adjusting for inflation, the average relative difference of monetary units for all GAS procedures decreased by 23.42% between 2014 and 2022. Specifically, reimbursement rates for transgender male procedures decreased by 23.72% and transgender female procedures decreased by 22.72% after adjusting for inflation. In addition, the average compound annual growth rate for all gender reassignment surgeries decreased by 3.31%, indicating that there was an average decrease in Medicare reimbursement rates during the same period

CONCLUSION: Reimbursement rates for GAS procedures covered under Medicare have decreased over the observed period, and trends in reimbursement rates have not kept up with consumer price index inflation. Gender-affirming surgeons should be conscious of these changes in reimbursement rates and advocate for fairer compensation to promote medical care amongst an underserved population.

Gender-Affirming Surgical Volume and Complication Trends During COVID-19 for Transgender and Gender-Diverse Patients

Abstract Presenter
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BACKGROUND: Gender-affirming surgeries (GAS) for transgender and gender-diverse people (TGD) have significantly increased over the past decade, with a 152-fold increase between 2009 to 2018(1) and a 4-fold increase between 2015 to 2019.(2) COVID-19 led to severe surgical volume reductions across all specialties, consistent with government policies restricting elective surgeries. This study assessed the impact of COVID-19 on GAS surgical volume and complication risk from the initial outbreak through the recovery period.

METHODS: The National Surgical Quality Improvement Program database, which includes patient chart data from approximately 700 U.S. hospitals, was queried for GAS using ICD-10 codes F64, F64.0 F64.1, F64.2, F64.8, F64.9, F51.1, and Z87.890. Patients were removed if their primary CPT code did not relate to GAS or if they were undergoing concurrent malignancy evaluation. Data was grouped into five time periods: Pre-pandemic (2019), Immediate pre-pandemic + COVID-19 outbreak (January-March 2020), Initial COVID-19 peak (April-June 2020), Pre-COVID-19 vaccine (July-December 2020), and Post-vaccine release (2021). Surgeries were classified as head/neck, chest, genital, and other surgeries. Surgeries were also sub-classified as facial, laryngeal, masculinizing mastectomy/reduction, chest augmentation, hysterectomy/salpingectomy, and other/unknown. Surgical complications included reoperation, hospital readmission, urinary tract infections, superficial surgical site infections, and wound

disruptions. Chi-square tests compared GAS volumes between different COVID-19 time periods and pre-pandemic levels. A multivariate logistic regression assessed associations with surgical complications.

RESULTS: Out of 2,963,230 total surgeries, 4,676 patients underwent GAS between 2019-2021. Chest procedures comprised 60.4% of all GAS, while genital and head/neck surgeries accounted for 30.1% and 6.8%, respectively. In 2019, 4.2% of GAS patients identified as Asian, 11.8% as Black, 23.0% as other/unknown race, and 61.1% as White. During the initial COVID-19 peak, 2.9% of GAS patients identified as Asian, 9.9% as Black, 12.3% as other/unknown race, and 74.9% as White.

During the initial COVID-19 peak, GAS surgeries halved to 171 from the 2019 mean of 339.75. Breast augmentations fell from an average of 47.25 cases per quarter in 2019 to 6 cases during Q2 of 2020, amounting to an 87.3% reduction of pre-pandemic levels ($p<0.05$). GAS volume after the initial peak period surpassed pre-pandemic levels, with the 2021 volume increasing 45% and 288% above 2019 and initial COVID-19 peak levels, respectively. The proportion of breast augmentation within GAS returned to pre-pandemic proportions ($p<0.05$). Older age, elevated BMI, and genital surgeries were significantly associated with higher odds of surgical complications during the study period. Notably, the initial COVID-19 peak did not correlate significantly with surgical complications.

CONCLUSION: GAS volume for TGD patients significantly decreased during the initial COVID-19 outbreak without implication on surgical complication risk. Since the initial outbreak, volumes have fully recovered and markedly risen above pre-pandemic levels, corresponding with trends over the past decade.

REFERENCES:
(1) Chaya BF, Berman ZP, Boczar D, et al. Gender Affirmation Surgery on the Rise: Analysis of Trends and Outcomes. LGBT Health. 2022;9(8):582-588.
(2) Scott KB, Thuman J, Jain A, Gregoski M, Herrera F. Gender-Affirming Surgeries: A National Surgical Quality Improvement Project Database Analyzing Demographics, Trends, and Outcomes. Ann Plast Surg. 2022;88(5 Suppl 5):S501-S507.

Huge Fibrin Accumulation after Augmentation mammoplasty with similar clinical features Breast Implant Associated Anaplastic Large Cell Lymphoma (BIA-ALCL)

Abstract Presenter
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INTRODUCTION: Late seroma and mass formation, which occur after breast augmentation with silicone implants, are important findings that generally suggest breast implant-associated anaplastic large cell lymphoma (BIA-ALCL). In the past 10 years, BIA-ALCL has been attracting attention as the biggest complication of patients who underwent aesthetic and

reconstructive breast surgery using silicone implant. Herein, we introduce a breast implant associated late complicative case that can clinically confusing with BIA-ALCL.

METHODS: A 30-year-old Korean woman presented with contour deformity with palpable mass on left breast. 8 years ago, she underwent augmentation mammoplasty and no side effect was observed since then. However, she visited the outpatient clinic with localized swelling and color change on left breast for 3 weeks. The patient denied history of trauma. Fluid collection was observed in the MRI performed after visiting hospital and the implant rupture was not identified.

RESULTS: Bilateral implant removal and reconstruction with local flap was performed. Intraoperatively, excision was done on multiple brownish specimen, huge seroma collection and the capsule. The immunohistochemical and flow cytometry findings of biopsy specimen revealed of fibrin accumulation with fibrous tissue and no infection was found [CD30(-), Anaplastic lymphoma kinase (-)]. 6 months after surgery, no recurrence was identified and the breast contour was also satisfactory.

CONCLUSIONS: Although this clinical case shows the typical clinical pattern of BIA-ALCL, the pathologic finding suggested accumulation of fibrin materials accompanied by seroma without implant rupture. It can be regarded as rare and abrupt complication more than 8 years after augmentation mammoplasty without trauma.

REFERENCES:
Louise, et al. Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL): an overview of presentation and pathogenesis and guidelines for pathological diagnosis and management. Histopathology (2019): 787-796.
Cordeiro et al. Risk of breast implant associated anaplastic large cell lymphoma (BIA-ALCL) in a cohort of 3546 women prospectively followed long term after reconstruction with textured breast implants. Journal of Plastic, Reconstructive & Aesthetic Surgery (2020): 841-846.

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Impact of Race and Ethnicity on Quality-of-Life Outcomes in Pediatric Craniofacial Trauma Patients

Abstract Presenter
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BACKGROUND: Trauma-acquired craniofacial conditions (CFCs) have a profound physical, emotional, and social impact on the lives of those affected, particularly in children. Health-related quality of life (HR-QoL) measures assess both physical, psychosocial, and emotional

function through patient and parent self-reporting.1 Current research suggests that race and ethnicity have a complex and permeating impact on HR-QoL outcomes across all fields of medicine.2 However, the impact of race and ethnicity's on QoL outcomes is not well-documented in pediatric patients with trauma-acquired CFCs. This study aims to investigate the intersectionality between ethnicity, race, and HR-QoL outcomes in pediatric patients with craniofacial conditions acquired by physical trauma while controlling for parental education attainment.

METHODS: The Craniofacial Conditions Quality of Life Scale (CFC-QoL) is a bilingual (English and Spanish) patient- and parent-report survey. The survey contains 7 sub-domains including social teasing, social peer relationship, psychological worry, appearance satisfaction with face, family support, appearance desire for change, and physical function. Children with CFCs (ages 7–21 years) and parents of children with CFCs were recruited at Rady Children's Hospital San Diego. Mean scores for each sub-domain were compared. Race was defined as White or non-White and ethnicity was defined as Hispanic or non-Hispanic. Race, ethnicity, and parental education were self-reported by patients and parents using demographic questionnaires. Multiple linear regression analysis was run to identify correlations between CFC-QoL outcome measures and race, ethnicity, or education.

RESULTS: The sample included 51 patients and 78 parents. In both patient and parent groups, samples were predominantly white (76%) and Hispanic (57%). For parent education level, parents completed college or beyond (n=34), some college (n=48), high school (n=35), and less than high school (n=9). Linear regression analysis showed significant positive standardized correlation coefficients for race and social teasing for parent-report (beta = .266, P = .023) and ethnicity and appearance satisfaction with face for patient-report (beta = .351, P = .025). The model showed two significant relationship correlations ($p < .05$): (1) non-White race correlated with higher social teasing per parent-report; and (2) Hispanic ethnicity correlated with higher appearance satisfaction per patient-report. No significant correlation coefficients were found for education. Other domains such as social peer relationship, psychological worry, family support, appearance desire for change, and physical function had no significant correlation with ethnicity in this demographic.

CONCLUSION: Our results supplement current literature suggesting that race and ethnicity plays a role in certain domains of HR-QoL. Future directions for study include control for SES as a potential confounding variable and ANOVA analysis to compare more specific categories of race, ethnicity, and parent education level with CFC-QoL outcome measures.

REFERENCES:

[1] Morgan, Austin; Ataseven, Burçin Din, Hena, et al. Health-Related Quality of Life in Craniofacial Conditions: Concordance Between Child and Parent Reports. Annals of Plastic Surgery 84(5S):p S295-S299, May 2020. DOI: 10.1097/SAP.0000000000002292

[2] Lim, E., Davis, J., Siriwardhana, C. et al. Racial/ethnic differences in health-related quality of life among Hawaii adult population. Health Qual Life Outcomes 18, 380 (2020). DOI:10.1186/s12955-020-01625-4

Implementation of an Enhanced Recovery After Surgery Protocol for Cleft Palate Repair

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BACKGROUND/PURPOSE: As trends in healthcare focus on decreased hospital stays and improved patient outcomes it is important to provide protocols that address both. Enhanced recovery after surgery (ERAS) protocols have been implemented across surgical disciplines, including cleft surgery. The authors aim to describe the implementation of an ERAS protocol for cleft palate repair at a tertiary care hospital.

METHOD: Institutional review board approval was received. All patients undergoing repair of a cleft palate at the authors' institution over a 10-year period were collected (n=242). Patient and cleft demographics were collected as well as operative details. Primary outcomes measures were hospital length of stay (LOS) and narcotic usage. Secondary outcome measures were development of a fistula and need for speech surgery. Chi square tests and independent t-tests were utilized to determine significance. A significance value of 0.05 was utilized.

RESULTS: During the time period examined, there were 290 cleft palate repairs performed at the authors' institution, 242 patients had enough data for analysis. Infiltration of the surgical field with bupivacaine was associated with decreased initial 24-hour morphine equivalent usage ($p < 0.01$) and decreased hospital LOS ($p < 0.01$). Utilization of the Furlow palatoplasty was associated with a decreased hospital LOS ($p < 0.01$). Patients using the ERAS protocol experienced a shorter LOS ($p < 0.01$). The development of a fistula was associated with increased 24-hour morphine equivalent usage ($p < 0.01$). The need for speech surgery was associated with an increased 24-hour morphine equivalent usage ($p < 0.01$) and an increased hospital length of stay ($p < 0.05$).

CONCLUSION: This study reiterates the benefit of developing and implementing an ERAS protocol for patients undergoing cleft palate repair. The protocol resulted in an overall decreased LOS and a decrease in narcotic use. The finding regarding fistula formation and need for speech surgery requiring increased narcotics may indicate that the initial postoperative period is vital to adequate wound healing and subsequent outcomes. This has implications for ways to maximize hospital reimbursement for these procedures, as well as potentially improve outcomes.

Incisional Negative Pressure Wound Therapy for Deep Inferior Epigastric Perforator (DIEP) flap donor site in Breast Reconstruction: Does It Impact Wound Healing?

Abstract Presenter
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BACKGROUND: The deep inferior epigastric artery perforator (DIEP) flap is a commonly used flap for breast reconstruction with donor site healing complications influenced by various risk factors, including BMI, diabetes, smoking, and prior chemotherapy. Incisional negative pressure wound therapy (iNPWT) has been used to optimize wound healing and avoid postoperative complications; however, further research is needed to determine the utility of iNPWT in donor site healing complications in patients undergoing DIEP breast reconstruction.

METHODS: This retrospective review evaluated female patients who underwent autologous breast reconstruction with DIEP flaps from 2017 to 2022 comparing those with iNPWT used on the abdominal donor site compared to standard dressings (SD) with Dermabond Prineo (Ethicon Inc., Somerville, NJ, USA), Steri trips. The primary outcome was abdominal wound healing complications at 30-day. Patient demographics and risk factors, including smoking, diabetes mellitus, chemotherapy, and abdominal wall subcutaneous thickness were collected. Abdominal wall thickness was measured using CT angiography (CTA) at three levels – at the umbilicus, 2cm and 3cm above symphysis pubis. Postoperative assessment included evaluation of wound healing complications, such as surgical site infection, seroma, dehiscence, hematoma, and necrosis, within the first 30 days. Major complications were defined as those requiring surgical intervention.

RESULTS: A total of 309 patients underwent DIEP reconstruction. Mean BMI of 29.6 ± 4.4 kg/m2. A total of 153 (49.5%) patients received iNPWT at the abdominal donor site. There was no difference in baseline demographics. The overall complication rate was 20.9% (32 cases) in the iNPWT compared to 26.9% (42 cases) with standard dressings (p=0.216). Major complications occurred in 4.6% (7 cases) with iNPWT and 5.7% (9 cases) with standard dressing (p=0.636). Subcutaneous thickness was not associated with higher risk of donor site overall complications. The median time to drain removal was 12 days (IQR 13) in the iNPWT group compared to 16 days (IQR 10) with standard dressing (p=0.0058).

CONCLUSIONS: iNPWT when used on the abdominal donor site trended toward lower number of major and minor complications. The mean time to drain removal was significantly lower in the iNPWT group compared to standard dressings. iNPWT is a useful adjunct to help reduce donor site complications when performing DIEP breast reconstruction.

Investigating Exosome-Induced Macrophage Polarization Relevant To Chronic Wound Healing

Abstract Presenter
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Almost 75 million patients with diabetes worldwide are at risk of developing a diabetic foot ulcer (DFU) in their lifetime. DFUs increase the health and economic burden these patients live with. Therefore, there is a need for novel treatments for diabetic patients suffering from chronic wounds. In the diabetic wound environment, the prolonged elevation of inflammatory cytokines such as IL-1β and TNFα leads to an unfavorable environment, partially characterized by presence of macrophages (Mφ), which are a key cell population involved in modulating wound healing. Current research indicates that Mφ infiltrate the wound area and that the pro-inflammatory type give way to the anti-inflammatory type through the course of healing. In type 2 diabetic mouse wounds, anti-inflammatory Mφ are rare. However, the anti-inflammatory Mφ numbers rise following local treatment with multipotent stromal cell-derived small extracellular vesicles, also called exosomes. Our goal was to isolate the interaction between monocyte-macrophages and exogenously administered multipotent stromal cell exosomes into an in vitro study. Exosomes are nanoscale extracellular vesicles secreted by all cells and ones from multipotent stromal cells promote angiogenesis and re-epithelialization when applied in tissue engineering approaches in diabetic wound healing models. We cultured bone-marrow derived monocyte-macrophages (BMDM) from adult wild type (WT) and LepRdb/db mice. We administered varying doses of exosomes to either cultured monocytes or in vitro-differentiated pro-inflammatory Mφ, and assessed for polarization into anti-inflammatory Mφ using cell surface phenotyping via flow cytometry. We found that 1e7 to 1e8 exosomes when applied to pro-inflammatory Mφ, drove higher expression of typical anti-inflammatory or pre-repair Mφ markers such as CD206, CD80. Simultaneously, we found reduction in typical pro-inflammatory markers, such as CD38. Our results suggest that a direct interaction exists between macrophages and exosomes. The interactions potentially model the cellular and molecular events occurring in vivo in preclinical diabetic wound models following application of multipotent stromal cell exosomes.

Is the Ethnic Rhinoplasty the Most Aesthetic Option available for the Ethnic patient? A Survey Study

Abstract Presenter
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BACKGROUND: The optimal structure of the nose can differ across various ethnicities and an increasing amount of literature has been dedicated to examining this. Different surgical methods have been proposed, unique to ethnicity, to provide a nose with a more refined appearance that aligns with the patients' aesthetic preferences. However, there is a paucity of data to show that these defined ethnic-specific proportions of rhinoplasty are aesthetically superior to those employed for other ethnic groups.

METHODS: Publicly available photographs of the frontal, lateral, oblique views of women of different ethnicities (Caucasian, Hispanic, Asian, African American, and Middle Eastern) were modified using photo manipulation software (FaceTouchup). One set of photographs of a well-known model was used to establish a range of attractiveness and nose suitability. Photos were manipulated with different ethnic rhinoplasties including the conventional proportions associated with the ethnicity. This was carried out in all views. Images were analyzed by human evaluators through a survey, evaluating the suitability of the nose and attractiveness of the face on a Likert scale. Survey respondents were blinded to whether the photos they viewed were manipulated or not.

RESULTS: There were 489 participants (343 Male, 146 Female) each of whom evaluated 20 sets of pictures. The average age of respondents was 35.47. Respondents were predominantly white (427 White, 20 Black, 19 Native American, 16 South Asian, 1 East Asian, and 6 Latino). The sexual orientation of most respondents was heterosexual (285 heterosexual, 186 bisexual, 13 homosexual, and 5 prefer not to say). The unmodified photos of the Asian woman and the model were rated to be significantly more attractive than the other groups. Attractiveness and nose suitability ratings between baseline and modified photos were analyzed. One comparison was found to be statistically significant: middle eastern modification of the African American woman was found to be less suitable for the face than the Caucasian modification (3.38 vs 3.61, $p<0.01$). On stratifying data by gender, there were no significant interactions found.

CONCLUSIONS: Although established ethnic proportions for rhinoplasties serve as valuable guidelines for the aesthetic surgeon, applying proportions typically associated with other ethnicities does not alter the face's attractiveness or suitability of the nose. Ultimately the procedure performed should not be based on the ethnicity of the patient but on the patient's needs

and wishes. Additional investigation is necessary to assess patient satisfaction following ethnic rhinoplasty.

Isolated Squamosal Craniosynostosis: Considerations of Presentation, Intracranial Pressure, and Management

Abstract Presenter
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BACKGROUND: Craniosynostosis of minor sutures has received little attention in the literature due to relative rarity uncertainty regarding diagnostic significance. Squamosal suture fusion, particularly in isolation, is one such entity. The goal of this study was to characterize the presentation and management of an institution cohort of isolated squamosal craniosynostosis with attention to laterality, intracranial pressure (ICP), and response to treatment.

METHODS: Three-dimensional computed-tomography (CT) images of the skull obtained at a single institution between 2010-2021 were screened for isolated squamosal craniosynostosis. Demographics and age at presentation were recorded. Suture laterality and degree of fusion (complete, partial) as determined by radiologist impression were documented. A composite outcome of hard signs for elevated ICP included papilledema, elevated retinal fiber nerve fiber thickness on optical coherence tomography (> 159.8 μm), and thumbprinting or ventricular effacement on CT. A composite outcome of soft signs included headaches and developmental delay. Management including cranial vault remodeling and helmeting was documented, as was response to treatment. ICP signs were compared between patients with unilateral and bilateral craniosynostosis

RESULTS: Three thousand, three hundred ninety-five patients were screened, 17 of whom had isolated squamosal craniosynostosis. Partial bilateral fusion was the most common diagnosis (n=7), followed by complete bilateral (n=6), complete unilateral (n=2), and partial unilateral (n=2). Two patients (12%) had hard signs of elevated ICP and five (29%) had soft signs. The two patients presenting with hard signs of elevated ICP presented at 8 and 9 years of age. No patient with unilateral synostosis had either hard or soft signs of elevated ICP. Four patients (66%) with complete bilateral synostosis had signs of elevated ICP, two who had thumbprinting on CT and two who presented with headaches. One patient (14%) with partial bilateral synostosis presented

with headaches. Eight patients (47%) were recommended cranial vault remodeling, two (12%) were offered helmeting therapy, and 7 (41%) have been managed conservatively. All patients offered surgery had bilateral synostosis (p=0.031) and both patients offered helmeting had unilateral synostosis.

CONCLUSIONS: Squamosal suture craniosynostosis is an uncommon entity with a highly variable presentation. While signs of elevated ICP are uncommon, they are more frequently observed in patients with complete bilateral synostosis. Late presentation was noted in both patients who presented with hard signs of elevated ICP. Unilateral disease was not associated with any signs of elevated ICP and was successfully managed with helmeting alone.

Lymphovenous Coupler-Assisted Bypass (CAB) for Immediate Lymphatic Reconstruction

Abstract Presenter
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BACKGROUND: Breast cancer-related lymphedema is the most common cause of lymphedema in the United States and occurs in up to 50% of individuals receiving axillary lymph node dissection (ALND). Lymphovenous bypass (LVB) at the time of ALND may prevent lymphedema, but long-term results and anastomotic patency are unclear. This study evaluates the feasibility and outcomes of performing immediate lymphatic reconstruction via coupler-assisted bypass (CAB).

METHODS: This is a retrospective review of all patients undergoing prophylactic LVB following ALND at two tertiary care centers between 2018-2022. Patients were divided into cohorts based on whether they received 'standard' end-to-end (E-E) suturing or CAB technique. The primary outcome of interest was development of lymphedema. Quantitative and qualitative assessments for lymphedema were performed preoperatively, and at 3, 6, 12, and 24 months postoperatively.

RESULTS: Overall, 63 lymphovenous bypasses were performed, of which 24 lymphatics underwent immediate reconstruction via "CAB" and 39 lymphatics via "standard" end-to-end

suture. Patient characteristics, including BMI, and treatment characteristics, including radiation therapy, did not significantly differ between groups. CAB was associated with a greater mean number of lymphatics bypassed per vein (standard 1.7 vs. CAB 2.6 p=0.0001) and bypass to larger veins (standard 1.2 vs. CAB 2.2 mm, p<0.0001). At a median follow-up of 14.7 months, 9.1% (1/11) of individuals receiving CAB developed lymphedema. These rates were similar to those seen following standard bypass at 4.8% (1/21), although within a significantly shorter follow-up duration (standard 7.8 vs. CAB 14.7 months, p=0.0170).

CONCLUSION: The CAB technique is a viable, effective technical alternative to the standard LVB technique. This comparative study of techniques in prophylactic LVB suggests that coupler-assisted bypasses maintain long-term patency, possibly due to the ease of anastomosing several lymphatics to single large caliber veins while reducing the technical demands of the procedure.

Monitoring for Breast Cancer Recurrence Following Goldilocks Breast Reconstruction

Abstract Presenter
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BACKGROUND: The Goldilocks breast reconstruction utilizes redundant mastectomy skin flaps to fashion a breast mound; however, imbrication of these skin flaps may predispose to fat necrosis and make detection of local breast cancer recurrence more difficult. Goldilocks patients follow a traditional post-mastectomy screening pathway that includes clinical examination for locoregional recurrence,1,2 but it is unclear if this is sufficient. We evaluate our Goldilocks reconstruction case series to determine rates of diagnostic imaging, biopsy, locoregional and distant recurrence.

METHODS: Sixty-six patients (94 breasts) undergoing Goldilocks breast reconstruction were retrospectively reviewed. Any diagnostic post-operative imaging/biopsies performed and confirmed local or distant breast cancer recurrence were noted.

RESULTS: Average time of follow up was 45 months. Most patients in this cohort had Stage 0 (28.1%) or Stage I (42.2%) breast cancer. There were a total of 8 (8.5%) concerning breast masses identified, all in ipsilateral postoperative breasts. Five (5.3%) masses were biopsied, of which 3 were benign and 2 were invasive cancer recurrence. Three masses (3.2%) underwent diagnostic imaging only, all with benign findings. Five patients in this series were found to have either distant disease or a second primary cancer in the non-operative contralateral breast.

CONCLUSIONS: Rates of local recurrence following Goldilocks are not higher than expected after other types of post-mastectomy reconstruction.4 Clinical monitoring successfully detected local recurrence in all affected patients in this series. More definite guidelines around the routine screening of Goldilocks mastectomy patients may aid in early detection of local breast cancer recurrence.

REFERENCE CITATIONS:

1) Trop I. Is There a Role for Imaging Surveillance after Mastectomy and Autologous Breast Reconstruction? Radiology. 2018;289(1):49-50.
2) Freyvogel, Mary et al. "Screening mammography following autologous breast reconstruction: an unnecessary effort." Annals of surgical oncology vol. 21,10 (2014): 3256-60. doi:10.1245/s10434-014-3913-1
3) van la Parra RFD, Liao K, Smith BD, Yang WT, Leung JWT, Giordano SH, Kuerer HM. Incidence and Outcome of Breast Biopsy Procedures During Follow-up After Treatment for Breast Cancer. JAMA Surg. 2018 Jun 1;153(6):559-568. doi: 10.1001/jamasurg.2017.5572. PMID: 29387884; PMCID: PMC5875371.
4) Joo JH, Ki Y, Kim W, Nam J, Kim D, Park J, Kim HY, Jung YJ, Choo KS, Nam KJ, Nam SB. Pattern of local recurrence after mastectomy and reconstruction in breast cancer patients: a systematic review. Gland Surg. 2021 Jun;10(6):2037-2046. doi: 10.21037/gs-21-15. PMID: 34268088; PMCID: PMC8258883.

Morbid Obesity and Complications following Reduction Mammaplasty

Abstract Presenter
Norma Cruz MD

INTRODUCTION: The risk of surgical complications and tissue necrosis after reduction mammoplasty has been reported by some authors to be higher in morbidly obese patients (1-2), while others report no relationship between the degree of obesity and complications (3).

METHOD: A prospective cohort study was performed to evaluate postoperative complications after reduction mammaplasty in morbidly obese and non-morbidly obese women. The patients were divided into two groups on the basis of BMI. Patients with a BMI equal or greater than 40 were considered morbidly obese, while patient with a BMI less than 40 were considered non-morbidly obese. All women who presented to the Plastic Surgery Clinic for a reduction mammoplasty were invited to participate in the study and the surgery was performed by the same team. Data collection included demographic questions as well as bra cup size, BMI, if diabetic or smoker, specimen weight, and postoperative complications. The difference between the groups was evaluated using Student's t-test or Chi-square, whichever was appropriate, with p-value of less than 0.05 being considered significant. This study was approved by the Institutional Review Board.

RESULTS: This study evaluated 274 women who had reduction mammoplasty. Of the group 123 (45%) had a BMI < 40 and 151 (55%) had a BMI ≥ 40. The groups were not significantly different in age (29±10 vs. 28±11), frequency of diabetes (5% vs. 4%), frequency of smokers (2% vs. 2%) and weight of breast tissue resection (911±129 vs. 927±113 grams). A significant difference was noted in the morbid obesity group regarding postoperative complications such as surgical site infection (12% vs. 2%, $p<0.05$), fat necrosis (10% vs. 1%, $p<0.05$) and nipple necrosis (9% vs. 1%, $p<0.05$). However, there were no significant differences in the need for revisions or re-operations (5% vs. 5%). There were no deaths or major systemic complications in either group.

CONCLUSION: Our findings indicate that morbid obesity is associated with an increased risk of postoperative complications. However, the majority of complications were minor and outcomes were satisfactory as indicated by the absence of a significant difference in the need for revisions or re-operations.

REFERENCE CITATIONS:

1. Gust MJ, SmetonaJT, Persing JS, Hanwright PJ, Fine NA, Kim JY. The impact of body mass index on reduction mammaplasty: a multicenter analysis of 2492 patients. Aesthet Surg J. 2013; 33:1140-1147.
2. Nelson JA, Fischer JP, Chung CU, et al. Obesity and early complications following reduction mammaplasty: an analysis of 4545 patients from the 2005-2011 NSQIP datasets. J Plast Surg Hand Surg. 2014; 48:334-339.
3. Wagner DS, Alfonso DR. The influence of obesity and volume of resection on success in reduction mammaplasty: an outcome study. Plast Reconstr Surg 2005;115:1034-1038.

Morphologic Changes following Nasoalveolar Molding (NAM) in Complete Unilateral Cleft Palate: A 3D Analysis of 3D Stereophotogrammetry

Abstract Presenter
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PURPOSE: Nasoalveolar molding (NAM) repositions the alveolar segments, medializes the alar base, and lengthens the columella, allowing for more favorable anatomic relationships for subsequent surgical cleft lip repair. Anthropometry and two-dimensional (2D) facial photography have been classically used to assess the resulting morphologic changes. As the

changes occur in three dimensions (3D), 3D photography (stereophotogrammetry) may be better suited to assess patients' skeletal and soft tissue positions, but there is a relative paucity of data in the available literature. We aimed to address this by using stereophotogrammetry to assess outcomes following NAM.

METHODS AND MATERIALS: An Institutional Review Board (IRB) approved retrospective review was conducted to identify patients with unilateral cleft lips who underwent NAM. The Vectra three-dimensional (3D) imaging system (Canfield Scientific, Parsippany, NJ) captured 3D images before initiation and after completion of NAM. MeshLab (www.meshlab.net), an open-source software for processing, editing, and analyzing 3D triangular meshes, was used to perform quantitative analysis of the 3D photographs. Statistical analysis was performed with SPSS Version 24.0 (IBM Corp., Armonk, NY).

RESULTS: From 2015 to 2022, 21 patients with unilateral complete cleft lips who underwent NAM were identified. NAM was initiated at an average of 35.2 days of age (range, 8-98 days). Eleven (52.3%) patients were males and 13 (61.9%) had left-sided cleft lips. Patients wore NAM devices for an average of 103.5 days (range, 70-173 days). Following NAM treatment, patients had decreased cleft width ($p=0.005$) as well as reduced deviation of the subnasale ($p<0.001$) and nasal tip ($p<0.001$).

CONCLUSIONS: Nasoalveolar molding achieves structural changes presurgically, optimizing patients for surgical cleft lip repair. Facial stereophotogrammetry is a feasible option to quantify post-NAM morphologic changes. It is noninvasive, non-ionizing, inexpensive, and captures images quickly, therefore making it well-suited for use with pediatric patients. In addition, the 3D images can be analyzed with freely accessible, open-source software.

Nonsyndromic Craniosynostosis Correlation Between Ethnicity, Race and Pattern of Affected Suture Type: Meta-analysis

Abstract Presenter
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BACKGROUND: Previous studies have sought to analyze risk factors associated with craniosynostosis and while syndromic craniosynostosis is often linked to genetic mutations, the

factors impacting nonsyndromic cases are less investigated. The aim of current meta-analysis is to evaluate the relationship between ethnicity and suture type in nonsyndromic craniosynostosis patients.

METHODS: The search term "craniosynostosis [Title/Abstract] AND (race [Title/Abstract] OR ethnicity [Title/Abstract])) NOT (syndrome [Title/Abstract])" was used to search the PubMed, Cochrane and Medline databases. Analyses were conducted separately for each racial and ethnic group for each suture type cohort. Odds ratios were conducted for each suture cohort and confounders were adjusted using linear mixed-effect models. Because of the homogeneity of the populations and categorical nature of the classification, binary logistic regression was run on aggregate data.

RESULTS: The literature search yielded 165 articles. After reviewing titles, abstracts, and manuscript contents of these articles, five studies were ultimately included in a meta-analysis. Studies with missing data for a particular cohort or variable were excluded from the respective analysis. Hispanic children had higher odds of sagittal suture involvement (OR 1.53, $p<0.001$), whereas Asian had coronal suture (OR 2.47, $p<0.001$). Both Asian and African American children had significantly lower odds of sagittal suture involvement (OR 0.50, $p<0.001$ and OR 0.7, $p = 0.04$, respectively).

CONCLUSION
The relationship between ethnicity and craniosynostosis has been suggested as a risk factor, but without definitive conclusion. Present meta-analysis findings demonstrated association between ethnicity and suture type, however further research with larger scale and geographically varied data is warranted.

Nontuberculous Mycobacterial Infection after Aesthetic Procedures: Diagnosis and Treatment Insights from a Retrospective Study

Abstract Presenter
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PURPOSE: Nontuberculous mycobacteria (NTM) are an important source of skin and soft tissue infections. It is well known that immunocompromised patients are often infected, but recently there have been increasing reports of infection following invasive procedures (i.e. lipolysis injection, fat grafting, etc.) in healthy adults [1]. The source of infection is not clearly known, but direct inoculation from contaminated objects is most likely [2]. Other routes of transmission have been reported, including skin-to-skin transmission due to inadequate preoperative sterilization, transmission from poorly disinfected surgical instruments, and transmission from ink used for skin marking (gentian violet ink, G-V ink) [3]. Because NTM skin and soft tissue infections are often difficult to diagnose and treat, we would like to share our

treatment experience.

METHODS: We retrospectively reviewed the data of 19 consecutive cases of NTM skin and soft tissue infection from January 2017 to December 2022. When patients presented to the clinic, a physical examination was performed, and the areas of pustule and abscess where diagnostic incision & drainage could be performed were checked. NTM-related tests were performed during the incision & drainage procedure. NTM identification and drug susceptibility testing took 2 months, so patients were given intravenous amikacin 10mg/kg once a day, oral azithromycin 500mg and linezolid 300mg once a day for 1 month. After discharge from hospital, only oral medication was continued according to the clinical course.

RESULTS: The mean age was 40.5 ± 12.1 years and all patients were female. None of the patients had diabetes or immunocompromised conditions, and one patient had a history of pulmonary tuberculosis. Previous procedures included 1 breast augmentation, 1 facelift, 2 blepharoplasty, 6 fat grafting and 9 lipolysis injection. AFB staining was positive in 1 case and NTM was isolated from AFB culture in 13 cases. The most common strain cultured was M. abscessus in 13 cases, followed by the M. chelonae and M. fortuitum complex in one case each. All were susceptible to amikacin in the NTM susceptibility test, so the initial antibiotic selection was appropriate, and most of the clinical signs improved after treatment. However, in some cases, nodules and pustules recurred when the drug was discontinued due to tinnitus or allergic reaction. The median duration of treatment was 7.2 ± 6.2 months, with some patients requiring antibiotic for up to 26 months. Due to the long-term nature of the treatment, close monitoring and proper evaluation of potential side effects (e.g. ototoxicity, leukopenia, and allergic reaction, etc.) are necessary. In most cases, only incision & drainage was performed, but abdominoplasty was performed in one patient with multiple abdominal abscesses.

CONCLUSION: NTM infection in skin and soft tissue after aesthetic procedures is challenging to diagnose and treat and requires prolonged and individualized management [4]. In our experience, NTM infections often recur and take a long time to resolve, so it is important to explain the course of the disease to patients at the time of diagnosis and to support and monitor them closely during treatment.

REFERENCES:

1. Dodiuk-Gad R, Dyachenko P, Ziv M, et al. Nontuberculous mycobacterial infections of the skin: A retrospective study of 25 cases. J Am Acad Dermatol 2007;57:413-20.
2. Fida AK, Rashida K. Nontuberculous mycobacterial cutaneous infections: an updated review. Cutis 2011;88:194- 200.
3. Safranek TJ, Jarvis WR, Carson LA, et al. Mycobacterium chelonae wound infections after plastic surgery employing contaminated gentian violet skin-marking solution. N Engl J Med 1987;317:197-201.
4. Wagner D, Young LS. Nontuberculous mycobacterial infections: a clinical review. Infection 2004;32:257-70.

Open versus Endoscopic Thyroid Chondroplasty: A Systematic Review

Abstract Presenter
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BACKGROUND: Through minimizing the appearance of the laryngeal prominence, the thyroid chondroplasty is a commonly employed procedure within the facial feminization process among transgender women.1 Despite its prevalence, the approach to thyroid chondroplasties remains largely unstandardized, consisting of both open and endoscopic methods.2,3 We therefore sought to systematically compare open and endoscopic techniques and associated outcomes.

METHODS: A systematic review was performed per PRISMA guidelines. Ovid MEDLINE, PubMed, and Web of Science were queried for records relevant to the study question using various combinations of Medical Subject Heading (MeSH) terms such as "gender-affirming surgery", "transgender", and "thyroid chondroplasty". Study characteristics and patient demographics were collected. Primary outcomes included operative techniques and postoperative outcomes.

RESULTS: Fourteen articles examining 427 transgender females met inclusion criteria. Average patient age was 33.9±8.0 years. Preoperatively, 3 studies (21.4%) reported multidisciplinary monitoring or psychiatry clearance, and 3 (21.4%) reported performing preoperative laryngostroboscopy for procedural planning. Open approaches were utilized in 11 articles (78.6%), whereas endoscopic techniques were utilized in 3 (21.4%). In open approaches, all 11 articles reported performing a transverse incision over a "natural skin fold", with 2 (18.2%) specifying as close to the cervicomental angle as possible. Endoscopic techniques involved a transoral approach, with incisions made along the frenulum edge, and mucosal border of the oral commissure bilaterally for port insertion. Nine articles (81.8%) described approaches to estimate the height of the anterior commissure of the vocal folds. By an average follow-up duration of 11.4±12.4 months, reported postoperative complications included: self-limited hoarseness (n=25, 5.9%), odynophagia (n=12, 2.8%), skin necrosis (n=2, 0.5%), dehiscence (n=1, 0.2%), and laryngospasm (n=1, 0.2%). No significant differences in complication rates were observed between open and endoscopic techniques (p=0.569). Postoperative voice assessments and satisfaction rates were typically conducted utilizing non-validated questionnaires (n=4, 28.6%), while validated patient-reported outcome measures (PROMs) were employed in just two studies (14.3%).

CONCLUSION: Both endoscopic and open approaches to transgender thyroid chondroplasties are safe methods to achieving relatively low rates of postoperative complications. Continued investigations are warranted to better understand patient outcomes specific to approach using

validated patient-reported outcome measures.

REFERENCES:

1. Lipschitz, N., Wolf, M., Amir, O., Sagiv, D., & Primov-Fever, A. (2017). Thyroid chondroplasty: Smoothing the thyroid cartilage-A retrospective study of thyroid chondroplasty for feminine neck appearance. International Journal of Transgenderism, 18(4), 389-394.
2. Eggerstedt, M., Lee, J. C., & Mendelsohn, A. H. (2022). Transoral Feminizing Chondrolaryngoplasty: Development and Deployment of a Novel Approach in 77 Patients. Facial Plastic Surgery & Aesthetic Medicine.
3. Aires, M. M., Vasconcelos, D. D., & Moraes, B. T. D. (2021). Chondrolaryngoplasty in transgender women: Prospective analysis of voice and aesthetic satisfaction. International Journal of Transgender Health, 22(4), 394-402.

Osteoplane: An Open Source Python Tool for the Assessment of Accuracy in Computational Presurgical Planning

Abstract Presenter
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BACKGROUND: Fibula free flap (FFF) surgery is a common reconstructive surgery used in patients with head and neck cancer. Accurate placement of the fibula osteotomy is crucial for the success of the surgery. However, deviations from the planned osteotomy can result in functional and aesthetic complications. As such, we developed a tool (Osteoplane) which quantitatively analyzes the osteotomy planes between planned and postoperative CT scans of fibula free flap repairs.

METHODS: Osteoplane allows the user to define a plane by selecting three points on a point cloud of both the planned and postoperative CT scans. For every segment of the FFF analyzed, both the proximal and distal plane of the segment are compared. Osteoplane calculates the equations for the selected planes using the x,y,z coordinates of the selected points, and then determines the rotation matrix and euler angles required to rotate the normal vector of the postoperative plane to become parallel with the normal vector of the planned plane. This calculation results in three discrete angles which give information about the magnitude and the direction of the deviance of the postoperative osteotomy plane compared to the planned model.

RESULTS: We tested Osteoplane on a dataset of 5 fibula free flap surgeries. The tool successfully evaluated all models. The results showed that Osteoplane is able to objectively and quantitatively assess the accuracy of the osteotomy placement with high precision and minimal user input. We also developed a novel visualization tool to display the planes in 3D space.

CONCLUSIONS: Osteoplane is a novel tool that provides surgeons with a quantitative and objective method to assess the accuracy of the osteotomy placement in fibula free flap surgeries. The tool has the potential to improve surgical planning and postoperative analysis, ultimately resulting in better surgical outcomes and reduced complications.

Our Experience with Robotic Peritoneal Flap Vaginoplasty for Gender Affirmation in Transgender Females – Principles, Decision-Making, and Outcomes

Abstract Presenter
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BACKGROUND: The number of gender affirmation surgeries (GAS) increased in recent years secondary to improvements in insurance coverage. For transgender females undergoing vaginoplasty, penile inversion remains the standard surgical technique. Alternatively, peritoneal flap vaginoplasty (PFV) is indicated for poor candidates of or previously failed penile inversion vaginoplasty. This study aims to provide an overview of the surgical approach, perioperative complications, and outcomes related to PFV.

METHODS: Transgender females who underwent PFV by the GAS team at a single center from August 2019 to July 2022 were retrospectively reviewed. Patient demographics and operative information were collected. Data concerning preoperative decision-making, surgical technique, length of hospitalization, major short- (≤30 days) and long-term (>30 days) complications, and outcomes was collected and assessed.

RESULTS: Of 228 identified patients, 13.5% (n=31) underwent a primary PFV, and 10.0% (n=23) underwent a revision PFV. The following techniques were employed: robotic assistance, superior rectal artery preservation, vaginal dilator for incisional guidance, additional flap creation for peritoneal content protection, and flexible sigmoidoscopy leak test. Mean duration (days) to foley catheter removal and first successful dilation were 4.92±1.56 and 4.70±0.83 days, respectively, for primary PFV patients vs. 6.25±6.43 and 4.13±1.45, respectively, for revision

PFV patients. Mean operative time (minutes) for primary vs. revision PFV patients were 314.2±57.0 and 278.6±83.1, respectively. Of the 31 primary PFV patients, 16.1% (n=5) reported major short-term complications including delayed wound healing (n=1), hematoma (n=1), infection (n=1), hemorrhoid (n=1), and rectovaginal fistula (n=1); four of whom necessitated return to the operating room (OR). Two patients (6.45%) reported major long-term complications including vaginal stenosis (n=1) and vaginal stricture (n=1). Of the 23 revision PFV patients, 17.3% (n=4) reported major short-term complications including migration of vaginal stent into the abdominal cavity (n=1), infection (n=1), mechanical bowel obstruction (n=1), and parietal hematoma (n=1); two required returns to the OR. Nine patients (39.1%) reported major long-term complications including vaginal stenosis (n=7), vaginal canal collapse (n=2), vaginal stricture (n=2), urinary tract infection (n=1), and urethrovaginal fistula (n=1). There were no cases of neovaginal canal hair growth, thrombosis, flap necrosis, neuroma, urethral stenosis, or rectal injury.

CONCLUSION: PFV is a feasible vaginoplasty technique to reduce the risks of neovaginal canal hair growth, major wound dehiscence, and rectal injury. Careful preoperative planning and operative techniques can effectively minimize surgical complications and improve outcomes.

Pain Outcomes in Transgender and Nonbinary Patients after Masculinizing Top Surgery: A Review of the Literature

Abstract Presenter
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BACKGROUND: Approximately 1.5 million adults identify as transgender or non-binary (TGNB) in the United States, with top surgery being the most requested gender-affirming surgery (GAS) in this population.1 Chronic pain is a negative sequela of mastectomy for breast cancer, reported in up to 68% of patients postoperatively. Despite some technical similarities between mastectomy for malignancy and masculinizing top surgery, studies assessing postoperative pain outcomes in the TGNB community are limited. The purpose of this study is to review the evidence in the current literature regarding the estimated prevalence and severity of postoperative pain following masculinizing top surgery in the TGNB population.

MATERIALS AND METHODS: A search was conducted on Pubmed, Embase, Web of Science, Pysch INFO, and clinicaltrials.gov to identify records describing any relationship between masculinizing top surgery in TGNB patients and post operative pain outcomes using keywords "postoperative pain," "transgender," "nonbinary," "mastectomy," and their synonyms. All studies must include patients that underwent masculinizing top surgery, identify as TGNB,

and have at least one reported clinical outcome related to postoperative pain. Cisgender patients, technique articles, systematic reviews, and animal studies were excluded.

RESULTS: Of the 732 reviewed studies, 10 met inclusion criteria, with a total of 1,001 evaluated patients. All but five patients (0.5%) identified as transgender men or non-binary. Average patient age was 25.83 years, and body mass index (BMI) was 26.5 kg/m2. Two studies (20%) included long term follow-up pain outcomes (greater than 6 months), demonstrating that 8.8-27.8% of these patients reported chronic postoperative pain. Three studies (28%) reported data on post operative opioid consumption, with an average of 39.8 (+/-16.9; range 22.3-58) morphine milliequivalents. Six studies categorized pain in the first 24 hours postoperatively, of which, 33.7% of patients (+/-12.7%; range 12.5-50%) reported pain that was moderate to severe. Numerical VAS or NRS scores were used to measure pain outcomes in four studies (43%), patient-reported descriptions not associated with a numerical score were used in another three (22%), and two (11%) studies grouped the VAS or NRS scores into subclasses of mild, moderate, and severe. In addition to the two studies that demonstrated higher BMI positively correlates with greater pain scores, grouped analysis of individual patient BMI throughout all included studies (n=339) yielded a similar positive correlation (R2=0.7421).

CONCLUSION: Postoperative pain following masculinizing top surgery has not been thoroughly evaluated in the current literature, especially for assessments of chronic or long-term pain outcomes. Pain measurement methodology was inconsistent in available studies, and granular data was unavailable for many individual patients. Our results may suggest that increased BMI contributes to greater postoperative pain scores, though the evidence is limited. The authors encourage future research efforts directed towards evaluating postoperative pain outcomes and management after GAS in the TGNB population.

REFERENCES:

1. Gonzalez E, Frey JD, Bluebond-Langner R. Technical Refinements in Gender-Affirming Top Surgery. Plast Reconstr Surg. 2020;146(1):38-40.
2. Gartner R, Jensen MB, Nielsen J, Ewertz M, Kroman N, Kehlet H. Prevalence of and factors associated with persistent pain following breast cancer surgery. JAMA. 2009;302(18):1985-92.

Paper Tape Improves Scar Aesthetics and Prevents Wound Closure Complications

Abstract Presenter
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BACKGROUND: There is uncertainty whether postoperative application of paper tape (PT) improves scar aesthetics and reduces wound closure complications. This study aims to review and assess the quality of applicable findings from studies investigating PT's efficacy.

Methods: PubMed and SCOPUS were queried using the search terms "(("paper tape") AND (wound OR closure OR heal* OR complication OR skin OR prevent* OR scar*))". Articles that were duplicates, basic science, and not clinically relevant were excluded. Level of evidence was assessed using the ASPS Rating Scale for Therapeutic Studies, ranging from I (highest) to V (lowest).

RESULTS: Of 186 publications reviewed, 8 were included. Five studies reported statistically significant positive outcomes on scar aesthetics and wound closure. One study (n=70) found 0% hypertrophic scarring in the PT group compared to 41% in the control group. Two studies (n=300 and n=60) reported reduced skin closure time with PT versus sutures. One study (n=163) demonstrated superior aesthetic outcomes with woven PT over surgical tape. One study (n=47) found silicone sheets produced better, but not clinically meaningful, scar appearance than PT. The remaining three studies (n=42, n=64, and n=4) reported cosmetically satisfactory scarring post-PT. Two studies were rated Level I, 3 Level II, 2 Level IV, and 1 Level V. Heterogeneity in study designs evaluating PT application limit outcome comparison.

CONCLUSIONS: The data support PT application for optimization of scar and wound management. Lack of higher levels of evidence, however, suggests the importance of additional randomized controlled trials to rigorously evaluate this promising approach.

Patient Reported Outcome Measures (PROMs) in Lower Extremity Agonist-Antagonist Myoneural Interface (AMI) Amputees

Abstract Presenter
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BACKGROUND: The agonist-antagonist myoneural interface (AMI) is a modified approach to amputation that incorporates the construction of AMIs constructs at the time of lower extremity limb amputation. The AMI is a surgical construct in which naturally opposed, neurotized muscles are biomechanically linked in order to recreate the neural feedback loops present in intact human joints. We here present the long-term Patient Reported Outcome Measures (PROMs) amongst our lower extremity AMI amputee cohort and demonstrate an overall

significant improvement in their physical and mental wellbeing.

METHODS: Patients were administered a set of four PROMs surveys (EQ-5D-3L, Lower Extremity Functional Scale (LEFS), Short Form-36 (SF-36), PROMIS-57) pre-operatively (baseline) and at 6 weeks, 3 months, 6 months, 9 months, 12 months post-operatively, and then annually thereafter. Surveys were either administered on-paper during the patient's clinic visit or completed electronically via the Research Electronic Data Capture (REDCap) platform.

RESULTS: The patient cohort was comprised of 31 patients (64.52% male; 35.48% female) of which there were 3 bilateral below-knee patients, 6 unilateral above-knee patients, and 22 unilateral below-knee patients.The cohort demonstrated significant improvements in EQ-5D-3L index value ($p < 0.0001$) and EQ VAS ($p < 0.0001$) at 12-months post-operatively ($n = 22$) when compared to baseline ($n = 27$). LEFS score significantly improved at 12-months post-operatively (mean = 31.96; $n = 21$) compared to baseline (mean = 59.04; $n = 28$; $p < 0.0001$). PROMIS-57 demonstrated significantly improved T-scores across domains at 12-months ($n = 21$) compared to their baseline ($n = 28$) scores. The p-value was < 0.0001 for all domains except for the Depression domain where $p = 0.0181$. The SF-36 results in eight health domain scores, a physical component score, and a mental component score. The health domain scores significantly improved from baseline ($n = 28$) to 12-months ($n = 20$-21) post-operation for all domains. The physical and mental component scores also significantly improved ($p < 0.0001$, $p = 0.0028$, respectively) along the same timeline.

CONCLUSION: The lower extremity Agonist-Antagonist Myoneural Interface (AMI) procedure presents as a promising surgical intervention that can increase patient-reported outcome measures and quality of life of below-knee and above-knee amputees.

Perception of Social Media Utilization and its Impacts on the Candidacy of Plastic Surgery Residency Applicants: A Survey of Program Directors and Associate Program Directors

Abstract Presenter
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BACKGROUND: Social media has transformed how we interact and share information. Plastic surgeons have long adopted social media to educate and market surgical services.(1) In recent years, an increasing number of plastic and reconstructive surgery (PRS) residency programs have established or expanded their presence on social media.(2,3) Prior studies investigating the influence of social media on PRS applicants have focused on the analysis of accounts operated by programs and how applicants perceive them.(2-4) But there is a dearth of studies investigating

in the opposing direction; that is, how do program administrators' attention to applicants' social media presence and usage impact their perceptions of candidates for their residency? This study aimed to answer this question by querying program directors (PDs) and associate program directors (APDs) through a widely distributed survey.

METHODS: An anonymous, 20-item, online survey was developed and distributed using Alchemer. An email was distributed to 171 PDs and APDs of U.S. PRS programs. Survey questions were devised to collect data regarding program social media involvement as well as program administrator demographics and their perceptions of applicant social media usage. Complete responses were analyzed.

RESULTS: Of the 171 PDs and APDs, 44 responded to the survey, for a response rate of 25.7%. Of those affiliated programs who responded, 93.2% are currently active on social media, with Instagram being the only universally-used platform, and 90.2% of accounts were managed by residents. Furthermore, 18.2% of programs mentioned regularly viewing applicants' social media profiles, with Instagram and Facebook being the most common considerations. Exactly 75% of respondents who regularly check applicant profiles mentioned their perceptions of an applicant were not influenced by the absence of a publicly available account. In free response, multiple respondents expressed that social media could only negatively impact applicants, if at all, and also stated that they viewed an applicants' expression of strong political views as a detriment.

CONCLUSION: As social media becomes an inextricable part of academic medicine, our survey results suggest that the impacts of social media on PD/APD perceptions of residency applicants do not move the needle; thus, staying true to one's self, adhering to general professional standards, and not tailoring one's online presence to better appeal to prospective residency programs are important lessons for applicants to consider. Maintaining minimal social media presence can also be considered a viable strategy, as there is little chance of positively influencing programs.

REFERENCES:

1. Wheeler CK, Said H, Prucz R, Rodrich RJ, Mathes DW. Social media in plastic surgery practices: emerging trends in North America. Aesthet Surg J. 2011;31(4):435-441.
2. Shiah E, Laikhter E, Manstein SM, Comer CD, Shen AH, Lin SJ. Evaluation of Social Media Utilization by Academic Plastic Surgery Programs during the COVID-19 Pandemic. Plast Reconstr Surg. 2021;148(5):825e - 836e.
3. Chartier C, Chandawarkar AA, Gould DJ, Stevens WG. Insta-Grated Plastic Surgery Residencies: 2020 Update. Aesthet Surg J. 2021;41(3):372-379.
4. Irwin TJ, Riesel JN, Ortiz R, Helliwell LA, Lin SJ, Eberlin KR. The Impact of Social Media on Plastic Surgery Residency Applicants. Ann Plast Surg. 2021;86(3):335-339.

Perspectives on Cybersecurity and Plastic Surgery: A Survey of Practicing Surgeons and Scoping Review of the Literature

Abstract Presenter

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BACKGROUND: Data breach costs in the U.S. are among the highest in the world, making robust cybersecurity an important bulwark of national defense. Healthcare is a popular target for cyber threats, and there is increasing emphasis on cybersecurity safeguards to protect sensitive patient data (1). The objectives of this national survey and scoping review were to identify cybersecurity awareness, preparedness, and practices among plastic surgeons and to provide guidelines to mitigate the threat of cyberattacks.

METHODS: A 16-question, anonymous online survey was developed and distributed to Aesthetic Society registrants to gauge plastic surgeons' cybersecurity knowledge and practices. Utilizing PubMed, CINAHL and Embase databases, eligible articles were identified as part of this Scoping Review.

RESULTS: Of the 89 individuals who began the survey, 69 completed it (77.5%). Sixty respondents agreed or strongly agreed that cybersecurity is an important issue in plastic surgery. The greatest perceived limitations for protection against cyberattacks were insufficient expertise (41.7%), followed by lack of funding, and insufficient time to dedicate to this goal. Most respondents (78.7%) had cybersecurity policies incorporated into their practice. Those who agreed or strongly agreed they had technology to prevent data theft/breach were significantly more likely to be older than 54 years of age ($p<0.001$). No articles identified in the literature specifically addressed cybersecurity in plastic surgery; however, twelve articles detailing cybersecurity in healthcare were identified and included.

CONCLUSIONS: Despite possessing adequate technology and procedures to prevent cyberattacks, plastic surgeons perceive significant barriers to cybersecurity protection, including insufficient expertise and lack of dedicated funding. Cybersecurity can be enhanced through physical mitigation measures, good cyber-hygiene, and device use policies. Furthermore, creating culture of security awareness among staff through targeted education and training in cyber-incident response will help mitigate the harmful effects of cyber events. It is imperative the plastic surgery community establishes standards and protocols to ensure the highest level of protection for patients and practices.

REFERENCES:

1. IBM Cost of a Data Breach 2022 Report. https://www.ibm.com/reports/data-breach. July 2022. Accessed November 1, 2022.

Post-Genital Surgery Survey of Transgender and Non-Binary Adults Assigned Male at Birth

Abstract Presenter
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BACKGROUND: Current measures of vaginoplasty success are adapted from tools validated for use in cisgender women, such as the Female Genital Self-Image Scale (FGSIS) and Female Sexual Function Index (FSFI). Data generated from these measures have shaped insurance policy and access to vaginoplasty. However, little research has been conducted on whether post-operative gender congruence, quality of life, sexual function and satisfaction, and aesthetic satisfaction are of equal importance when adapted from the currently available measures of success for transfeminine vaginoplasty patients. The goal of this survey was to examine patient-reported vaginoplasty outcomes related to the experience of gender incongruence and post-operative satisfaction and sexual function.

METHODS: Transgender patients receiving surgical care at a single academic center were invited to complete post-surgical surveys. From August 2019 to May 2022, 157 patients who had undergone surgery between September 2016 and March 2022 were contacted; 40 (25.4%) completed consent and post-surgery survey. Survey questions were selected based on prior literature, discussions with patients, and adaptations from the FGSIS and FSFI. Statistical analyses were carried out in RStudio.

RESULTS: Among the 40 respondents, mean age was 45.8 years (SD = 14.0) and mean time since surgery was 237.3 days (SD = 260.8). Thirty-two (78.0%) had neovaginoplasty with creation of a vaginal opening and 9 (22.0%) had genital remodeling without creation of a vaginal opening. Thirty-nine (97.5%) of all respondents were happier after their operation than they were before. Of the 23 respondents who had engaged in sexual activity in the past 4 weeks, 10 (43.5%) were often or almost always satisfied with their arousal during sexual activity and 9 (39.1%) were satisfied with their ability to reach orgasm with sexual stimulation. Among this group, 19 (82.6%) felt positively about their genitals, 19 (82.6%) were satisfied with the appearance of their genitals, and 23 (100.0%) were happier after surgery than before. Seventeen respondents (42.5%) did not report having engaged in sexual activity in the past 4 weeks. Of these individuals, 15 (88.2%) felt positively about their genitals, 11 (68.8%) were satisfied with the appearance of the genitals and 16 (94.1%) were happier after surgery.

CONCLUSION: These findings indicate a discordance between the positive psychosocial outcomes of vaginoplasty and sexual function when measured using adapted tools validated for

use in cisgender women. Patient-reported outcomes measures that center sexual function as a primary measure of vaginoplasty success may not accurately capture the quality-of-life benefit afforded by improved gender congruence. While sexual function is an important aspect of overall quality-of-life, patients in this study reported high rates of surgical satisfaction and improved happiness regardless of whether they had engaged in sexual activity or were satisfied with their arousal and ability to reach orgasm. More work is needed to develop measures that address the complex relationship between sexual function, sexuality, gender identity, and satisfaction with surgery.

Presentation of Diffuse Large B-cell Lymphoma on Skin after COVID-19 Vaccination

Abstract Presenter
Junho Park MD

INTRODUCTION: B-cell lymphomas are neoplastic diseases occasionally associated with chronic inflammation. mRNA vaccines for coronavirus disease 2019 (COVID-19) induce inflammatory responses, which often lead to fever and lymphadenopathies indistinguishable from lymphomas. Although both lymphadenopathy and lymphomas can be influential, the correlation between them is unclear. Herein, we present the first case of diffuse large B-cell lymphoma following mRNA COVID-19 vaccination.

METHODS: A 68-year-old Korean woman presented with multiple left forearm palpable masses that appeared a day after she was administered her third mRNA COVID-19 vaccination (BNT162b2). The mass persisted over 6 months after vaccination. At her first visit to hospital, ultrasound revealed the size of the masses to be 10.2 x 8.3mm, 5.3 x 7.2mm, and 11.6 x 9.2mm. Initially, we suspected benign lymphadenopathy as a side effect of vaccination. Two weeks later, the sizes of the masses were increased and the local tenderness was noticed.

RESULTS: Excisional biopsy was performed with local anesthesia and diagnosed as diffuse large B-cell lymphoma based on immunohistochemical and flow cytometry findings of biopsy specimen (Positive CD20, Bcl-6, Bcl-2, Ki-67). After further evaluation with Chest CT Abdominopelvic CT and PET-CT reactive changes at the bilateral palatine and lingual tonsils were observed and chemotherapy was carried out. After 6 months of chemotherapy, neither local recurrence of the lymphoma nor the progression was noticed.

CONCLUSIONS: Although 4 to 6 weeks of observation for lymph node inflammation after vaccination is recommended, malignancy should also be considered in the differential diagnosis of lymphadenopathy following vaccination.

REFERENCES:
Wali et al. Rapid progression of marginal zone B-cell lymphoma after COVID-19 vaccination (BNT162b2): A case report. Frontiers in Medicine 2022:9;963393

Cavanna et al. Non-Hodgkin Lymphoma Developed Shortly after mRNA COVID-19 Vaccination: Report of a Case and Review of the Literature. Medicina 2023: 59;157

Prospective Eyelid Ptosis Study to Evaluate Eyelid Parameters with Levator Shortening

Abstract Presenter
Grant Wagner

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PURPOSE: Levator shortening can be used to correct eyelid ptosis. The goal of this prospective study was to assess the degree of improvement by comparing pre-operative, intra-operative, and post-operative eyelid measurements.

METHODS: A single-institution chart review was performed of all patients who underwent bilateral levator advancement for upper eyelid ptosis between February 2015 and August 2022 by the senior author. Specific eyelid parameters assessed were marginal reflex distance-1 (MRD-1), aperture, mid-pupil to upper lid crease distance, and degree of levator shortening intraoperatively. Measurements were obtained preoperatively, intraoperatively, and postoperatively by measuring with a ruler on the patient. All measurements were obtained in millimeters. These values were compared for each patient preoperatively and postoperatively.

RESULTS: Our final cohort included a total 31 patients with a total of 55 eyelid measurements preoperatively and 51 measurements postoperatively. For the patients included in the study, the average increase in MRD-1 was 2.56 mm. Postoperatively, the mean aperture increase was 3.79 mm. Mid-pupil to crease distance increased by 2.72mm on average. For levator advancement, the average levator shortening was 4.84 mm.

CONCLUSION: Our use of eyelid parameters can be used as a reliable assessment tool to predict MRD-1 and mid-pupil to crease changes in patients undergoing bilateral levator advancement. This procedure should be considered for patients suffering from eyelid ptosis.

Reducing DIEP Donor Site Complications: The Impact of Progressive Tension Sutures with Umbilectomy

Abstract Presenter
Cyrus Steppe

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PURPOSE: Umbilectomy has been implemented in both abdominoplasties and deep inferior epigastric perforator (DIEP) flaps to improve abdominal wound healing and better control the location of the neo-umbilicus; however, seroma rates are increased. The objective of this study is to compare the seroma rate following DIEP flap reconstruction with umbilectomy when progressive tension sutures (PTS) are implemented. We hypothesize that the use of PTS will significantly reduce the donor-site seroma rate when compared to patients who only received drains.

METHODS: A retrospective chart review was performed to evaluate the post-operative seroma rate in patients undergoing DIEP flap breast reconstruction at a single academic institution between January 2015 and September 2022. All procedures were performed by the two senior surgeons. Patients were included if they had their umbilicus removed intraoperatively. The senior surgeons utilized PTS in all abdominal closures beginning in late February 2022, creating two groups. Demographics, comorbidities, and additional post-operative complications were evaluated.

RESULTS: Two Hundred and forty-one patients underwent DIEP flap breast reconstruction with intraoperative umbilectomy. Forty-three consecutive patients received PTS. Overall complications were significantly lower in those who received PTS (8.6%) when compared to those who did not receive PTS during their abdominal closure (31.8%) ($\chi 2(1) = 7.11$, $p = 0.007$). There were no abdominal seromas (0%) in patients who received PTS. Fourteen abdominal seromas (7.1%) occurred without PTS. The use of PTS conferred a decreased likelihood of abdominal seroma (5.687 times lower risk, $p = 0.017$). Additionally, wound formation was significantly lower in those who received PTS (3 wounds, 6.97%) when compared to those in the no-PTS group (43 wounds, 21.7%) ($\chi 2(1) = .497$, $p = 0.031$).

CONCLUSION: The use of PTS in the abdominal closure during DIEP flap reconstruction addresses the previously seen rise in seroma rates when concomitant umbilectomy is performed. Decrease in both donor site wound and now seroma rates reaffirm the efficacy of removing the umbilicus to improve patient outcomes.

Reverse Sural Supercharged with Medial Sural Flap Perforators: A Novel Flap Design for Complicated Lower Extremity Reconstruction

Abstract Presenter
Arjun Nanda

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BACKGROUND: Since the Reverse Sural Flap was described by Masquelet, it has been a work-horse for lower extremity reconstruction. But, as with all flaps, it has its limitations, including reach, venous congestion, and the need for skin grafts to cover its margins or to close the donor site. Also, many lower extremity defects need sufficient tissue to close dead space. Our new design will enhance flap survival and supply more tissue for lower extremity reconstruction, as well as allowing for primary donor site closure. Due to previous anatomical studies, we proposed a new alternative for reconstruction of lower extremity defects, the Reverse Sural Flap Supercharged with Medial Sural Artery Perforator Flap (RSMSAP).

METHODS: Patients were enrolled prospectively who fulfilled the inclusion criteria of age between 18-65 years, ASA II or less, able to consent to the procedure and have a lower extremity wound in need of fasciocutaneous +/- myocutaneous flap coverage. Diabetes Mellitus and peripheral vascular disease were criteria for exclusion.

RESULTS: Three males and one female were treated with the RSMSAP. All of the defects were associated with traumatic injuries. The mean age was 37.7 years old. The mean defect size was 63.5cm2. The mean size of the flap skin paddles was 88.7cm2. Medial Sural Artery caliber ranged between 1.5 – 3mm. The median caliber of the Medial Sural Vena Comitantes ranged from 2.5-3mm. These vessels were supercharged to Anterior Tibial vs. Posterior Tibial depending on the location of the wound and preoperative runoff on axial imaging. All donor sites were closed primarily. We were able to cover all defects and all flaps survived. Minor complications were encountered in only one case, such as distal tip epidermolysis. This resolved with local wound care.

CONCLUSION: The RSMSAP is an avant-garde experimental proposal that needs further research to be included in the well-known vast array of tools used for lower extremity reconstruction.

Seasonal Variations in Necrotizing Soft Tissue Infection Outcomes in the United States

Abstract Presenter
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Background: Necrotizing soft tissue infections (NSTI) are a life-threatening disease that has been associated with increased incidence in warmer months in other nations.[1] It has been proposed that seasons with substantial humidity and precipitation have an associated increased rate of NSTI.[2] In 2019 and 2020 in the United States the highest humidity was in the summer months, with the highest precipitation in the spring.[3], [4] The goal of this study was to identify temporal trends in NSTI encounters in the United States.

METHODS: We used the National Inpatient Sample 2019 and 2020 databases. The inclusion criterion was a principal diagnosis of either necrotizing fasciitis or Fournier's gangrene. Patients were subdivided into 4 seasonal admission categories: winter (December-February), spring (March-May), summer (June-August) and fall (September-November). The primary outcome was in-hospital mortality. The secondary outcomes were morbidity (septic shock, acute respiratory distress syndrome, prolonged mechanical ventilation, ventilator-induced pneumonia), and healthcare resource utilization as measured by total hospitalization costs and charges and length of hospital stay. Confounders were adjusted for using multivariate regression analysis.

RESULTS: 11,890 patients were included in the study. The mean patient age was 53 years and two thirds were males. The highest NSTI incidence was in the fall (winter: 2765,spring: 2685, summer:3065, fall: 3355,p=0.03). In-hospital mortality rates were similar among the 4 seasons: winter: reference, spring: adjusted odds ratio (aOR): 1.35 (0.65-2.81),p=0.42, summer: aOR: 0.64 (0.27-1.50),p=0.31, fall: aOR: 1.20 (0.59-2.44),p=0.61. Furthermore, rates of septic shock (winter: reference, spring: aOR: 1.19 (0.64-2.23),p=0.59, summer: aOR: 1.14 (0.61-2.15),p=0.68, fall: aOR 1.31 (0.73-2.37),p=0.37), prolonged mechanical ventilation (winter: reference, spring: aOR 1.18 (0.47-2.96), p=0.72, summer: aOR 0.49 (0.15-1.58),p=0.23, fall: aOR 0.99, (0.39-2.50),p=0.98) and ventilator-induced pneumonia (winter: reference, spring: aOR 0.93 (0.11-7.79),p=0.95, summer: aOR 0.41 (0.04-4.19),p=0.45, fall: aOR 0.56 (0.09-3.56),p=0.54) were similar among the 4 seasons. Length of stay (winter: reference, spring: adjusted mean difference (aMD): -1.27 (-2.76-0.21),p=0.09, summer: aMD -0.82 (-2.24-0.59),p=0.25, fall: aMD -0.24 (-1.80-1.31),p=0.76) , total hospitalization costs (winter: reference, spring: aMD -$2074 (-$7520-$3372),p=0.45, summer: aMD -$3106 (-$7575 - $1364),p=0.17, fall: aMD: $2242 (-$3166-$7650),p=0.42) and charges (winter: reference, spring: aMD -$5476 (-$3794-$26988),p=0.74, summer: aMD -$14433 (-$35131 - $6265),p=0.17, fall: aMD $21796 (-$13550-$57143),p=0.23) were also similar for all groups.

C**ONCLUSION:** The incidence of NSTI is highest in the fall season in the United States. However, treatment outcomes including in-hospital mortality, morbidity, and resource utilization are independent of season of admission or weather conditions.

REFERENCES:

1.Fadel ZT,Burke E,Joukhadar N,Samargandi OA,Bezuhly M. Effects of seasonal changes in temperature and humidity on incidence of necrotizing soft tissue infections in Halifax, Canada, 2001-2015. Saudi Med J.2019 May;40(5):469-474.

2.Subissi L,Sousa A,Ba I,et al. A large epidemic of a necrotic skin infection in the Democratic Republic of São Tomé and Principe: an epidemiological study. Int J Infect Dis.2021 Oct;110 Suppl 1:S69-S76.
3.NOAA National Centers for Environmental Information, Monthly National Climate Report for Annual 2019, published online January 2020, retrieved March 2, 2023 from https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/201913/supplemental/page-3.
4.NOAA National Centers for Environmental Information, Monthly National Climate Report for Annual 2020, published online January 2021, retrieved March 2, 2023 from https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202013.

Septorhinoplasty in the tertiary children's hospital setting: A cohort study utilizing the Pediatric Health Information System (PHIS) Database

Abstract Presenter
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PURPOSE: Septorhinoplasty is a common reconstructive surgery and has both functional and cosmetic benefits. Most septorhinoplasties are done in adults, with only 13% being done in the pediatric population. Common indications in children are correction of congenital and traumatic nasal deformities. These represent some of the most challenging cases both due to anatomic/technical considerations and potential medical comorbidities arising from syndromic causes. In patients less than 15 years of age, surgical maneuvers are generally less aggressive to avoid derangement of future growth. In patients greater than 15, who have reached or are near to skeletal maturity, more aggressive adult-like septorhinoplasty maneuvers may be entertained. Attempt was made to describe the unique demographics, management patterns, and outcomes of pediatric patients undergoing septorhinoplasty at tertiary children's hospitals using a large multi-institutional database.

METHODS: The Pediatric Health Information System (PHIS) database contains clinical data from 49 children's hospitals across the United States. The database was queried using selected International Classification of Diseases (ICD) 10 procedural codes for patients who were 18 years or younger and underwent either a septorhinoplasty between October 1st 2015 – December 21st 2022. Demographic data and variables related to their surgical encounter were identified. Additionally, patients were classified based on their age (<15 and ≥ 15 years old) and presence of orofacial clefting (OFC). Descriptive analysis was conducted including calculation of means

and medians and reporting of frequency counts and percentages.

RESULTS: In total, 13,177 procedures were performed on 12,343 patients. 63% of procedures were done on patients <15y/o and 37% were done on patients ≥15y/o. 47% of the patients had a diagnosis of OFC, and 53% did not. Patients with OFC experienced more inpatient surgeries (40%vs24%), a higher median cost of surgery ($9,100 vs $5,971) and greater need for secondary surgeries (8%vs4%).

A subgroup analysis was done on those who were <15y/o. In this population, 63% had a diagnosis of OFC, while 37% did not. 39% of procedures were performed on inpatients and the overall average hospital length of stay (LOS) was 3.9 days. The median cost of surgery was $8,426.

A further subgroup analysis was done on patients ≥15y/o. In this population, 22% had a diagnosis of OFC while 78% did not. 19% of procedures were performed on inpatients and the overall average hospital LOS was 1.6 days. The median cost of surgery was $6,299.

CONCLUSIONS: A large proportion of septorhinoplasties are done on patients with OFC and a large volume are performed in the inpatient setting. Younger patients (<15y/o) tend to have longer hospital LOS, with a higher proportion being done in the inpatient setting. The cost of surgery is greatest for younger patients, and patients with a diagnosis of OFC.

Skin Biomechanical Characteristics Differences In Ultrasonic Liposuction Devices Used In Liposuction

Abstract Presenter
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INTRODUCTION: New plastic surgery devices have been development to improve results in liposuction procedures like Vibration Amplification of Sound Energy at Resonance (VASER) is one of those devices that revolutionized liposuction surgery.
Liposuction developed in 1977, with many changes over the years on cannulas, aspirating devices, assist with external devices on fat emulsification, tumescent infiltration, in late 1980s Zocchi described the use of ultrasonic lipoplasty in which fat was liquefied with ultrasonic energy and then evacuated from subcutaneous space reducing trauma and blood loss in patients1. Vibration amplification of sound energy at resonance (VASER) is a third-generation ultrasound-assisted modality of liposuction. Which was introduced to the United States in the early 90s and now stands as the most popular of its kind2 . This system uses ultrasound energy at a 36 kHz frequency to separate the adipose cells from its tissue matrix through stable cavitation and acoustic streaming3. By this mechanism it facilitates fat emulsification and extraction,

preserving vascularization and improving the long-term aesthetic results4. In 2009 Nagy and Vanek published a multicenter, prospective, randomized, single-blind, clinical trial comparing VASER-assisted lipoplasty and Suction-Assisted lipoplasty finding improved skin retraction and reduction in blood loss compared to suction-assisted lipoplasty5.

METHODS: This prospective study compared two different devices (VASER, Solta Medical Inc. Hayward Calif.) and the new HEUS (Inomedica, México) for liposuction procedures. Thirteen patients (2 males and 11 females) between the ages of 21 and 46 years received Ultrasound-Assisted liposuction with both devices, one side with HEUS-assisted liposuction and the contralateral side treated with VASER-assisted liposuction; the side of the patients treated with HEUS and VASER were randomized. We used the devices in the same conditions, same anatomical areas, time applied in each area, device power parameters (%), fat aspirated volume and surgeon, the assigned side was randomly assigned to VASER and HEUS.
We measured bio-mechanical skin parameters: distensibility, Net-elasticity, Biological-Elasticity, Skin Hydration, Erythema and Melanin with cutometer MPA 580. 2 sides were compared. In the statistical analysis, no statistically significant differences were observed in any of the functional or biomechanical parameters as show in table. 1.

CONCLUSION: According to cutometer there was no difference between HEUS ultrasonic liposuction device and VASER, HEUS is a safe option to archive good results in liposuction surgery, this device is currently use over Mexico and Latin America.

REFERENCES:
1. Beidas OE, Gusenoff JA. Update on Liposuction: What All Plastic Surgeons Should Know. Plast Reconstr Surg. Published online 2021:658E-668E.
2. Chia CT, Neinstein RM, Theodorou SJ. Evidence-Based Medicine: Liposuction. Plast Reconstr Surg. 2017;139(1):267e-274e. doi:10.1097/PRS.0000000000002859
3. Schafer ME, Hicok KC, Mills DC, Cohen SR, Chao JJ. Acute adipocyte viability after third-generation ultrasound-assisted liposuction. Aesthet Surg J. 2013;33(5):698-
4. Hoyos A, Perez ME, Guarin DE, Montenegro A. A report of 736 high-definition lipoabdominoplasties performed in conjunction with circumferential VASER liposuction. Plast Reconstr Surg. 2018;142(3):662-675.
5. Nagy MW, Vanek PF. A multicenter, prospective, randomized, single-blind, controlled clinical trial comparing vaser-assisted lipoplasty and suction-assisted lipoplasty. Plast Reconstr Surg. 2012;129(4).

Surgical Management of Acquired Buried Penis and Scrotal Lymphedema: A Retrospective Review

Abstract Presenter
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INTRODUCTION: Acquired buried penis is a condition that can have detrimental physical and psychological consequences for patients. Factors such as elevated BMI, chronic scrotal lymphedema, hidradenitis suppurativa, and chronic inflammation can lead to the condition. Surgical intervention is the treatment of choice for advanced disease1-3. We will review our patients over the past 5 years treated with this condition and specifically look at patient demographics, comorbidities, surgical treatment with expert technique review, and outcomes.

METHODS: Following IRB approval, a retrospective chart review was performed for patients with a diagnosis of acquired buried penis who required surgical intervention. Details of patient history, surgical management including intraoperative and post-operative photography, and complications were reviewed.

RESULTS: Seven patient cases were reviewed. The average age at time of surgery was 44 with a mean weight of 344 pounds and an average BMI of 48. Severe scrotal lymphedema and hidradenitis were common concurrent comorbidities. Concurrent scrotoplasty and infraumbilical panniculectomy were standard parts of the operations. Native glans skin was salvageable in all but one case. Penile shaft skin was reconstructed with skin grafts or adjacent tissue transfer. 88% of the cases had some element of wound dehiscence post operatively.

CONCLUSIONS: Surgical management of an acquired buried penis can be challenging. The patient demographic with the disease is frequently complicated by morbid obesity, concurrent lymphedema, or hidradenitis. Post-operative complications are expected. The surgical techniques presented can aid in simplifying the management of this challenging surgical population.

CITATIONS:

1. Anandan L, Mohammed A. Surgical management of buried penis in adults. Cent European J Urol. 2018;71(3):346-352. doi: 10.5173/ceju.2018.1676. Epub 2018 Sep 22. PMID: 30386659; PMCID: PMC6202613.
2. Fuller TW, Theisen KM, Shah A, Rusilko PJ. Surgical Management of Adult Acquired Buried Penis. Curr Urol Rep. 2018 Feb 28;19(3):22. doi: 10.1007/s11934-018-0768-1. PMID: 29492732.
3. Smith-Harrison LI, Piotrowski J, Machen GL, Guise A. Acquired Buried Penis in Adults: A Review of Surgical Management. Sex Med Rev. 2020 Jan;8(1):150-157. doi: 10.1016/j.sxmr.2019.02.008. Epub 2019 May 14. PMID: 31101591.

The Dragonfly Pedicle: A Safe and Effective Technique for Reduction Mammaplasty

Abstract Presenter
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PURPOSE: Reduction mammaplasty is a commonly performed surgical procedure to alleviate symptomatic macromastia, correct breast asymmetry, and reshape the breast after reconstruction or body weight loss. While numerous surgical techniques exist, all aim to reduce adverse effects of mammary hypertrophy and create a smaller, symmetric breast. In this work, we describe our experience with a novel "dragonfly" pedicle for reduction mammaplasty, using an inferior pedicle with superomedial extension with an autologous internal brassiere.

METHODS: Retrospective chart review was performed. All patients who underwent reduction mammaplasty with dragonfly pedicle technique at the senior authors' institution between October 2021 and December 2022 were included. Patient demographics, comorbidities, operative details, and postoperative adverse events were recorded.

RESULTS: Seven patients were treated with the dragonfly pedicle breast reduction technique. The average age was 46.2 years, and the average body mass index was 28.6 kg/m2. The average operative time was 2 hours 42 minutes and average breast tissue removed was 562 g (right breast) and 543g (left breast). Aesthetic outcome was monitored at 2-4 weeks and at 6-12 months. Post-operative measurements were stable throughout follow-up. There were no complications.

CONCLUSION: The dragonfly pedicle, an inferior pedicle with a superomedial extension, is a novel approach for reduction mammaplasty. This technique offers dual blood supply, greater mobility of the nipple-areola-complex (NAC), and increased medial pole fullness and projection. The incorporation of an autologous internal brassiere enhances inferior support. This novel technique offers excellent aesthetic outcomes for suitable patients without additional risk.

The Effect of Obesity on Vaginoplasty Outcomes

Abstract Presenter
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ABSTRACT: Background: Some surgeons employ body mass index criteria within the patient selection processes prior to vaginoplasty, thereby limiting access to select obese patients.(1,2) We sought to better characterize the effect of obesity on postoperative outcomes across multiple vaginoplasty techniques.

METHODS: A single-center retrospective review of all transfeminine patients undergoing primary vaginoplasty procedures from December 2018 to July 2022 was conducted. Patients were stratified into cohorts according to the World Health Organization Obesity Class criteria. Data regarding demographics, comorbidities, operative details, postoperative complications, and all-cause revision were collected.

RESULTS: A total of 237 patients met inclusion criteria. Multivariate regression revealed patients with class I and class II/III obesity were associated with higher odds of developing vaginal stenosis (class I: OR 7.1, p=0.003; class II/III: OR 3.4, p=0.018) and all-cause revision (class I: OR 3.7, p=0.021; class II/III: OR 4.8, p=0.027). Undergoing either robotic peritoneal or robotic intestinal vaginoplasty was associated with lower odds of delayed wound healing (peritoneal: OR 0.2 95%, p<0.001; intestinal: OR 0.2, p=0.011). Lastly, adherence to dilation regimen was negatively associated with development of vaginal stenosis (OR 0.04, p<0.001).

CONCLUSION: Patients with obesity may be at a higher risk of developing vaginal stenosis after vaginoplasty, which may ultimately necessitate operative revision. While patients with obesity may remain surgical candidates, proper preoperative counseling and adherence to postoperative vaginal dilation regimens are critical to optimizing outcomes. Robotic techniques may prove to be an optimal alternative within this patient population to minimize wound healing-related complications.

REFERENCES

1. Brownstone LM, DeRieux J, Kelly DA, Sumlin LJ, Gaudiani JL. Body mass index requirements for gender-affirming surgeries are not empirically based. Transgender health. 2021;6(3):121-124.
2. Goddard JC, Vickery RM, Qureshi A, Summerton DJ, Khoosal D, Terry TR. Feminizing genitoplasty in adult transsexuals: early and long-term surgical results. BJU international. 2007;100(3):607-613.

The Increased Burden of Cosmetic Tourism During the COVID-19 Pandemic

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INTRODUCTION: Despite the initial hesitancy to present for medical care across other specialties, the COVID-19 pandemic led to a surge in demand for cosmetic surgery.1,2 The promise of lower costs and increased availability caused some to seek cosmetic procedures outside of their home geographic area; those who returned with complications turned to their local plastic surgeons for further care. Here, we evaluate the trends in such patients presenting with complications following cosmetic tourism.

METHODS: We performed a retrospective chart review of all consecutive patients seen by the plastic surgery department at a large, tertiary referral center before (January 2018 to February 2020) and during (March 2020 to December 2021) the COVID-19 pandemic. Patients with complications following cosmetic tourism were identified by keyword search. Descriptive statistics were used to compare patient characteristics and outcomes.

RESULTS: A total of 33 patients were identified, 10 (30.3%) pre-COVID and 23 (69.6%) during COVID. All patients were female with a mean age of 34.8(±7.2) years. 17 (73.9%) patients presenting during COVID were obese compared to 2 (20%) patients pre-COVID. There was no significant difference in tourism location or type of procedure among groups. The most common tourism locations included Florida (57.6%) and the Dominican Republic (27.3%). The most common procedures were abdominoplasty (19 patients) and gluteal augmentation (17 patients), with 29 (87.9%) patients undergoing combined procedures. All patients presented with concerns for wound complications and were admitted for further work-up. More patients during COVID required at least one invasive intervention for their post operative complication (18 [78.3%] vs 6 [60%] patients) and home wound care (16 [69.6%] vs 5 [50%] patients). Although the mean length of stay during COVID was similar to pre-COVID (6.3±9.3 vs 6.0±5.3 days), 2 (8.7%) patients during COVID required intensive care and intravenous antibiotics upon discharge.

CONCLUSION: The number of cosmetic tourism patients presenting with complications increased two-fold despite the ongoing COVID-19 pandemic. Although the total number of cosmetic tourism patients is unknown, this relative increase in complications exacerbated the strain the local healthcare system already overwhelmed by the pandemic. Furthermore, this study highlights the inherent lack of continuity of care and reliance on local plastic surgeons to care for complications following cosmetic tourism. Patients often required prolonged hospitalizations, invasive procedures, and specialized wound care spanning weeks to months. Further research is needed to assess the magnitude of cosmetic tourism and the risk factors for complications in this population.

REFERENCES: 1. Czeisler MÉ, Marynak K, Clarke KE, et al. Delay or avoidance of medical

care because of COVID-19–related concerns-United States, June 2020. Morbidity and mortality weekly report. 2020;69(36):1250.
2. Survey Finds Demand for Cosmetic Surgery, Driven by Women Under 45, Surged After the Pandemic. Press Release. American Society of Plastic Surgeons; August 24, 2022. https://www.plasticsurgery.org/news/press-releases/survey-finds-demand-for-cosmetic-surgery-driven-by-women-under-45-surged-after-the-pandemic

The Influence of Plastic Surgeons on TikTok: An Emotion and Sentiment Analysis of Comments

Abstract Presenter
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BACKGROUND: Currently, TikTok is the world's fastest growing video application and preferred platform for communication amongst America's teenagers [1] and in a recent study, 51.2% of plastic surgery-related content was physician generated [2]. However, it is still unclear how influential these videos are on users. In this observational study, the aim is to assess engagement and levels of emotional response to better understand the impact of plastic-surgery related TikTok videos.

METHODS: A cross-sectional study was performed between November 7th 2020 and November 20th 2022 on the 200 most recent posts of the top 8 board-certified plastic surgeons on TikTok. The accounts were scraped for user-level quantitative measures (number of followers, videos, total views, total likes). The included videos were scraped for content-level qualitative (semantic content of comments per video) and quantitative data (number of views, likes, comments and shares). Emotional and sentiment analyses of the textual content was performed with R NRX Word-Emotion Association Lexicon. Awareness, motivation, and engagement were also measured by quantifying frequencies of content exposure and words related to various sentiments and emotions.

RESULTS: The TikTok accounts of top 8 plastic surgeons had 20.5 million (M) followers, 874.0M views, and 713.1M likes. Comments on the 1588-included videos were associated with 70,815 sentiments (44.6/video) and 142,575 emotional words (89.8/video). The overall sentiment per video was directionally more positive (25.0) than negative (19.6). In the emotional analysis, the most frequently used words generating emotion included "surgery" with sadness and fear, "love" with joy, "nose" with disgust, and "trust" with doctor. However, overall, anger was the most frequently generated emotion (51,995 associated words, 32.7/video) followed by

anticipation (17.7/video) and fear (15.5/video). The quantity of total and individual emotions significantly associated with number of followers, views, likes, and comments. By contrast, there was no statistically significant association between followers and views.

CONCLUSIONS: Our quantitative analysis of TikTok comments revealed the presence of a substantial emotional response which was correlated with the number of views, likes, comments, and followers. Given that the TikTok algorithm prioritizes content exposure according to user interactions (like, comment, play), if user emotional engagement (emotions/video) correlates with these interactions, we may witness a promotion of the most emotionally provocative content. This may distort the perception of plastic surgeons and plastic surgery to viewers and holds the potential to influence behavior. These findings may be important considerations for plastic surgeons in their consideration of producing content on TikTok.

REFERENCES:
[1] Xue X, Yang X, Xu W, Liu G, Xie Y, Ji Z. TikTok as an Information Hodgepodge: Evaluation of the Quality and Reliability of Genitourinary Cancers Related Content. Frontiers in Oncology. 2022;12. doi:https://doi.org/10.3389/fonc.2022.789956
[2] Rivera JC, Juan HY, Long AS, et al. Presence of Cosmetic and Aesthetic Surgery on TikTok. Plast Reconstr Surg Glob Open. 2022;10(9):e4519. Published 2022 Sep 21. doi:10.1097/GOX.0000000000004519

The Intersection of Gender Identity and Breast Cancer: Multi-Institutional Strategies for Gender-Affirming Oncologic Breast Reconstruction

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PURPOSE: Transgender males and females receiving hormone therapy are at substantially higher risk of developing breast cancer in comparison to cisgender men, though at lower risk than cisgender women1. There is a paucity of literature regarding oncologic breast reconstruction in gender-diverse individuals. This study was to develop a standardized approach to reconstruction for gender-transitioning individuals with concurrent breast cancer.

MATERIALS AND METHODS: A systematic review of the literature was performed followed by a multi-institution review of gender-diverse patients who underwent oncologic breast reconstruction was conducted. Chart review identified patient demographics, oncologic

diagnosis and surgery, reconstruction, complications and revisions. Pre and postoperative photos were obtained of all patients. A review of current literature including keywords "breast cancer" "transgender" and "surgery" was done from the last ten years. Articles were excluded if not related to oncologic surgery.

RESULTS: A systematic review of literature revealed 100 articles and 8 met inclusion criteria. A total of 13 cases of oncologic breast reconstruction were identified. Six were in transmasculine patients and seven in transfeminine patients. Four gender-transitioning individuals were identified across a multi-institutional review. Two transmasculine patients were identified and two non-binary patients, all of whom desired gender affirmation surgery. A variety of reconstructive options were offered to patients. One patient underwent mastectomy and chest contouring with fat grafting (25%), two patients underwent mastectomy and implant-based reconstruction either for pectoralis definition or chest feminization (50%), and one patient underwent mastectomy and autologous tissue reconstruction (25%). Factors in gender diverse individuals that were frequently stressed prior to, or shortly after, reconstruction included any use of hormone replacement therapy (HRT), family history of breast cancer, and genetic studies performed on the patient for any mutations linked to breast cancer.

CONCLUSION: Breast reconstruction should be offered to gender-diverse individuals as part of a multidisciplinary cancer care team. Guidelines for oncologic breast reconstruction in gender diverse individuals in the literature emphasize the importance of utilizing a shared decision-making process with the patient to balance an aesthetically pleasing surgical result while simultaneously providing the best oncologic treatment. This multi-institutional case series highlights the variety of techniques available to provide reconstruction in gender diverse patients diagnosed with breast cancer. It is important for providers and patients to have open conversations about oncologic and immediate reconstructive options for transitioning patients.

REFERENCES

1. Corso G, Gandini S, D'Ecclesiis O, Mazza M, Magnoni F, Veronesi P, Galimberti V, La Vecchia C. Risk and incidence of breast cancer in transgender individuals: a systematic review and meta-analysis. Eur J Cancer Prev. 2023 Feb 16:e000784. doi: 10.1097/CEJ.0000000000000784. Epub ahead of print. PMID: 36789830.

The Potential of Amniotic Membrane Derived Products for Peripheral Nerve Repair: A Comprehensive Review of Commercial Product Applications

INTRODUCTION: Peripheral nerve repair (PNR) is often prone to recurrence and suboptimal results. Human amniotic membrane (HAM) is non-tumorigenic, non-immunogenic tissue with potent regenerative properties and neuro-stimulatory effects. This literature review aims to assess the use of HAM-derived commercial products in PNR.

METHODS: A systematic literature search was conducted utilizing PubMed and other search engines, using relevant keywords such as 'Human Amniotic Membrane', 'Umbilical Cord', 'Peripheral Nerve Repair', and 'Nerve Regeneration' to establish the body of knowledge. The

search was limited to articles published from January 2000 to December 2021. Important details on products were noted. Clinical and in vivo studies were included for efficacy investigation. Methods containing cell isolates were excluded.

RESULTS: 30 commercially available products from 16 companies were identified with significant variations in thickness, form, and preservation methods. The thickness of the HAM based products varied greatly, ranging from 35um to over 1000um. The size of the products also varied, with some companies offering multiple sizes and shapes of the HAM based products. Only 4 products were reported for clinical or animal use in peripheral nerve surgeries (3 in human, 1 in rat). AlloWrap (Stryker) was used as a wrap in a single patient thoracic outlet syndrome case report and showed efficiency in preventing neural adhesions. Cygnus (Vivex) was wrapped around a 1 cm rat sciatic nerve bridging allograft and compared to collagen or no wrap. The amnion-wrapped cohort achieved significantly better nerve regeneration and lesser fibrosis. Amniofix (Mimedx) was used in 58 patients during nerve-sparing radical prostatectomy. In a score-matched analysis, HAM cohort showed superior mean time to continence and potency. A case series on 8 patients with recurrent cubital tunnel syndrome used XWrap (AppliedBiologics) to wrap the scarred ulnar nerve after decompression. Treatment significantly improved pain levels, disability scores, pinch strength, and elbow motion. All studies reported no side effects.

Conclusions:
There is limited information on the use of HAM derived products for peripheral nerve repair. However, reported success deems the exploration of HAM-based product use in PNR promising for enhancing patient outcomes and offers a promising avenue for further investigation. Further investigation into the use of HAM products for PNR is needed to fully understand the potential of this promising treatment option.

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Use of Ultrasound in the Diagnosis of Craniosynostosis

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PURPOSE: Craniosynostosis (CS), caused by premature fusion of the sutures between skull bones, is a rare condition in infants that may produce increased intracranial pressure and have related detrimental effects on the growing brain. Though clinical diagnosis is possible, confirmation often requires radiologic imaging, historically with XR and CT scans.1 Recently, ultrasound has been suggested as a safer, yet sensitive and specific, diagnostic tool for craniosynostosis, although its use in clinical practice is not well characterized.2 The authors examined the trends of imaging for the diagnosis of craniosynostosis in a children's hospital setting and delineate if imaging patterns have changed with newer studies in ultrasound.

METHODS: Patients with suspected craniosynostosis that underwent ultrasound as their first imaging modality between January 2005 to December 2018 at Mount Sinai Hospital were evaluated. Patients that had additional scans to confirm the diagnosis were also analyzed.

RESULTS: A total of 40 patients with suspected craniosynostosis underwent US scans for their first imaging modality. Out of these patients, 27 did not show signs of craniosynostosis, and 13 had inconclusive studies, where further imaging was not done at the discretion of the provider. No patients who initially underwent US had repeat US done. Initial CT scan for patients with suspected craniosynostosis was performed in 148 patients. 23 were confirmed to have craniosynostosis, 119 did not shows signs of craniosynostosis, and 6 had inconclusive studies. Of the 119 CT scans that did not show signs of craniosynostosis, 5 patients had repeat CT scans and all 5 had confirmed no signs of craniosynostosis.

CONCLUSION: The use of ultrasound as a surrogate imaging study to CT for the diagnosis of craniosynostosis in a clinical setting has rarely been studied. The present study shows that, even with evidence of ultrasound as an alternative, many initial scans/diagnoses are made with CT. Furthermore, ultrasounds, though effective in ruling out craniosynostosis, often lead to inconclusive reads that require follow-up. Physicians maintain a preference for CT imaging as the definitive diagnostic tool for craniosynostosis, and in patients with multiple scans, they remain consistent with the imaging modality that they began with (CT imaging was the modality of choice when repeat imaging was done) – potentially because of preference. A potential limitation could be system-implemented protocols that result in repeated imaging modalities, such as CT followed by CT, leaving open the possibility that multiple site studies could show different imaging trends.

REFERENCES:

1. Massimi L, Bianchi F, Frassanito P, Calandrelli R, Tamburrini G, Caldarelli M. Imaging in craniosynostosis: when and what?. Childs Nerv Syst. 2019;35(11):2055-2069. doi:10.1007/s00381-019-04278-x

2. Rozovsky K, Udjus K, Wilson N, Barrowman NJ, Simanovsky N, Miller E. Cranial Ultrasound as a First-Line Imaging Examination for Craniosynostosis. Pediatrics. 2016;137(2):e20152230. doi:10.1542/peds.2015-2230\

Utility of AI tools to Detect Pain Through Facial Expressions: a Systematic Review.

Abstract Presenter
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INTRODUCTION: Pain is a complex experience primarily assessed by the patient's self-report. Artificial intelligence (AI) has the potential to automate pain assessment through the recognition of facial expressions associated with pain. This systematic review will investigate the use of AI and machine learning (ML) to detect pain through facial expression analysis, exploring its potential implications, challenges, and research gaps.

METHODS: We conducted a systematic review using PubMed, Embase, Web of Science, CINAHL, and MEDLINE to search for studies evaluating the AI-assisted detection of pain through facial expressions.
Results and discussion: 15 articles were eligible for inclusion. AI/ML models varied widely among studies. The overall risk of bias within and across studies was deemed low. Four studies assessed the accuracy of pain detection based on self-reported pain scales, three based on the intensity of applied stimuli, nine on the validated PSPI scale, and two on the circumstantial knowledge of painful stimulation. For pain detection, the reported accuracy ranged from 80.9% to 89.59%, while the AUC ranged from 84% to 93.3%. In pain intensity estimation, the accuracy range was between 51.7% to 96%, while the AUC ranged from 65.5% to 93.67%. Finally, the accuracy range was between 85% to 88% for distinguishing between real and faked pain, with an AUC of 91%. Five studies showed that AI/ML outperformed human observers and nurses. AI/ML algorithms face ethical concerns and limitations such as scarcity of databases, confounding, and medical conditions affecting facial shape and mobility.

CONCLUSION: This systematic review confirms that AI/ML technologies can accurately detect and quantify pain through facial expressions, outperforming human observers and detecting deceptive facial expressions of pain. AI/ML could be a helpful tool in providing objective and accurate measurements of pain intensity, enabling clinicians to make more

informed decisions regarding the diagnosis and treatment of pain. However, more publicly available data and randomized control trials are needed to determine the generalizability of automated pain detection in real clinical scenarios. Further research is required to expand the capabilities of AI/ML and test its performance in different pain settings while exploring patient satisfaction and preferences and addressing ethical considerations around privacy and algorithm biases.

Ventral Hernia Repair in Complex Patients: The Impact of Multiple Comorbidities on Surgical Outcomes

Abstract Presenter
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INTRODUCTION: Complex ventral hernias are larger, more complicated hernias that can be difficult to repair, especially in patients with multiple comorbidities. The goal of complex ventral hernia repair is to reduce the risk of recurrence, minimize postoperative complications, and improve the patient's quality of life. Recurrence rates of ventral hernias have been quoted at 5% to 25%, however limited studies have analyzed the potential additive impact of multiple comorbidities on the complexity of the hernia[1234]. The purpose of this study was to assess the viability of complex ventral hernia repair in patients with multiple comorbid conditions and analyze their postoperative outcomes and complication rates.

METHODS: We retrospectively reviewed medical charts of patients who received an open ventral hernia repair by a single plastic surgeon at University of Maryland from January 2020 to June 2022. Data related to demographics, hernia characteristics, and postoperative outcomes were recorded. Patients were subcategorized based on the number of comorbidities for comparative analysis (1,2, 3+). Unadjusted associations between patient comorbidities, hernia characteristics, and surgical outcomes were evaluated using chi-square tests and multivariate regression modeling. To aid in statistical analysis, the following categories were made to group the complications: surgical site occurrence, SSO (skin dehiscence, skin necrosis, chronic wound, surgical site infection, seroma, and hematoma), repair failure (fascial dehiscence and hernia recurrence), and return to operating room (OR).

RESULTS: Sixty patients (33 female: mean age, 55 years) underwent ventral hernia repair at our institution . These patients average BMI was 31 +/- 6.3 kg/m and average of 2.1 +/- 1.3 comorbidities (obesity (n=26, 43.3%), diabetes (n=22, 36.7%), malignancy (n=19, 31.7%), on immunosuppressive therapy (n=16, 26.7%)). Postoperatively, 15% (n=9) of patients had SSO,

10.7% (n=11) had hernia recurrence, and 23.3% (n=14) return to OR. There was no statistically significant association between the number of comorbid conditions, SSO rates or hernia recurrences. However, patients with a higher number of comorbid conditions (3+) were more likely to require a return to the operating room (p=0.0266).

CONCLUSION:
In conclusion, ventral hernia repair can be challenging in patients with multiple comorbidities, emphasizing the importance of careful patient selection, preoperative evaluation, and post-operative management in this unique patient population.

REFERENCES:
1. Kanitra JJ, Hess AL, Haan PS, Anderson CI, Kavuturu S. Hernia recurrence and infection rate in elective complex abdominal wall repair using biologic mesh. BMC Surgery. 2019;19(1). doi:10.1186/s12893-019-0640-3
2. Krpata DM, Blatnik JA, Novitsky YW, Rosen MJ. Evaluation of high-risk, comorbid patients undergoing open ventral hernia repair with synthetic mesh. Surgery. 2013;153(1):120-125. doi:10.1016/j.surg.2012.06.003
3. Maia R, Salgaonkar H, Lomanto D, Shabbir A. Ventral hernia and obesity: Is there a consensus? Annals of Laparoscopic and Endoscopic Surgery. 2019;4:17-17. doi:10.21037/ales.2019.01.07
4.Singhal V, Szeto P, VanderMeer TJ, Cagir B. Ventral hernia repair: Outcomes change with long-term follow-up. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2012;16(3):373-379. doi:10.4293/108680812x13427982377067

What Do Patients Look for When Scheduling Their Initial Plastic Surgery Consultation?

Abstract Presenter
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BACKGROUND: Patient decision making in scheduling their initial plastic surgery consultation varies. We aim to determine which factors are most important to patients when booking their first consultation.

METHODS: An anonymous 23 question survey was distributed online via Amazon Mechanical Turk to participants with a prior plastic surgery consultation or planning to have one in the future. Participant demographic data was collected, and participants were asked to rank the

importance of factors related to cost, surgeon reputation, accessibility, appointment preferences, social media, technology, and amenities on a 1-5 Likert scale. Rankings were reported by mean and standard deviation (SD).

RESULTS: A total of 593 responses were gathered. 48.1% of participants were 25-34 years old, 54.6% were Female, 66.3% identified as White/Caucasian, 78.4% were located in the United States, 74.9% were married/partnered, 54.5% had a Bachelor's Degree, and the majority made $50,000-$75,000 per year (29.2%). Participants gave the highest importance ratings to a surgeon's online reviews (mean = 4.15, SD = 0.81), surgeon presence at follow-up visits (mean = 4.01, SD = 0.91), and availability of pricing prior to appointment (mean = 4.01, SD = 0.91). Lowest ranked factors were waiting room amenities and social media advertising.

CONCLUSIONS: Patients considered online reviews, surgeon presence at follow-up visits, and availability of pricing information to be most important when booking a plastic surgery consultation. These results may provide physicians guidance on structuring plastic surgery consultations based on factors of importance to patients.