

# Managing the Risks of Smoking in Plastic Surgery Patients

**Summary:** Smoking is a risk factor for various postoperative complications, including blood clots and pneumonia. In plastic surgery, smoking can contribute to a host of issues that affect not only patients' health and healing but also their aesthetic results, such as delayed healing, tissue necrosis, and loss of breast implants. The American Society of Plastic Surgeons (ASPS) has developed a *practice reference* to support members in avoiding perioperative issues among patients who smoke, with both general guidance and procedure-specific considerations for breast reconstruction.

## ► BACKGROUND & RATIONALE

Patients who smoke cigarettes or use any form of nicotine (patches, vaping) are at higher risk for postoperative complications due to smoking's effects on cardiovascular and pulmonary function, wound healing, and bone healing.<sup>1</sup> They experience increased rates of surgical site infections, blood clots, pneumonia, and other issues following surgery compared with nonsmokers.<sup>2</sup> As a result, total hospital charges for patients with a history of smoking may be higher than charges for their nonsmoking counterparts.<sup>3</sup> Adverse effects can relate to the contents of cigarettes, including nicotine and carbon monoxide. Smoking can also affect airway function.

In plastic surgery, smoking cigarettes (or use of nicotine) is associated with issues that negatively affect not only patients' health and healing but also their aesthetic results.<sup>4</sup> For example, depending on the procedure, smokers may be more likely to experience skin slough,<sup>5</sup> tissue necrosis,<sup>6</sup> flap failure,<sup>7,8</sup> loss of breast implants,<sup>9</sup> and tissue expander or breast implant infection. The effect on the desired aesthetic results, an important outcome in many aspects of cosmetic and reconstructive surgery, adds another layer of concern to the negative impact of smoking on plastic surgery.

Vasoconstriction associated with nicotine is also particularly concerning in plastic surgery procedures that depend on adequate blood flow of tissue.<sup>10</sup> A 2024 meta-analysis demonstrated that smoking is a clear risk factor in most aesthetic plastic surgeries and emphasized the importance of smoking cessation and patient education for optimal recovery from surgery.<sup>11</sup>

Over the past decade, the prevalence of cigarette smoking in the United States has declined, but the popularity of e-cigarettes has grown.<sup>12</sup> There is a lack of clinical data specific to e-cigarette use and surgical risks, but nicotine is known to reduce blood flow. As such, it may contribute to certain surgical issues, such as skin flap complications. Thus, patients' use of e-cigarettes or other nicotine products is a potential risk factor.<sup>13</sup>

In addition, marijuana use has increased in recent years,<sup>14</sup> and almost half of states now permit adult nonmedical use of cannabis.<sup>15</sup> Marijuana use may pose perioperative risks related to anesthesia, as both marijuana and anesthesia affect the central nervous system.<sup>16</sup> Marijuana use can also affect the cardiovascular and respiratory systems.<sup>17</sup> Limited research is available on the risks of marijuana use in plastic surgery. However, a 2023 study found that patients undergoing implant-based breast reconstruction who used marijuana had an increased risk

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of surgical site infection.<sup>18</sup> The potential surgical issues related to marijuana are also important to consider.

Many organizations have guidelines with recommendations to minimize surgical complications for patients who smoke (Appendix A). Although some practices may be widely beneficial, differences in patient populations could correspond to variation in complication profiles and, therefore, optimal treatment approaches.<sup>19</sup>

In 2011, ASPS included evidence-based recommendations for patient selection and risk management approaches for patients who smoke in the resource *Pathways to Preventing Adverse Events in Ambulatory Surgery*.<sup>20</sup> The ASPS Smoking Task Force determined that having consensus-based guidance with broad considerations for providing care to patients who smoke, as well as specific considerations for breast reconstruction patients, could be beneficial to members.

## ► PRACTICE REFERENCE *for Surgeons*

Patient selection is influenced by modifiable and nonmodifiable risk factors. Smoking cigarettes is one modifiable risk factor that has strong evidence for detrimental effects on patient health and postoperative outcomes. In a shared decision-making framework, surgeons should educate patients on the value of smoking cessation and advocate for the lowest risk strategy to achieve the desired outcome.

The following practice reference, based on available evidence and surgeon expertise, addresses patient selection as well as pre- and postoperative approaches to mitigate the known risks or potential risks of smoking cigarettes. While these best practices apply to the risks of traditional cigarette smoking, nicotine delivered from e-cigarettes is presumed to carry similar risks of nicotine from cigarettes; proof is yet to be established for the safety of e-cigarettes by the industry.<sup>21</sup>

Further, until more research is available, surgeons should consider the effects of marijuana use on the central nervous, cardiovascular, and respiratory systems – and its potential association with surgical site infection in breast reconstruction—when profiling a patient’s surgical risks.

Note: The best strategy for managing risk may vary by procedure and patient. Surgeons should always use their best clinical judgment. This reference includes a PubMed® collection with procedure-specific studies that examined or included smoking as a risk factor in plastic surgery as a source of reference (Appendix B).

### Patient Screening and Selection

- Ask about smoking history, including number of pack-years, and whether anyone in the household smokes. If the patient no longer smokes, ask how long ago the patient quit
- Ask about comorbidities that could exacerbate the effects of smoking (e.g., airway obstruction, chronic obstructive pulmonary disease, chronic cough)
- Identify whether the patient smokes e-cigarettes or consumes any other form of nicotine (e.g., chewing tobacco, nicotine lozenges, nicotine patches)
- Consider asking whether the patient smokes or otherwise consumes marijuana
- Document patient responses to screening questions. If the surgical approach is adjusted based on the patient’s history of smoking, record this decision and clearly communicate it with the patient

### Preoperative Approaches

- Discuss with the patient the risks of smoking cigarettes and other types of nicotine exposure, as well as the potential risks of consuming marijuana, on surgical outcomes. Include relevant risks in the informed consent form
- Recommend preoperative smoking cessation, which, depending on the patient’s overall health and the surgical procedures, should occur 4–8 weeks before surgery unless there is an

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emergent clinical reason to operate on a shorter cessation timeline

- Discuss available options to aid in smoking cessation, such as a quit line (e.g., 1-800-QUIT-NOW) or program (e.g., American Lung Association's Freedom From Smoking®, or BecomeAnEx)<sup>22</sup>
- Until more clinical evidence is available, consider recommending a similar duration of preoperative cessation for smoking e-cigarettes and consuming other forms of nicotine to that recommended for traditional cigarettes<sup>10</sup>
- Until more clinical evidence is available to suggest tapering approaches, consider advising patients who actively or frequently use marijuana on its potential effects on anesthesia and postoperative pain control.<sup>23</sup> Also consider delaying the procedure in patients whose decision-making is impaired by acute cannabis intoxication
- Consider conducting a urine cotinine and/or nicotine test on the day before or day of the procedure to inform whether to delay it
- Record using an informed refusal form<sup>24</sup> or other type of documentation a patient's refusal to comply with surgeon-recommended risk modification

### Postoperative Approaches

- Recommend continued cigarette smoking cessation and avoidance of nicotine exposure for a specified period after surgery. Consider recommending cessation for at least 4 weeks following the procedure
- In follow-up appointments during the postoperative period, ask about cigarette use and consider asking about e-cigarette or other nicotine use. Counsel patients on the benefits of quitting smoking indefinitely

### PROCEDURE-SPECIFIC REFERENCE: BREAST RECONSTRUCTION

Approaches for managing patient risk may vary by plastic surgery procedure. However, procedure-specific studies focused on smoking as a risk factor are limited for many types of surgeries in plastic

surgery. Breast reconstruction is one procedure for which there is a wider breadth of clinical studies that include or examine smoking as a risk factor. In addition, because the timing of breast reconstruction must often be considered in the context of ongoing cancer treatment, patient risk factors that result in delayed treatment are of particular importance in this type of care. Thus, along with the broad guiding principles above, the following considerations can aid decision-making when patients who smoke plan to undergo breast reconstruction.

### Implant Versus Flap Reconstruction

Smoking has been identified as an independent risk factor for deep incisional surgical site infections, incisional dehiscence, and reoperation across several plastic surgery procedures.<sup>25</sup> For implant reconstruction, specifically, patients who smoke may have a higher risk for loss of implant, loss of tissue expander, and nipple complications than those who do not smoke.<sup>9,26,27,28</sup> For flap reconstruction, patients who smoke may have a higher risk for flap necrosis or flap loss than those who do not smoke.<sup>7,8,29</sup>

### Cessation

As with other procedures, smoking/nicotine cessation before breast reconstruction can reduce the risk of surgical complications. A single-institution study by Chang et al. classified patients undergoing transverse rectus abdominis myocutaneous (TRAM) flap breast reconstruction who quit smoking at least 4 weeks before surgery as former smokers, and this group had a significantly lower rate of complications than the active smokers.<sup>29</sup> The study also found no significant difference in the complication rate between former smokers and nonsmokers.

### Nicotine Exposure

Surgeons should ensure patients are aware of the potential risks of any nicotine exposure, including e-cigarette use, on their breast reconstruction results. In one case study, a patient receiving immediate tissue expander reconstruction reported that she was a nonsmoker prior to surgery.<sup>13</sup> She experienced extensive bilateral skin flap necrosis during the postoperative period. Afterward, her doctors learned she had switched

to e-cigarettes three months before the procedure, believing they were safer than traditional cigarettes. More research is needed on the association between e-cigarette use and surgical complications, but Taub et al. suggest it is reasonable to treat e-cigarettes similar to traditional cigarettes when advising patients on smoking cessation, noting that stopping use four weeks before surgery would be prudent.<sup>10</sup>

### **Marijuana Use**

Members should also monitor research on the association between marijuana use and plastic surgery complications. As noted earlier, a 2024 study found that patients who used marijuana were at greater risk for developing surgical site infection.<sup>18</sup> The risk of complications was higher among patients diagnosed with both marijuana and tobacco use.

### **Timing of Reconstruction**

A patient's smoking status may influence the surgeon's decision to proceed with immediate or delayed breast reconstruction. In Chang et al.'s single-institution study, they found that smokers who received immediate reconstruction had a significantly higher rate of mastectomy skin flap necrosis than those who received delayed reconstruction.<sup>29</sup> Although immediate reconstruction offers certain benefits, such as the potential for fewer separate operations, delaying the procedure could allow more time for the patient to taper their smoking, lowering the possibility of certain complications. Members may opt to test patients' cotinine or nicotine levels when deciding whether to postpone breast reconstruction.

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### Appendix A. Existing Guidance on Smoking and Surgery

American Society for Metabolic and Bariatric Surgery, 2021: ASMBS Position Statement on Preoperative Patient Optimization Before Metabolic and Bariatric Surgery (<https://asmbs.org/resources/asmbs-position-statement-on-preoperative-patient-optimization-before-metabolic-and-bariatric-surgery>)

World Health Organization, 2020: Tobacco & Postsurgical Outcomes (<https://apps.who.int/iris/bitstream/handle/10665/330485/9789240000360-eng.pdf>)

French Society of Anesthesia and Intensive Care, 2017: Guidelines on Smoking Management During the Perioperative Period (<https://doi.org/10.1016/j.accpm.2017.02.002>)

American Academy of Orthopaedic Surgeons, 2016: Information Statement: Tobacco Use and Orthopaedic Surgery (<https://www.aaos.org/globalassets/about/bylaws-library/information-statements/1047-tobacco-use-and-orthopaedic-surgery-3.pdf>)

American College of Surgeons, 2014: Statement on the Effects of Tobacco Use on Surgical Complications and the Utility of Smoking Cessation Counseling (<https://www.facs.org/about-acs/statements/effects-of-tobacco-use-on-surgical-complications-and-the-utility-of-smoking-cessation-counseling/>)

Cochrane Library, 2014: Interventions for Preoperative Smoking Cessation (Review) (<https://doi.org/10.1002/14651858.CD002294.pub4>)

### Appendix B. PubMed® Collection of Procedure-Specific Studies on Smoking Risk

ASPS has started a collection of studies focused on a variety of plastic surgery procedures that examined or included smoking as a risk factor. Procedure-specific studies include those on breast reconstruction, breast reduction, face lift, hand surgeries, head and neck reconstruction, panniculectomy/abdominoplasty, and rhinoplasty. This collection is available at <https://www.ncbi.nlm.nih.gov/sites/myncbi/1P1v0rxLnmoc8/collections/63097981/public/>.

**Note:** Inclusion of articles should not be construed as an endorsement or recommendation of their conclusions. The articles are for reference only, and surgeons should use their best clinical judgment about how to adjust their practice based on emerging research. The collection is not meant to represent a comprehensive or exhaustive view of the literature on smoking and specific plastic surgery procedures.

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