

Office-based Plastic Surgery—Evidence-based Clinical and Administrative Guidelines

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Summary: Outpatient procedures are extremely prevalent in plastic surgery, with an estimated 82% of cosmetic plastic surgery occurring in this setting. Given that patient safety is paramount, this practical review summarizes major contemporary, evidence-based recommendations regarding office-based plastic surgery. These recommendations not only outline clinical aspects of patient safety guidelines, but administrative, as well, which in combination will provide the reader/practice with a structure and culture that is conducive to the commitment to patient safety. Proper protocols to address potential issues and emergencies that can arise in office-based surgery, and staff familiarity with thereof, are also necessary to be best prepared for such situations. (*Plast Reconstr Surg Glob Open* 2022;10:e4634; doi: 10.1097/GOX.0000000000004634; Published online 9 November 2022.)

INTRODUCTION

Outpatient procedures remain a popular trend in recent years. In 2020, 82% of cosmetic procedures and 41% of reconstructive procedures were performed in the outpatient setting, compared with 81% and 62% in 2007, respectively.^{1,2} Internationally, 56% of cosmetic procedures were performed in the outpatient setting in 2020.³ Improved convenience, comfort, and costs benefit both patients and surgeons when compared with the hospital setting.⁴⁻⁶ It is, therefore, reasonable to expect the prevalence of outpatient procedures to continue, or even rise, into the future. Despite such momentum, regulations have been slow to keep pace; fewer than 30 states have laws governing office-based surgery (OBS), and even fewer states require accreditation.^{7,8} Among those that do, there is a lack of standardization over accreditation.⁹

Conflicting evidence exists regarding the complication rate in OBS compared with other surgical settings.¹⁰⁻¹² Regardless, patient safety remains paramount.⁴ Given the lack of safety regulations for OBS, organizations, such as the American College of Surgeons, the American Society of Plastic Surgeons (ASPS), the Aesthetic Society (formerly ASAPS), and the American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF), have released

practice advisories to guide surgeons.¹³⁻¹⁶ As such, the onus of patient safety lies on the shoulders of surgeons.

This article will summarize and consolidate contemporary, evidence-based practice guidelines to help plastic surgeons understand topics guiding patient safety in OBS. The principles outlined herein are not exhaustive, nor are they hard and fast rules. They also should not be interpreted as the legal standard of medical care. Rather, physicians should use these guidelines to inform their own understanding of the evidence and supplement their best clinical judgment within individual circumstances.

PRINCIPLES GOVERNING OFFICE SAFETY

Accreditation

Accreditation provides validation of safe practices, compares performance against other accredited facilities, and standardizes practice guidelines.^{12,17} This demonstrates that the practice meets a nationally accepted standard and is committed to patient safety and quality care.¹⁷ Current accreditation organizations include AAAASF, the Accreditation Association for Ambulatory Health Care, and the Joint Commission.^{14,17,18} With expanding medical tourism, reciprocal demand for patient safety has increased international outreach from these organizations.¹⁹ AAAASF has modified domestic accreditation standards to accommodate cultural and social differences internationally and been endorsed by the International Society for Aesthetic Plastic Surgery.

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All accredited facilities are reevaluated yearly via self-survey and every 3 years by an onsite inspector.¹⁹ While each agency has their own process, they share the goal of ensuring quality health care and patient safety.¹⁷ Membership to plastic surgery societies also demonstrates a commitment to patient safety; ASPS and the Aesthetic Society mandate members operate in accredited outpatient facilities.²⁰

Culture of Safety

The Institute of Medicine defines safety culture as “individual and organizational behavior, based upon shared beliefs and values that continuously seek to minimize patient harm.”²¹ This culture is a foundational element of outpatient surgery. Administering surveys can evaluate perception of safety culture in the office.²² Physicians and staff are responsible for maintaining and honoring the office culture to ensure a collective commitment to quality improvement and patient safety.²³

Personnel and Training

Physicians should maintain certification as recognized by the American Board of Medical Specialties, the American Osteopathic Association, or a state-approved board with equivalent standards.^{4,14,24,25} Office-based physicians are generally subject to less-detailed credential review, predisposing them to “practice drift”; that is, they are more susceptible to providing care outside the scope of their training.^{26–30} Physicians must work within the scope of their licensing, experience level, and the facility’s accreditation guidelines.^{4,14,28,29} This also applies to anesthesiologists, who may receive less ambulatory training in residency, as well as nursing and support staff.^{18,23,31,32}

Informed Consent

Informed consent is the acknowledgement of a discussion between the provider and patient about the proposed procedure, including indications, expectations, risks, and benefits along with alternative options.^{25,32} This includes a corresponding discussion with the anesthesiologist regarding the anesthetic plan.²⁶ Discussions should consist of nonmedical jargon, with communication performed at a fifth-grade level and translated into the patient’s preferred language.^{32–35} Supplemental use of visual aids can improve understanding and retention of information.³³ Patients should demonstrate their understanding of the discussion and proposed treatment using the teach-back method before signing their consent.^{32,33} Consent should also be thoroughly obtained for legal purposes.³⁴

In 2021, the US Food and Drug Administration updated informed consent protocols tying breast implant

manufacturers and plastic surgeons to a comprehensive decision-making process with patients. These involve a device-specific label consisting of five components (Table 1), including an additional checklist created by implant manufacturers for obtaining informed consent. This checklist aims to confirm understanding of the risks associated with the operation and implant, and it must be signed by both the patient and implanting plastic surgeon after review. Implant manufacturers are prohibited from selling breast implants to surgeons until they attest in writing their agreement to using the checklist while obtaining informed consent.^{36,37}

ASPS encourages plastic surgeons to become familiar with these new Food and Drug Administration guidelines.³⁶ For this purpose, both organizations have released examples of implant labels.^{38,39} These examples are not official manufacturer labels and should only be used as reference—not for patient care.

PROTOCOLS TO ENSURE SAFETY

Organization is essential to maintaining a safe and successful ambulatory practice. Perioperative patient safety checklists are simple tools that promote safety culture and have helped decrease complication rates.^{40–42} The World Health Organization Surgical Safety Checklist is one example that can be tailored to its user’s needs, such as for outpatient plastic surgery. (See figure, Supplemental Digital Content 1, which displays an example of a 28-element, perioperative checklist template for use in the office-based setting developed by Rosenberg et al 2012, <http://links.lww.com/PRSGO/C236>.)^{40,43} However, emergencies may arise, and equipment and established policies should be familiar to all staff to handle both routine and emergency care.^{26,44}

Fire Safety

Fires in the OR involve three components: an oxidizer, often oxygen or nitrous oxide; an ignition source, such as cautery; and fuel, which includes sponges and alcohol-based solutions.^{45–48} Proper management of fuel and ignition sources in the OR and perioperative areas is priority.^{24,45–47} It is crucial to observe proper safety technique of potential ignition devices, allow preparation solution to completely dry to disperse flammable fumes, keep gauze and sponges moist, and minimize oxygen concentration as appropriate (ideally <50% FiO₂).^{45–48}

The major factor behind fire litigation is lack of discussion among the surgical team regarding the risk of fire.⁴⁵ As such, fire-safety training and teamwork are necessary. If a fire occurs, the procedure must be stopped, and fire protocols should be executed.^{45,47}

Table 1. The Five Components of Breast Implant Manufacturer Labeling

Components of Breast Implant Manufacturer Labeling
1. A “black box” warning regarding potential short-term, long-term, and life-threatening consequences associated with implant use.
2. A patient decision checklist to help confirm patient understanding of the benefits, aforementioned risks, and other information about the implant.
3. Updated recommendations about silicone gel-filled implant rupture-screening protocols.
4. A device description with a list of materials that compose the implant.
5. A patient device card to fulfil medical device tracking requirements.

EQUIPMENT AND STERILITY

Properly functioning equipment and sharps and sterile technique are crucial for OR safety. For any OBS using sedation, the American Society of Anesthesiologists (ASA) and AAAASF recommend monitoring pulse oximetry, electrocardiogram, blood pressure, capnography, and temperature.^{4,24,25} Equipment must be frequently maintained, sanitized, inspected, and sterilized with an autoclave, as appropriate.^{5,24} Intraoperative events, such as hypothermia or bleeding, increase postoperative morbidity, and equipment should be ready to prevent and treat such incidents.^{16,24,49–52} The CDC establishes sterility and disinfection protocols adopted by many hospitals; office-based practitioners should use such a model as well.⁵³ Ultimately, meticulous adherence to proper sharps and sterile technique is best for ensuring surgical safety.^{41,54}

Despite this, sharps and needlestick injuries remain among the most common injuries sustained by surgeons. In the event of a sharps injury or exposure to blood-borne infection, staff must wash the area, report the injury, obtain patient samples for source testing, and receive proper and punctual prophylaxis to HIV and hepatitis B or C viruses, as applicable.^{54,55}

Documentation and Quality Improvement

For every procedure, documentation should include indications, procedure-specific information, findings, specimens, complications, and patient tolerance. A procedure should be documented immediately after its completion. Inclusion of all pertinent points is important for continuity of care, protecting patient safety and privacy, and potential legal ramifications.³² Such medical records must be stored within the facility.²⁴

Thorough documentation can also help with quality improvement. Monthly audits of random cases and operative sequelae should be performed, and adverse events must be analyzed and used to improve systems and prevent reoccurrences.^{24,56,57} The National Surgical Quality Improvement Program allows practices to collect and compare patient data with other participating facilities. It also uses data sharing to develop and update best practice guidelines to its member practices.⁵⁸ Indeed, adherence to National Surgical Quality Improvement Program protocols has decreased the risk of surgical complications and increased patient satisfaction ratings.^{59–61} More specific to plastic surgery, the Tracking Operations and Outcomes for Plastic Surgeons and ASPS Qualified Clinical Data Registry help plastic surgeons identify areas for improvement and compare quality improvement efforts with their peers. All ASPS members are encouraged to participate in the Tracking Operations and Outcomes for Plastic Surgeons program, and AAAASF requires its member practices to engage in quality improvement programs.^{57,62}

Within the effort to improve patient care, many plastic surgeons have turned to standardized risk stratification during patient evaluations. Postoperative scoring tools such as the LACE+ index and TIME-H objectively evaluate patient characteristics and comorbidities to stratify patients on their risk for developing complications. This

information helps providers reallocate resources and attention to better monitor those deemed high risk and avoid excessive care to patients who may not require it.^{63,64}

Postoperative Care

After surgery, minimizing complications should be a priority. Postoperative nausea and vomiting (PONV) leads to multiple morbidities, including dehydration, electrolyte imbalances, aspiration, wound complications, and anorexia. Furthermore, PONV can delay discharge and is a leading cause of unanticipated hospital admission.^{4,7,65} PONV may be reduced by modifying anesthesia, using pharmacologic prophylaxis, and managing pain. Long-term monitoring of patients at high risk for postoperative complications should be performed.

At discharge, patients should be handed off to an adult who can understand and adhere to postoperative directives. The use of durable materials with basic illustrations is a valuable resource in assisting with this goal.⁶⁷ Follow-up visits allow physicians to monitor for complications and manage wound care devices such as closed-suction drains.^{41,67} The timing of follow-up is important too; appointments within a week of discharge can reduce readmission rates in inpatients.⁶⁸ Clinic staff may help improve adherence by emphasizing the importance of follow-up appointments, providing resources that ameliorate socioeconomic barriers, and sending appointment reminders.^{69,70}

EMERGENCY AND TRANSFER PROTOCOLS

Detailed protocols for handling medical and situational emergencies (eg, inclement weather and fire) should be available for reference at any time.^{26,32,44} Facility premises should be spacious and organized to enable lifesaving interventions and retrieval of equipment.^{4,24} A source of emergency power must be present and immediately available.²⁴ At least one physician who is credentialed in the resuscitative techniques advanced trauma life support, advanced cardiovascular life support, or pediatric advanced life support must be present until the patient is ready for transfer. Medical personnel with direct patient contact should be trained in basic life support.^{14,18} For emergent anaphylaxis, epinephrine or alternative vasoactive drugs should be administered intravenously. Steroids and antihistamines may be used as adjuncts or for mild reactions, and glucagon should be available for rescue treatment for epinephrine nonresponders (eg, due to β -blocker use).⁷¹ Physicians should also have admitting privileges or maintain an emergency transfer agreement with a nearby hospital.^{4,13,14}

Periodic inventory checks and simulations are recommended to keep members of the clinical team familiar and coordinated with their roles.^{4,32,56} These can be done via walk-throughs, role-playing, or practice on mannequins. Debrief sessions provide an opportunity to discuss strengths and areas of improvement to better prepare for the next drill or a real situation.⁵⁶

PERIPROCEDURAL SAFETY PRINCIPLES

Periprocedural evaluations, including histories and physical examinations, are crucial for determining outpatient surgical eligibility and identifying and planning for potential complications.^{24,32,51,72} Information to elicit includes patient allergies, adverse drug reactions, medications and drug history, nutritional status, and comorbidities, such as obesity, cardiovascular disease, pulmonary disease, diabetes mellitus, and obstructive sleep apnea.^{4,5,25,32,41,51,72,73} Preoperative laboratory testing is not recommended.⁷²

Obesity and Procedure Characteristics

Patient BMI must be considered when planning outpatient plastic surgery, as BMI is directly correlated with the risk of perioperative complications.^{51,74–81} The British National Health Service recommends patients undergoing body contouring surgery who have a BMI less than or equal to 28; however, no further clinical guidelines exist for setting BMI limits or contraindicating plastic surgery due to obesity.^{79,80,82} Instead, clinical judgment should account for the combination of procedures to be performed, procedure indication, and the overall health of the patient.^{80–82}

Procedure length is known to impact postoperative morbidity.⁵¹ Administration of anesthesia for more than 1 hour and operations ending after 3 PM are significant, independent predictors of unanticipated admission following surgery.⁸³ Although a procedure duration of less than 6 hours was accepted as a safe cutoff, those lasting more than 4 hours, as well as combined procedures (in particular with abdominoplasty), are significant risk factors for developing venous thromboembolism (VTE).^{51,75,82–85} Similarly, specific to liposuction, a lipoaspirate volume less than 5L was considered safe.⁸² Two recent reviews found an increased risk of VTE in those with a lipoaspirate more than 3L,⁸⁵ and an increased risk of VTE and other complications in those with a lipoaspirate more than 3.5L.⁸⁶ Therefore, further postoperative monitoring can be considered for patients with a BMI more than 30 kg/m², liposuction volume more than 3L, operative time more than 4 hours, and those undergoing combined procedures.^{51,85} Postoperative monitoring must be supervised by a health care provider with documentation of a course of events.^{24,85} Finally, longer procedures should be scheduled earlier in the day.

Homeopathic Supplements

The increasing popularity of alternative and homeopathic medicine without regulation of product labeling poses potential health risks for surgical patients.^{41,87,88} Screening for these supplements should be part of the preprocedure evaluation.⁸⁸ For homeopathic medications lacking pharmacokinetic data, ASA recommends they be discontinued 2–3 weeks preoperatively and not be resumed for another 1–2 weeks postoperatively.^{41,88,89} Ultimately, an empathetic surgeon can counsel on homeopathic therapies while maintaining cultural respect and patient compliance in preparation for surgery.⁹⁰

Anesthesia

Preoperative evaluations are necessary to maintain patient safety when administering sedatives, local, or general anesthesia.^{24,92} The chosen anesthetic technique should be appropriate for both the patient's overall health and the procedure.²⁶ The ASA Patient Selection Physical Status Classification System places patients into four categories of health and ability to tolerate anesthesia.^{14,32,51} Categories 1–3 are able to undergo OBS, whereas those in category 4 are not.^{26,41,51,72}

Conscious sedation, characterized by the patient's ability to self-maintain spontaneous respirations and airway protection, and local anesthesia can be considered in the OBS setting, including for facial and breast surgery and body contouring.^{92–94} These techniques offer multiple advantages over general anesthesia, including shorter recovery, less PONV, improved cost effectiveness, and less equipment and personnel required for administration. Low-dose propofol is a good sedative in OBS because of its anxiolytic and amnesic properties and its manageable pharmacodynamics and side effects. Adjuvants, such as ketamine, fentanyl, and benzodiazepines, may also be used. Oral sedation offers some advantages over intravenous administration, such as relative vital sign stability, but it also lengthens drug onset and duration, which could complicate management.⁹²

Targeted techniques and nerve blocks can also be applied in certain operations. Infiltration of anesthesia between the internal oblique and transversus abdominis (TAP blocks) can reduce the need for postoperative analgesia in abdominal surgery.^{95,96} Pectoralis and intercostal nerve blocks are a strong first choice for local anesthesia in breast procedures, with serratus anterior plane and erector spinae plane blocks as reasonable alternatives or adjuncts.^{23,96–98}

Ropivacaine is commonly used as the local agent.⁹⁶ Liposomal bupivacaine has a duration of action of approximately 72 hours and can, therefore, be effective in reducing postoperative pain.⁹⁹ The aforementioned blocks are similar in efficacy and safety, so surgeons should use whichever block they are most comfortable with.⁹⁶ Surgeons should also be aware of signs of anesthetic toxicity, including agitation, confusion, dizziness, drowsiness, tinnitus, perioral numbness, metallic taste, and dysarthria. Antidotes should be available for administration as necessary, including benzodiazepines in the event of seizures or epinephrine for cardiac arrest.¹⁰⁰

Patients considered for conscious sedation should be ASA 1 or 2 and emotionally stable to reduce the risk of intraoperative agitation. Given the nature of conscious sedation and local anesthesia, it is the surgeon's responsibility to be aware of the patient's comfort level and be in communication with the anesthesiologist.⁹²

Antibiotic Prophylaxis

Surgical site infections are a risk ubiquitous to all settings. The Surgical Care Improvement Project recommends IV antibiotic prophylaxis between 30 and 59 minutes of incision (2 hours for vancomycin and fluoroquinolones).^{101–103} Preoperative antibiotics should be tailored to the patient;

cefazolin, or clindamycin in those with beta-lactam allergies, is commonly used. If the surgery lasts over 4 hours, repeat dosing is indicated.⁹⁹ Antibiotics are unnecessary 24 hours postoperatively in clean cases except with placing a foreign object or for head and neck oncologic reconstruction.^{41,101,103–106} Antibiotic administration and discontinuation time, and incision time, should be documented.¹⁰⁵ While no guidelines exist for antibiotic prophylaxis based on procedural characteristics in plastic surgery, surgeons can refer to the standards recommended by other surgical specialties in combination with their own judgment.¹⁰¹

Venous Thromboembolism

Plastic surgeons must assess for VTE risk by recording predisposing conditions and lifestyle factors (Table 2).^{23,51,84,107} The Caprini Score uses this information to stratify patients into low-, moderate-, and high-risk categories, allowing systematic administration of VTE prophylaxis based on risk profile.^{16,108–112} The American Association of Plastic Surgeons released recommendations in 2015 regarding deep vein thrombosis and pulmonary embolism (DVT/PE) prevention in plastic surgery (Table 3).^{110,113} However, there remains no all-encompassing recommendation regarding VTE chemoprophylaxis based on Caprini stratification, and surgeons should use clinical judgment when evaluating patients for VTE management.^{108,109,114} An exception may be noted for abdominoplasty, which is associated with a higher risk of developing VTE; studies have shown benefit in using VTE chemoprophylaxis in abdominoplasty patients.^{23,99,112,115}

Hypothermia

Hypothermia is an intraoperative event associated with increased risks of surgical site infections, myocardial events, and blood loss due to disruption of the coagulation cascade^{24,50,116,117}; a 1 °C decrease in core body temperature increases blood loss by as much as 20%, in turn increasing the likelihood of a transfusion.^{16,49–51} Hypothermia

Table 2. Common Risk Factors for Venous Thromboembolism

Common Risk Factors for Venous Thromboembolism
Personal or family history of clotting disorders (eg, factor V Leiden)
History of more than three pregnancies
Current pregnancy
Contraception use
Venous insufficiency
Chronic heart failure
Infectious disease
Recent muscular trauma
Confinement to a bed and/or armchair
Long-distance travel
Use of general anesthesia during surgery
Standing >6 hours per day
Performance of combined procedures
Performance of abdominoplasty

can also potentiate the effects of anesthesia and prolong the duration of postoperative recovery and the hospital stay.^{50,116–118} Therefore, measures to prevent hypothermia should be available, including but not limited to, ambient temperature optimization, forced air warming blankets (bair huggers), warmed intravenous fluids, and blood products.^{16,24,51,117} Strict monitoring of patients' vitals and temperature is necessary in all practices.⁴

Malignant Hyperthermia

Malignant hyperthermia (MH) is a life-threatening, anesthetic emergency that must be investigated during the preprocedure evaluation. A query of personal and family history of adverse anesthesia reactions, such as intraoperative trismus, unexplained fevers, or deaths during anesthesia, should be performed.^{119,120} If a patient is deemed susceptible to hyperthermia or has history of muscular pathology, he/she may still undergo outpatient surgery with proper precautions.^{120,121} This includes obtaining a baseline serum creatine kinase, potassium, and myoglobin level.¹²⁰ Nontriggering anesthetics such as propofol and vecuronium should be used for all susceptible patients, while volatile anesthetics and succinylcholine must be avoided.^{119,120,122} Early recognition of MH is crucial, with common indicators being end-tidal hypercarbia, sinus tachycardia, and masseter spasm.¹¹⁷ In the event of a hyperthermic crisis, dantrolene and active cooling methods, such as ice packs and cold IV fluids, should be ready until the patient can be transferred to a hospital.^{51,117} Failure to monitor temperature is associated with mortality in MH, further highlighting the importance of monitoring vitals during and up to 2.5 hours after surgery.^{50,51}

Multimodal Analgesia (MMA)

The use of local anesthesia and adjunctive MMA can provide many benefits pertaining to operative and postoperative anesthesia. Improved comfort and PONV management reduce unanticipated postoperative admissions and promote recovery with increased patient satisfaction.^{23,51,96,97,99,123,124} Importantly, use of local anesthesia and MMA could reduce the need for opioids and, thus, reduce the risk of new persistent opioid use.^{96,97,99,124–126} Appropriate supplementation with NSAIDs, acetaminophen, gabapentinoids, and steroids is, therefore, recommended.^{98,123}

CONCLUSIONS

As physicians, patient safety is the foremost priority. In an ever-evolving landscape that favors decentralization, this means the institution, adherence, and continual improvement of culture and protocols to secure high-level patient care. For the plastic surgeon, it also

Table 3. American Association of Plastic Surgeons 2015 Recommendations for DVT/PE Prevention in Plastic Surgery

Recommendations for Prevention of Deep Vein Thrombosis and Pulmonary Embolism in Plastic Surgery

1. Use nongeneral anesthesia when appropriate.
2. All patients should have intermittent pneumatic compression.
3. All patients should have preoperative Caprini risk stratification performed.
4. Chemoprophylaxis for Caprini scores >8 should be considered on an individualized basis.

means assessing whether the patient is suitable for outpatient surgery and knowing and preparing for adverse events that may occur in the facility or after discharge. This article represents a starting point for the outpatient plastic surgeon to reference with the goal of promoting consistent understanding and awareness for patient safety. Indeed, a conscientious physician who exercises prudent clinical judgment goes a long way in ensuring patient safety. (See table, Supplemental Digital Content 2, which displays the main takeaways of each topic section discussed in this article, <http://links.lww.com/PRSGO/C237>.)

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