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Cosmetic

Awake Rejuvenation With the Deep Plane Face Lift and Extended Deep Neck Contouring

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Background: The deep plane face lift corrects progressive soft tissue sagging and neck laxity associated with the aging process. With patients requesting fewer procedures under general anesthetics, trends have turned toward performing minimally invasive procedures under tumescent local anesthesia. Many surgeons are apprehensive about operating on the deep structures of the neck with minimal anesthesia; thus, there is limited published data on the efficacy of more invasive procedures under tumescent local anesthesia, such as the deep plane face lift. This study aimed to illustrate the exceptional results that can safely be obtained when performing the deep plane face lift under tumescent local anesthesia.

Methods: Two hundred patients who underwent the deep plane face lift under tumescent local anesthesia between January 2020 and January 2024 were identified, and their charts were retrospectively reviewed. Patient demographics, length of operation, concomitant procedures, and postoperative complications were recorded, and a descriptive analysis was performed.

Results: Seventeen (8.5%) patients experienced complications postoperatively, and there were no mortalities. The most common complications were wound infection (2.0%) and hematoma (2.0%). All patients who experienced complications were treated conservatively with complete resolution. No permanent motor nerve damage, xerostomia, or sialoceles were reported. There were no cases of lidocaine toxicity.

Conclusions: The deep plane face lift provides patients with excellent results compared with other methods of facial rejuvenation. This is an invasive operation that can be performed with minimal pain under tumescent local anesthesia, providing patients with optimal outcomes and decreasing the risk of postoperative complications associated with prolonged anesthesia. *(Plast Reconstr Surg Glob Open 2025;13:e7305; doi: 10.1097/GOX.0000000000007305; Published online 19 December 2025.)*

INTRODUCTION

In 2000, Gatti[1] proved that surgical cosmetic procedures commonly performed under general anesthesia could be safely and successfully carried out with local anesthesia and oral medication. Since this time, the number of cosmetic plastic surgery procedures performed in the office under minimal sedation has risen exponentially. In 2023, the American Society of Plastic Surgeons reports 46% of procedures being performed in an office-based setting as opposed to the 16% reported for hospital-based procedures.[2] These trends can likely be attributed to the patient's appeal to affordability, faster recovery times, and the overall comfort afforded by the use of tumescent local anesthesia.

The American Society of Anesthesiologists describes minimal sedation as a state in which the patient is able to respond normally to verbal commands, and airway reflexes, spontaneous ventilation, and cardiovascular function remain unaffected.[3] The use of perioperative

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oral medications and local anesthetics to achieve this state reduces procedure costs and eases patient anxiety surrounding the effects of general anesthesia.[4] Creating a relaxing patient experience and reducing preoperative stress have been shown to decrease postoperative pain, subsequently improving postoperative outcomes.[5,6] In addition to contributing to enhanced visual results, minimal sedation reduces the risk of undesirable sequelae of general anesthesia, such as pain, cardiopulmonary and/or cerebral dysfunction, nausea and gastrointestinal paralysis, fatigue, and prolonged convalescence.[5]

As a result of the improved patient experience and decreased hospital resource use, the demand for facial rejuvenation procedures under tumescent local anesthesia continues to grow in popularity.[7] Typically, patients choose noninvasive or minimally invasive procedures such as laser treatments or thread lifts; however, the results tend to be more subtle and temporary compared with full surgical face lifts.[8,9] Joining the growing trend, surgeons are offering variations of face lifts under tumescent local anesthesia to achieve a more voluminous, youthful appearance.

When opting for the balanced aesthetic results of a face lift, there are multiple variations to consider: skin flaps, superficial musculoaponeurotic system (SMAS) flaps, composite flaps, deep plane face lifts, and subperiosteal face lifts.[10] Dissection in a traditional low SMAS face lift often neglects adequate release of the deep zygomaticus and masseteric ligaments, limiting aesthetic results in the midface, nasolabial folds, and jowls.[11–14] To address these shortcomings, surgeons have engineered techniques such as the deep plane face lift, which releases these ligaments deep to the SMAS and allows lifting of a composite flap, resulting in harmonious facial and cervical rejuvenation.[10,15]

As publications continue to prove the advantages of performing cosmetic surgery with minimal sedation, surgeons are reluctant to offer procedures involving deeper anatomical structures, such as the deep plane face lift.[16] Due to the intricate anatomy of the facial nerve and the manipulation of structures deep to the SMAS, it is falsely believed that this procedure poses too great a risk for injury and is safer under general anesthesia.[7,17] This study intended to demonstrate that adequate patient selection and anesthetic technique allow for invasive procedures such as the deep plane face lift to be safely performed under tumescent local anesthesia with minimal pain.

METHODS

Patient Selection

This retrospective study was approved by the Main Line Health (E-24-5410) and Advarra (Pro00077384) institutional review boards. Patients were identified through an extensive chart review as individuals who had undergone a deep plane face lift with tumescent local anesthesia by the senior surgeon in a Class A American Association for Accreditation of Ambulatory Surgery Facilities (QUAD A)–certified surgical facility between January 2020 and January 2024. Patients were excluded from the study if their procedure was performed under general anesthesia.

Takeaways

Question: Can procedures that manipulate the deep structures of the face and neck be safely implemented under tumescent local anesthesia?

Findings: With surgical expertise and a thorough understanding of local anatomy, the deep plane face lift can be performed safely under tumescent local anesthesia.

Meaning: Remarkable aesthetic outcomes can be safely achieved when performing the deep plane face lift under tumescent local anesthesia.

Patients underwent surgery under local anesthesia per patient request or for medically indicated reasons. No procedures were performed under the supervision of an anesthesiologist. No cases were converted from local anesthesia to general anesthesia. Patients are required to stop taking any oral hormones, aspirin, and vitamins 2 weeks before surgery. If a patient was identified as currently smoking, cessation was mandatory at least 2 weeks before surgery and was confirmed via urine cotinine test on the day of the operation.

Anesthesia

Approximately 1 hour before the start of surgery, intravenous antibiotics are started, and patients are administered diazepam, oxycodone, and ondansetron using patient-based dosing. Safe-dose calculations for subcutaneous injections and maximum lidocaine–tumescent are weight based (Table 1). Intraoperative local injectable solution is as follows: 20 mL of 1% lidocaine with epinephrine, 5 mL of 0.9% normal saline, 5 mL of 8.4% sodium bicarbonate, and 20 mL of 0.50% ropivacaine. No tranexamic acid (TXA) is used.

Surgical Technique

The patient is administered oral medications (a narcotic and a benzodiazepine) in the preoperative room approximately 1 hour before being transferred to the operating room. The surgical team consists of the

Table 1. Safe-dose Calculations for Subcutaneous Anesthetic Injections and Formula for Maximum Lidocaine Volume in Tumescent Solution

	Sample Calculation
Safe-dose calculations: in the subcutaneous level	
____ kg × 7 mg/kg = ____ mg/10mg/mL = ____ mL 1% lidocaine with epinephrine (maximum)	50 kg × 7 mg/kg = 350 mg/10mg/mL = 35 mL 1% lidocaine with epinephrine (maximum)
____ kg × 3 mg/kg = ____ mg/5mg/mL = ____ mL 0.5% ropivacaine (maximum)	50 kg × 3 mg/kg = 150 mg/5mg/mL = 30 mL 0.5% ropivacaine (maximum)
Maximum lidocaine–tumescent	
35 mg/kg × ___ kg = ____ mg maximum 1% lidocaine with epinephrine	35 mg/kg × 50 kg = 1750 mg maximum 1% lidocaine with epinephrine

surgeon, the scrub technician, a first assistant, and a circulating room nurse. The patient is then injected with 20 mL of 1% lidocaine with epinephrine and bicarbonate at the planned incision sites, the chin, and the periauricular region. Small stab incisions are made at the junctions along the superior helical rim, side burn region, ear lobule, and postauricular region. Following this, 250 mL of tumescent fluid is injected into the subcutaneous plane bilaterally. Intraoperatively, if the patient describes a tactile sensation, supplemental 0.25% ropivacaine is injected at the affected area.

The initial dissection is performed in the submental region with defatting in the preplatysmal plane. The platysma is then elevated on both the right and left sides, with subplatysmal fat excision and exploration extending to the submandibular gland (SMG). If the SMG is found to be prolapsing below the mandibular border, the capsule is entered, and the portion of the gland extending beneath the mandible is resected using bipolar cautery. If the patient is feeling any discomfort, additional ropivacaine is injected, and this immediately resolves their sensation. In the case of bleeding during partial SMG resection, electrocautery can be used to control the situation and achieve hemostasis. This is true with both tumescent and general anesthesia.

Attention is then turned to dissection in the preauricular space, starting with incisions into the subcutaneous tissue, followed by anterior dissection for 3 cm medial to the ear lobule. At this point, a blue marker is used to indicate a curvilinear path from the malar mound, across the mandible, and into the posterior neck. This marks the entry plane for dissection into the sub-SMAS layer of the midface, extending down to the mandibular retaining ligament, which is also released. Dissection releases the masseteric retaining ligament and the zygomaticus retaining ligament and continues anterior to the zygomaticus major muscle. (**See Video 1 [online]**, which displays a release of the retaining ligaments and mobilization of the malar mound.)

The dissection is then carried superiorly underneath the orbicularis oculi muscle; this is performed with direct visualization and blunt dissection with the Trepsat. For full release of the retaining ligaments, direct tactile sensation and visualization with 2.5× magnification is used to differentiate between retaining ligaments and facial nerves. (**See Video 2 [online]**, which displays the dissection technique using the Trepsat.) There is proprioceptive feedback when dissecting along the facial motor nerves, which aids in the complete release of ligaments and the protection of nerves. If the patient notes any discomfort or pain, additional ropivacaine is injected. The dissection proceeds inferiorly in the subplatysmal plane, crossing the lateral border of the platysma, which is elevated down to the neck. Attention is then turned back to perform the platysmaplasty in the central neck. (**See Video 3 [online]**, which depicts the platysmaplasty.) The SMAS is elevated and inset using a 3-0 PDS suture, securing it to the temporal fascia. The elevated platysma muscle at the angle of the mandible is then inset to the mastoid crevasse with a 2-0 Prolene suture. No drains are used. The incisions are closed with absorbable 4-0 Monocryl sutures. Progressive, hemostatic net sutures are placed using 4-0 Monocryl, continuing from the midface into the neck region.

Postoperative Care

After surgery, the patient's head is wrapped with abdominal pads, Kerlix, and an ACE elastic wrap with moderate pressure set by the senior surgeon. The patient is advised to keep the wrap in place for approximately 1 week and change it daily. Hemostatic net sutures are typically removed in the clinic around 3 days postsurgery. Patients are instructed to return for weekly follow-up appointments for the first month after the procedure.

Statistical Analysis

The data collected from patients' electronic medical records included total volume of tumescent anesthesia, length of procedure, postoperative complications including time of onset, and concomitant procedures. Additionally, patient sex, age at the time of surgery, body mass index, and comorbidities (specifically weight, smoking status, and coagulopathies) were collected. A descriptive analysis of patient demographics and surgical outcomes was performed using Microsoft Excel data sheets (Microsoft Corporation, Redmond, WA). The primary outcome measured was postoperative complications occurring within 1 month of surgery. Complications were defined as wound dehiscence, cyst formation, fat necrosis, temporary neuropraxia, hematoma, seroma (fluid collection >20 mL), and wound infection.

RESULTS

Demographics

A total of 200 patients were analyzed in this study, 180 (90.0%) were women and 20 (10.0%) were men (Table 2). The average patient age was 61.8 (±8.7) years, ranging from 41 to 85 years. The average weight at the time of surgery was 148.8 (±30.4) lbs with a range of 92–240 lbs. The mean body mass index was 24.7 (±4.2) kg/m^2 with a range of 16.8–36.3 kg/m^2. The mean volume of tumescent administered was 531.2 (±144.5) mL with a range of 140–1100 mL. Procedure length was measured as the time from initial incision to closure, with a mean duration of 249.8 (±58.7) minutes and a range of 104–437 minutes. The average time from administration of preoperative pain medication to the initial injection of local anesthesia was 47.0 (±23.0) minutes, with a range of 10–145 minutes. The average time from the postanesthesia care unit to discharge was 28.0 (±17.9) minutes, ranging from 4 to 120 minutes. Twenty-two (11.0%) of the patients self-identified as having formerly smoked, 4 (2.0%) as currently smoking, and 149 (74.5%) as having never smoked. Patients who identified as currently smoking were instructed to quit at least 2 weeks before surgery. Cessation was confirmed on the day of surgery via urine cotinine testing.

Table 2. Descriptive Analysis of Demographics and Intraoperative Measures

Age, y	
Mean ± SD	61.8 ± 8.7
Range	41–85
Weight, lbs	
Mean ± SD	148.8 ± 30.4
Range	92–240
Body mass index, kg/m^2	
Mean ± SD	24.7 ± 4.2
Range	16.8–36.3
Total volume of tumescent, mL	
Mean ± SD	531.2 ± 144.5
Range	140–1100
Procedure length, min	
Mean ± SD	249.8 ± 58.7
Range	104–437
Time from preoperative medications to local injection, min	
Mean ± SD	47.0 ± 23.0
Range	10–145
Time from PACU to discharge, min	
Mean ± SD	28.0 ± 17.9
Range	4–120

PACU, Postanesthesia care unit.

Table 3. Analysis of Postoperative Complications

Complications, n (%)	No. Patients, 17 (8.5%)
Wound infection	4 (2.0%)
Hematoma	4 (2.0%)
Skin necrosis	3 (1.5%)
Temporary neuropraxia	2 (1.0%)
Seroma	2 (1.0%)
Wound dehiscence	1 (0.5%)
Cyst	1 (0.5%)

Seroma was defined as any fluid collection >20 mL.

Complications

Of the 200 patients reviewed, 17 (8.5%) experienced complications postoperatively; there were 0 mortalities (Table 3). No patients required revision surgery within 1 year postoperatively. The most common complications were wound infection and hematoma. Four (2.0%) of the patients developed a wound infection postoperatively. Each patient was treated with an appropriate course of antibiotics, and the infection resolved with no additional sequelae. Four (2.0%) patients developed a postoperative hematoma, which was drained in the clinic using a 16G needle. Three (1.5%) patients experienced small areas (>3 mm) of skin necrosis in the retroauricular region. Two (1.0%) patients developed temporary neuropraxia, which was treated with botulinum toxin-A for symmetry and resolved within 3 weeks. These patients healed with no additional complications. There were no cases of lidocaine toxicity. No permanent motor nerve damage, xerostomia, or sialoceles were reported.

Additional Procedures

A total of 190 (95.0%) patients underwent concomitant procedures. The most common procedure performed was an open neck lift, with 170 (85.0%) patients receiving this surgery (Table 4). The second most common procedure was bilateral blepharoplasty with 45 (22.5%) patients undergoing this operation.

Table 4. List of Concomitant Procedures

Concomitant Procedure Rate, n (%)	No. Patients, 190 (95.0%)
Open neck lift	170 (85.0%)
Bilateral upper and/or lower blepharoplasty	45 (22.5%)
SMG excision	21 (10.5%)
LaMiNa procedure	12 (6.0%)
Brow lift	12 (6.0%)
Facial fat grafting	11 (5.5%)
Upper lip lift	6 (3.0%)
Canthopexy	3 (1.5%)
Rhinoplasty	1 (0.5%)
Lesion excision	1 (0.5%)

LaMiNa, laser, microneedling, and nanofat first described by Dr. R. Brannon Claytor.

DISCUSSION

The perfect approach to a face lift for the treatment of the gravitational effects of aging remains a debate among surgeons.[12,18] Since 1916, the face lift has been performed by applying lifting forces to the lower face and neck in the opposite direction of the aging vectors to create a harmonious, youthful appearance.[19] With time, techniques have evolved to include the SMAS, and a more profound comprehension of SMAS anatomy has allowed surgeons to lift the deep tissues of the face without damaging the underlying neurovasculature, thus offering safe, balanced, and long-lasting solutions to the aging face.[19–21]

The most commonly used face lift techniques are imbrication or plication of the SMAS and suture suspension.[19,22] Though effective, these maneuvers have a limited impact on the midface and provide no improvement to the nasolabial region, as they fail to release the masseteric and zygomaticus ligaments deep to the SMAS, preventing upward advancement of the malar and nasolabial regions.[15,19] Failure to release these ligaments restricts vertical redraping of the skin, which can result in the “wind swept” look and often results in a revision operation.[23] Dissection in the deep plane permits surgical release of both the masseteric and zygomaticus sub-SMAS ligaments, leading to harmonious elevation of the midface, cheek, and lower face, and eliminates the need for a separate midface lift procedure.[19,24,25] The surgical approach used in this study involves dissection below the SMAS along a continuous strategic plane extending from the temporal region, including the orbicularis oculi muscle, to the midline of the neck to include the platysma. This allows for the release of the deep retaining ligaments while simultaneously protecting the facial nerve branches.[20] Through release of the retaining ligaments and continuous dissection through the deep plane, the skin flap remains a composite flap and can be pulled harmoniously in a superolateral vector, allowing for upward traction of the midface and treatment of jowling and midface descent. Furthermore, as dissection continues caudally along the trajectory of the platysma, the flap remains contiguous from the mid-cheek to the level of the cricoid cartilage, allowing for superolateral elevation of the cervical structures, simultaneously sharpening the jawline. This results in a youthful elevation of the cheeks, elimination of nasolabial folds, and a defined cervicomental angle (Fig. 1).

Though some approaches may include manipulation of the platysma, another limitation of the conventional face lift is its inability to address significant neck laxity and jowling, which can lead to a "curtain neck" deformity.[12] As women consider their jawline to be their most disliked feature of aging, addressing neck deformities while managing the face should not be overlooked during surgical planning.[26,27] We use the deep plane face lift to address the pitfalls of the traditional lift. By releasing the retaining ligaments deep to the SMAS and continuing dissection to release the superior border of the platysma at the level of the mandible, we are able to elevate the flap as a single unit in the superolateral vector, creating a natural, seamless contour to the neck, eliminating jowling, and reducing redundancy.

Another advantage of the deep plane dissection possibly contributing to our negligible reported rate of skin necrosis is the anatomical characteristics of the skin–SMAS composite flap. In the studied surgical procedure, a composite flap is created by following a more limited subcutaneous dissection in the deep facial plane and undermining the skin and the SMAS as a composite unit (skin–SMAS flap).[19,28] In addition to providing access for release of the deep retaining ligaments, this technique maintains excellent blood supply to the flap, preserves the natural characteristics of the skin, and reduces the risk of flap necrosis.[19,28] Additionally, preserving the natural link among the skin, orbicularis, malar fat, and platysma enables the entire flap to be pulled as a cohesive unit, resulting in a continuous, more balanced lift.[16]

Studies have illustrated the long-lasting, youthful results of the deep plane face lift, resulting in a rapid rise in popularity.[20] With the growing interest, the complications associated with the procedure have become more evident.[29] A common impediment holding surgeons back from performing the deep plane face lift is the perceived heightened risk of facial nerve injury.[30] This is a valid concern as disruption can result in serious facial defects as the facial nerve innervates the mimetic muscles of the face.[31,32] However, the facial nerve runs deep to the SMAS and is protected by an overlying layer of deep fascia.[20,33] Therefore, with a true understanding of the anatomy of the nerve and deliberate, careful blunt dissection, there is minimal risk of compromising the nerve.[20,34] Reportedly, nerve injury accounts for 0.7%–2.5% of complications secondary to the deep plane face lift.[32] Here, we report a rate

Fig. 1. A 56-year-old woman shown preoperatively and 3-months status post deep plane face lift with open neck lift under tumescent local anesthesia. A–C, Preoperative. D–F, Postoperative.

of 1.0% temporary neuropraxia and no cases of permanent nerve injury.

Our relatively low rate of temporary neuropraxia may be attributed to performing the procedure under local anesthesia, as patients can provide a cautionary measure to the surgeon by indicating a pain or a "weird sensation" when in close proximity to the nerve. The facial nerve contains both motor and sensory fibers; the parasympathetic and sensory nerves are bound together in a fascial sheath known as the "nervus intermedius."[35] Because of the combined sensory and motor capabilities of the nerve, when stimulated, the nerve sends signals to both the motor nuclei and the sensory and parasympathetic nuclei of the brain, indicating disruption.[32] This highlights a key advantage of performing the procedure under tumescent local anesthesia, as it guides the dissection and allows the surgeon to better visualize the anatomy of each patient's unique facial nerve plexus.

Because the patient can verbalize their pain or even a sensation under tumescent local anesthesia, unlike with general anesthesia, the operating team is better able to control intraoperative pain levels, leading to reduced fluctuations in blood pressure and heart rate. Real-time proprioceptive feedback allows for immediate injection of local anesthetic, resulting in prompt pain control, which has been shown to reduce postoperative complications such as hematoma.[32,36–38]

Likely a result of the high vascularity and surgical trauma, bleeding and hematoma are the most common complications after a face lift, with the literature reporting an incidence ranging from 0.2% to 8% and hypertension being a known risk factor.[37] Resulting mitigation measures include strict monitoring of perioperative blood pressure, compression devices, drains, tissue sealants, wetting solution infiltration, and TXA.[38] Though these methods have proven effective, they are not without consequences and can lead to additional complications. By using local anesthesia, patients exhibit reduced perioperative anxiety and overall perioperative pain, resulting in a reduction of blood pressure throughout the entire surgical and recovery process.[5,6] In the studied procedure, the senior surgeon does not require a perioperative blood pressure less than 120 mm Hg and does not use TXA, tissue sealant, or drains. Patients are treated based on reported symptoms rather than a specific blood pressure value. No intravenous blood pressure modification drugs are used at all. We report a hematoma rate of 2.0%, on par with the published series.[39] We have observed a decreased frequency of blood pressure fluctuations during and after surgery. We hypothesize that this is a direct result of the physiological and psychological benefits of performing the procedure under tumescent local anesthesia.

An additional advantage of tumescent local anesthesia is an expedited postoperative recovery period. A potential complication of general anesthesia is acute postoperative hypertension, which likely occurs within the first 10–20 minutes upon waking; however, the risk can last up to 48 hours, not only increasing the risk of hematoma but often requiring patients to stay in the hospital for additional monitoring.[40,41] This drawback is eliminated when the procedure is performed under local anesthesia. Our patients are relaxed and comfortable following the procedure, and most patients are discharged within an hour, as evidenced by an average postanesthesia care unit time of 28.0 minutes.

There are multiple limitations to this study worth considering. This is a retrospective study with a small cohort comprised of 90.0% female patients. There was no control group for outcome comparison, and no perioperative pain analysis was performed to compare the results with procedures performed under general anesthesia. Our report presents results from a single practice, examining 1 experienced surgeon's surgical techniques. It does not suggest all surgeons are necessarily qualified to safely adopt the proposed methodology until further controlled, multicenter, multisurgeon studies are conducted to validate or refute the results.

CONCLUSIONS

When the deep plane face lift is chosen as the preferred approach to address facial aging, anatomical and surgical expertise make it possible to perform the procedure under tumescent local anesthesia, which can enhance patient outcomes. The studied surgical technique releases the zygomaticus and masseteric ligaments beneath the SMAS, allowing for superior and longer lasting elevation of the midface and neck when compared with conventional approaches. We demonstrate that the deep plane face lift under tumescent local anesthesia can be safely performed with minimal complications.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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