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## CHAPTER 11.1

# Facial Cosmetic Surgery

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## Introduction to Cosmetic Facial Surgery

The presenting symptoms of the aging face are predictable, based on the effects of gravity, soft tissue atrophy, facial expression, ultraviolet radiation exposure, and connective tissue changes. Patients present with concerns about appearing tired, angry, or aged. They also may have functional difficulties, such as difficulty breathing or visual field obstruction due to drooping brows or eyelids. Other common complaints are wrinkles around the eyes and mouth, and a sagging or fatty chin and neck.

Cosmetic facial surgery aims to rejuvenate and restore the facial form by surgical manipulation of the hard and soft tissues. The techniques used involve any or all of the following: soft tissue release, resection, plication, and resuspension.

Facial aging takes place simultaneously in all areas of the face and neck; combined procedures are not uncommon. Generally in combined procedures, a browlift would precede a necklift, followed by a facelift. Blepharoplasty procedures can be performed at different times in the surgical scheme, because of their effect on eyelid tissue and brow posture. A rhinoplasty ideally is reserved for last, as it can cause bleeding and swelling that can obscure other facial surgical fields.

## Facelift and Necklift

### Surgical Considerations

#### Facelift (or Meloplasty or Rhytidectomy)

**Description:** **Facelifts** and **midface lifts** are procedures to rejuvenate the face by surgical manipulation of the soft tissues between the inferior orbital rim and the inferior border of the mandible. The lips and nose are generally unaffected. Many types of “facelift” procedures have been developed to address the diverse challenges of facial aging and rejuvenation. Traditional facelift procedures took place in the subcutaneous plane, with some skin resection. Today, three planes of dissection are used ([Fig. 11.1-1](#)).

**Subcutaneous dissection** continues to be popular, traversing the adipose tissue below the skin and many of the vessels supplying the skin. The **subSMAS** technique develops the plane between the superficial musculoaponeurotic system of the face (SMAS) and the parotid gland. Finally, **subperiosteal dissections** (midface lifts) have become popular, due to the decreased risk of postoperative hematomas. Combinations of these dissection planes also have been described. More recently, greater attention has been paid to minimal access techniques. Surgeries such as the minimal access cranial suspension lift, as well as adjunctive procedures such as the barbed suture lift, are being performed more frequently.

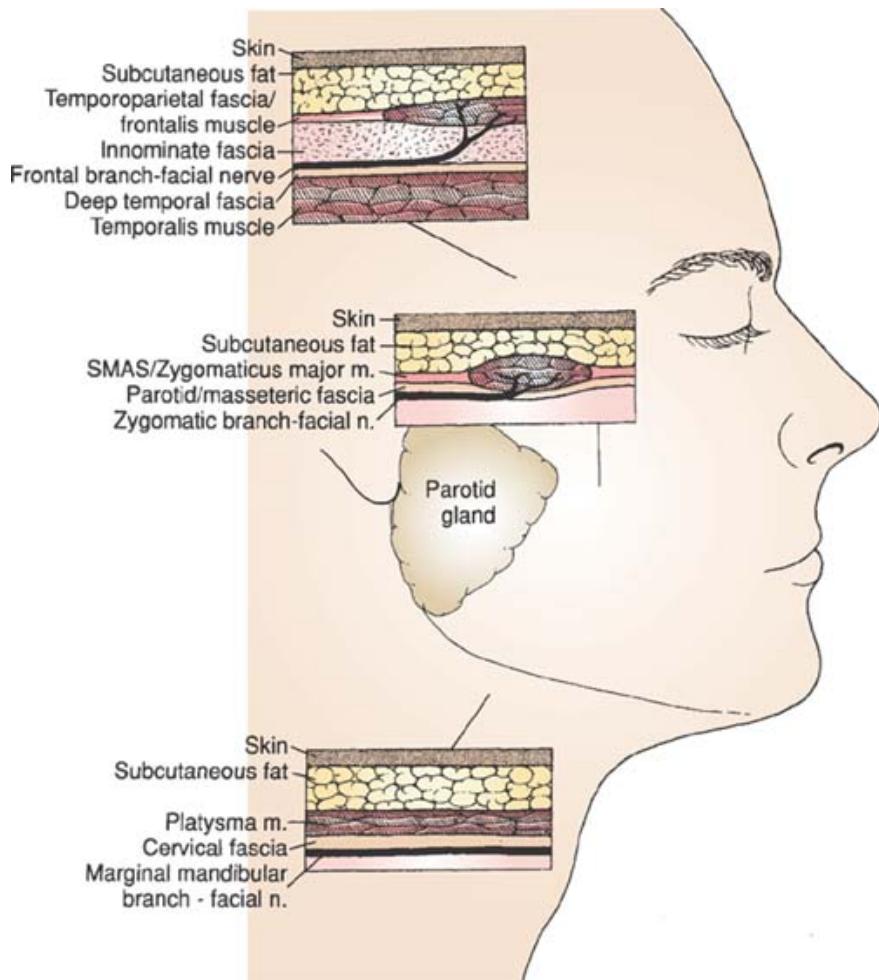
Local anesthetics with epinephrine are injected presurgically for the various procedures. A number of subcutaneous infiltration mixtures may be used, including one described by **Klein** that consists of NS 1,000 mL with 1.0 mL epinephrine (1:1000) and 50 mL of 1% lidocaine  $\pm$  12.5 mL of 8.5% sodium bicarbonate solution. It has been shown that with the use of this mixture, 5–7 times the traditionally accepted maximum dose of lidocaine with epinephrine can be injected safely into the subcutaneous space. Not only does this solution provide hemostasis and hydrodissection, but decreased operative time and excellent perioperative analgesia also have been attributed to its use.

Traditional incisions typically are made in the preauricular region with temporal and postauricular scalp extensions. The approaches for the subcutaneous and SMAS techniques resemble those used for bilateral facial palsy and parotid gland operations. The midface procedures may be carried out through intraoral, temporal, and/or lower-lid incisions and may be combined with other facelift procedures.



A typical facelift may begin with subcutaneous dissection of the facial skin flap (Fig. 11.1-2) on one side, with meticulous hemostasis accomplished with bipolar electrocautery. The SMAS layer can then be mobilized and resuspended. Some surgeons continue on the same side with skin resection and closure before beginning on the other side, while others temporarily pack the first side and perform an identical procedure on the opposite side. In the latter case, a second look for bleeding is made on each side after a waiting period.

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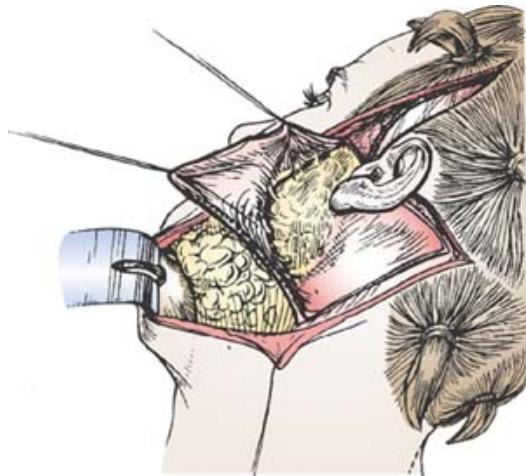
**Figure 11.1-1. 1.** Anatomic layers of the face. Although the names vary, the arrangement persists, regardless of the area of the face. The facial nerve (CN VII) branches innervate their respective muscles of the SMAS layer via the deep surfaces. (Reproduced with permission from Thorne CHM, Aston SJ: Aesthetic surgery of the aging face. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)

Hematoma is the most common complication of facelift surgery. Because hypertension is the most frequently encountered medical condition in the age group that typically presents for facelift, perioperative hypertension must be anticipated and treated preemptively to avoid development of hematoma. The risk is highest in male patients, perhaps due to increased perfusion of the bearded region, hormonal gender differences, or increased sebaceous gland density. Commonly used salicylates and other NSAIDS are contraindicated in the immediate preoperative period (i.e., within 10 days of surgery).

Smoking also has been shown to be detrimental to facelift results, especially with regard to skin flap survival. Ideally, patients should not smoke for two weeks before and after surgery.

One of the least desirable complications is injury to the facial nerve, which can produce a disastrous result following an elective cosmetic surgery. Many surgeons prefer that no paralytics be used during the procedure to allow for careful monitoring of facial nerve function.

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**Figure 11.1-2. 2.** Dissection of SMAS/platysma flap. If a composite rhytidectomy is performed, the same plane of dissection is used. If SMAS dissection extends to the zygomaticus major muscle, it is termed “extended.” (Reproduced with permission from Thorne CHM, Aston SJ: Aesthetic surgery of the aging face. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)

## Necklift

**Description:** Necklift is the rejuvenation of the area from the inferior mandibular margin to the clavicles. This procedure often is combined with facelift procedures to sharpen the chin and smooth the anterior neck (i.e., improve the cervicomental angle). It usually is achieved by extending the facelift dissection inferiorly through the preauricular incision. A small submental incision may also be used to allow for **submental liposuction, lipectomy, or platysma muscle modifications** (plication, suspension, resection, or transection techniques).<sup>8</sup> Some platysmal suspension techniques require the facelift incisions to remain open with continuity in the subcutaneous plane laterally.

**Variant procedures or approaches:** **Laser resurfacing** (see [p. 1080](#) and [p. 1512](#)), especially in the perioral and periorbital regions; **blepharoplasty** and **browlift** (see [p. 1071](#)) are common adjunct procedures.

**Usual preop diagnosis:** Facelift: facial rhytids (wrinkles/creases); solar or senile elastosis; jowling; deep nasolabial folds; tear troughs; nasojugal folds; malar bags. Necklift: “turkey gobblers” neck; platysmal bands; cervical laxity; cervical rhytids

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## Summary of Procedures

	Facelift	Necklift	Midface lift
<b>Position</b>	Supine, reverse Trendelenburg		
<b>Incision</b>	Preauricular, scalp	Extension of facelift incision + Intraoral ± subciliary or submental incision.	
<b>Special instrumentation</b>	Infiltration equipment for super wet techniques; endoscopic equipment (more frequent with brow lifts) Oral intubation; ability to move ETT side-to-side. Watch for: oculocardiac reflex (OCR), retrobulbar hematoma with periorbital approaches. If laser is used:	± liposuction instrumentation.	-



<b>Unique considerations</b>	<ul style="list-style-type: none"> <li>• Special fire-retardant ETT and drapes</li> <li>• Laser eye protection for all in room</li> <li>• Cannula-administered O<sub>2</sub> should be far away from laser (fire safety).</li> <li>• Smoke evacuation system (See <a href="#">Facial Laser Resurfacing, p. 1080.</a>)</li> </ul> <p>Infiltration of large volumes of local with epinephrine in facelift and liposuction procedures. Cefazolin 1 g iv, (<math>\pm</math> methylprednisolone 125 mg iv). Antivirals periop if laser used (e.g., acyclovir 2,400 mg <math>\times</math> 2 d preop and 14 d postop)</p>	—
<b>Antibiotics + other meds</b>	—	—
<b>Surgical time</b>	4–6 h Trendelenburg for final hemostasis $\pm$ drains Some surgeons prefer gentle $\uparrow$ in BP during hemostasis. Tissue thrombin agents may be—used between the elevated flaps.	1–2 h —
<b>Closing considerations</b>	Sensory nerve blocks by surgeon $\pm$ Full head/face wrap before patient awakens Gentle, nonagitated awakening to prevent sudden $\uparrow$ BP.	— —
<b>EBL</b>	100–200 mL	2–4 h — —
<b>Postop care</b>	Monitor for hematoma: most common complaint is pain; therefore, r/o hematoma before increased analgesia or sedation. Lightly compressive dressing, $\pm$ drains: both removed at 24 h. 2 wk no aspirin, moderate activity	—
<b>Mortality</b>	Rare Early hematoma: <ul style="list-style-type: none"> <li>• Large expanding: 1–15% (return to OR)</li> <li>• Small (&gt; 30 mL): 10–15% (<math>\pm</math> aspiration in office)</li> </ul> Late hematoma (average = 9 d postop; 2° to exertion or aspirin use; from superficial temporal vessels) Infection: 0–0.33% Nerve injury:	Very rare —

	<ul style="list-style-type: none"><li>• Motor (temporal/marginal mandibular branches)</li><li>• Temporary: 0.1–2.6%</li><li>• Permanent: 0–0.66%</li><li>• Motor (spinal accessory nerve): Rare</li></ul>	Very rare
	Sensory injury:	—
	<ul style="list-style-type: none"><li>• Great auricular nerve → ↓ sensation in lower of ear ± painful neuromas or paresthesias.</li><li>• Lesser occipital nerve painful → neuroma.</li></ul>	—
<b>Morbidity</b>	Alopecia: 0.4% (most temporary, along the incision)	—
	Skin slough: 14% (especially in retroauricular area) (12.5 × greater in smokers)	—
	Dehiscence: 0.1–0.35%	—
	Parotid cysts: Rare	—
	Poor cosmetic result:	—
	<ul style="list-style-type: none"><li>• Hyperpigmentation</li><li>• Telangiectasia (pre-existing lesions may worsen)</li><li>• Hypertrophic scarring</li><li>• Keloids: Very rare</li><li>• "Pixie" (pulled-down earlobe) deformity (technique-dependent)</li><li>• Hairline shifts</li></ul>	—
	Ectropion (midface, approached via lid incisions only): Up to 3%	—
<b>Pain score</b>	3	3

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## Patient Population Characteristics

<b>Age range</b>	> 35 yr
<b>Male:Female</b>	1:9 to 1:5 (increased from 1:17 in the 1970s.)
<b>Incidence</b>	104,055 facelift procedures in the United States (2006); sixth most common cosmetic plastic surgery procedure
<b>Etiology</b>	Facial rhytids 2° solar elastosis, senile elastosis, facial expression
<b>Associated conditions</b>	Cancers of the skin (basal cell carcinoma, squamous cell carcinoma and precursors, and melanoma), in solar elastosis cases, especially fair-skinned patients



## Anesthetic Considerations

See [Anesthetic Considerations following Browlift and Blepharoplasty, p. 1075.](#)

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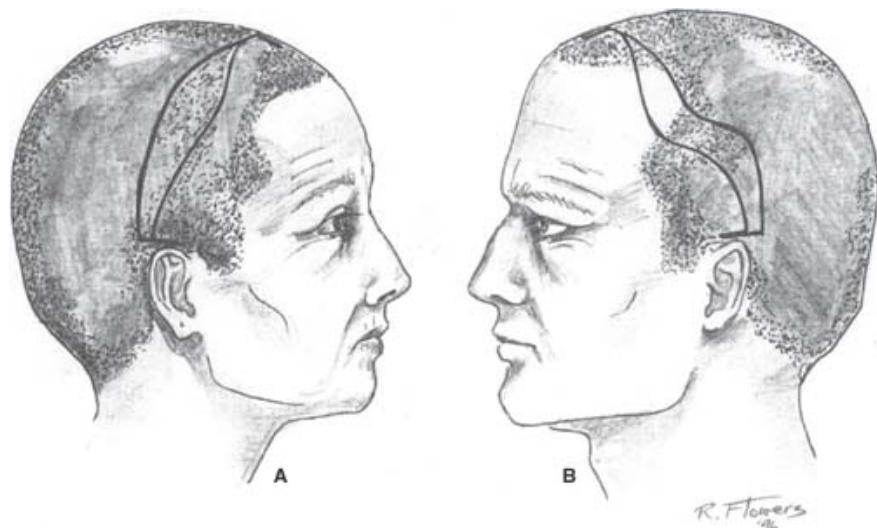
## Browlift and Blepharoplasty

### Surgical Considerations

#### Browlift (or Forehead Lift)

**Description:** Browlift is the resuspension of the brows and elimination of upper facial rhytids to restore the youthful appearance of the upper face. This procedure has a significant effect on the results of an upper blepharoplasty, with which it is frequently paired. Patients presenting for browlift usually have specific concerns about lateral brow hooding, forehead wrinkles, and glabellar creases that give them an angry appearance.

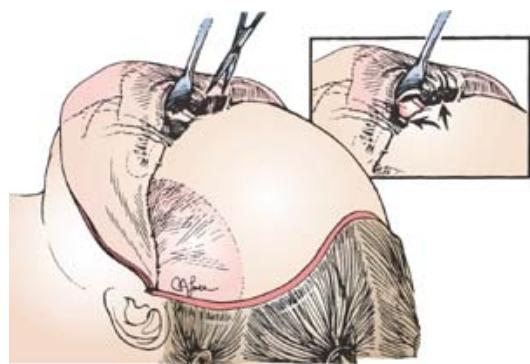
Like facelift procedures, browlifts have been performed in the subcutaneous plane, but the relatively avascular subgaleal and subperiosteal planes are more commonly used. The subgaleal and subperiosteal approaches have become more popular with the incorporation of **endoscopic techniques**. The incision may be a complete bicoronal or three to five small, interrupted access incisions along the hair line or within the hair-bearing scalp ([Fig. 11.1-3](#)). In the open technique, the bicoronal flap is dissected off the upper face ([Fig. 11.1-4](#)). The brows are elevated by **scalp resuspension ± resection**. Closure of the scalp helps maintain the resuspended position. The soft tissues may also be fixated directly to the cranium with screws or resorbable fixation devices and sutured to the temporal fascia to maintain (Print pagebreak 1072) their new positions. Release of the periosteum along the superior orbital rims is a prerequisite to adequate resuspension when using a subperiosteal approach. Elimination of the upper facial rhytids (i.e., glabellar wrinkles) is achieved by resection of the medial brow musculature (corrugator and procerus) from beneath the elevated flap. Muscular bleeding is controlled with bipolar electrocautery.



**Figure 11.1-3.** 3. Incisions for forehead/brow lifting. Consistent blepharoplasty results demand appropriate frontal lifting technique. **A:** Standard coronal incision. **B:** Male and female balding incision. Note the posterior displacement of the ascending incision for maximum camouflage. Hair perimeter incisions are rarely necessary. The central brow corrects nicely from only parietotemporal scalp excisions (after appropriate supraperiosteal release). (Reproduced with

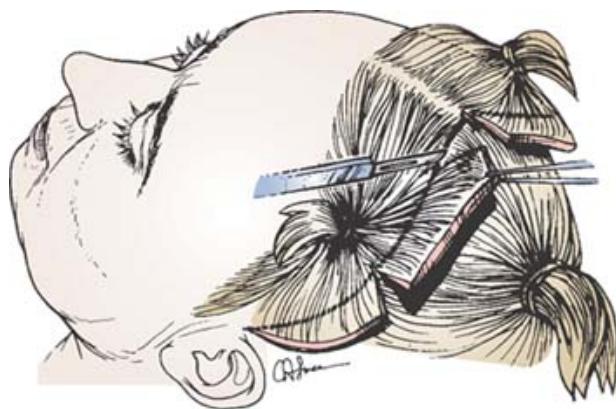


permission from Flowers RS, DuVal C: Blepharoplasty and periorbital aesthetic surgery. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)



**Figure 11.1-4.** 4. Exposure after subgaleal, suprperiosteal dissection of the forehead. The supraorbital nerves can be seen easily, but the supratrochlear nerves are more superficial and are hidden by the corrugator muscles. Scissors are used to tease through the corrugator muscles to locate the supratrochlear nerve branches. The muscle is then aggressively resected, preserving the sensory branches. (Reproduced with permission from Thorne CHM, Aston SJ: Aesthetic surgery of the aging face. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)

**Variant procedures or approaches:** The browlift has become the facial plastic surgery procedure most adaptable to the techniques of **endoscopy**. Multiple smaller (1–1.5 inch) incisions are used within the scalp for access, (*Print pagebreak 1073*) (*Print pagebreak 1074*) (*Print pagebreak 1075*) and small, elliptical excisions also may be used to achieve the desired effect. The muscle resection is accomplished endoscopically with very small biting forceps from beneath the flap.



**Figure 11.1-5.** 5. Redraping the forehead/brow using "key" fixation sutures. Maximal tension is placed laterally to elevate the lateral brow to a greater extent than the medial brow. (Reproduced with permission from Thorne CHM, Aston SJ: Aesthetic surgery of the aging face. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)

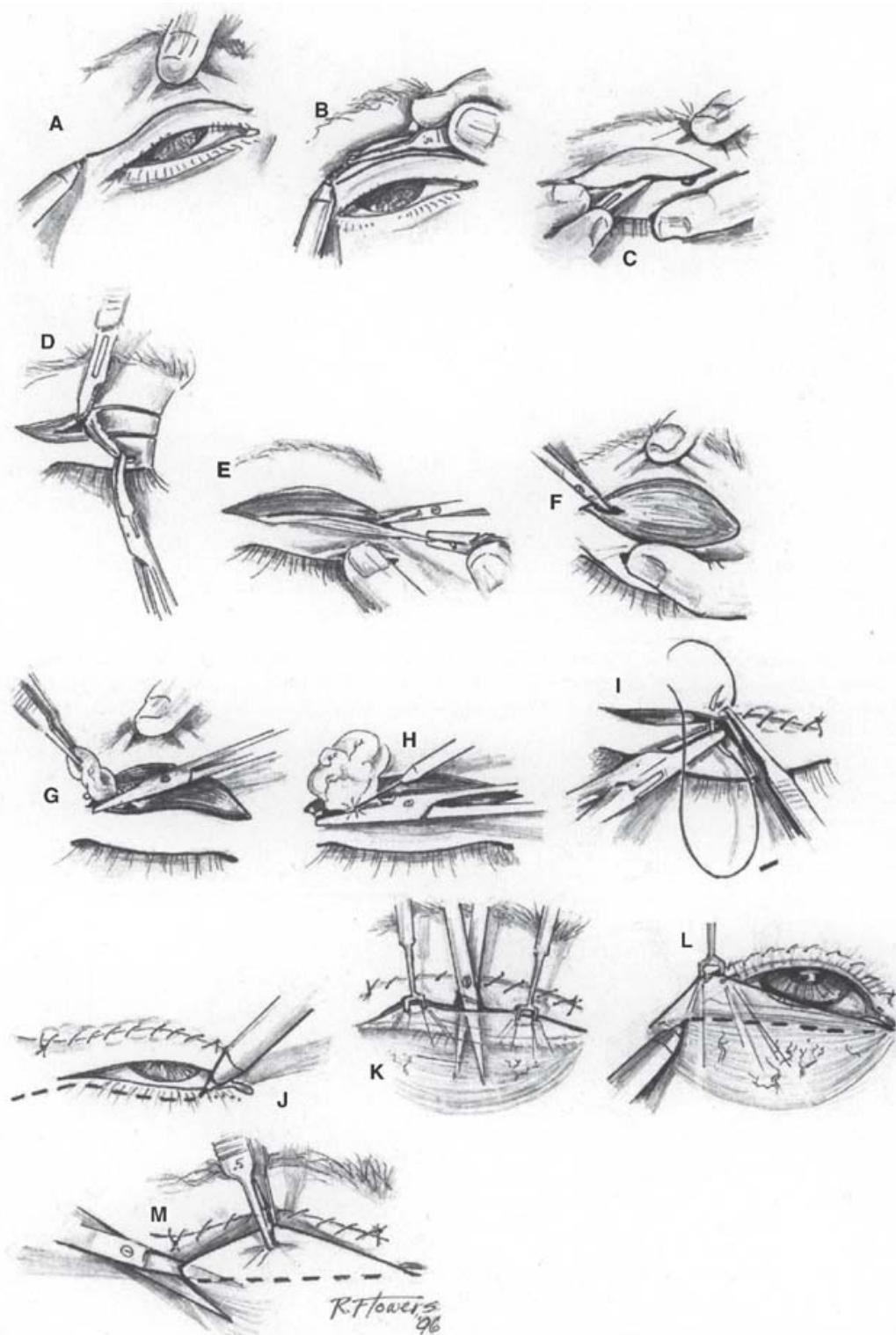
## Summary of Procedures

	Browlift	Blepharoplasty
<b>Position</b>	Supine; table rotated 90 or 180°	
<b>Incision</b>	Hairline, coronal; multiple scalp for endoscopic procedure	Upper: tarsal fold; lower: subciliary, transconjunctival
<b>Special instrumentation</b>	Fibrin glue, screws or resorbable fixation devices for suspension; endoscopic equipment	Bipolar electrocautery
<b>Unique considerations</b>	Local anesthetic with epinephrine	Retrobulbar hematoma; OCR; local anesthetic with epinephrine
<b>Antibiotics</b>	Cefazolin 1 g iv ± methylprednisolone 125 mg iv	

<b>Surgical time</b>	1–2 h	
<b>Closing considerations</b>	Place dressing before arousing patient. Gentle arousal from anesthesia ( $\uparrow$ in BP or emesis → risk of hematoma)	No dressing (ointment)
<b>EBL</b>	50 mL	Minimal
<b>Postop care</b>	PACU → room/home Lightly compressive dressing Head of bed elevated	Cool packs  Ophthalmic lubricant Vision checks
<b>Mortality</b>	Rare	
	Hematoma: Rare Alopecia: Rare (more common with bicoronal approach) Infection: < 1%	— — —
<b>Morbidity</b>	Frontalis paralysis: Rare (usually transient) Poor cosmetic result Sensory nerve dysfunction Lagophthalmos	Blindness: Extremely rare Ectropion Entropion
<b>Pain score</b>	3	2–3

## Patient Population Characteristics

<b>Age range</b>	Most $\geq 35$ yr
<b>Male:Female</b>	Blepharoplasties: 1:4 Browlifts: 1:7.33
<b>Incidence</b>	Blepharoplasties: 233,200 (fourth most common cosmetic procedure in the United States, 2006) Browlifts: 55,525 (ninth most common cosmetic procedure in the United States, 2006)
<b>Etiology</b>	Facial rhytids secondary to solar elastosis, senile elastosis, facial expression, and increased muscle resting tone; Asian eyelids
<b>Associated conditions</b>	Cancers of the skin (basal cell carcinoma, squamous cell carcinoma and precursors, and melanoma) in solar elastosis cases, especially fair-skinned patients



**Figure 11.1-6. 6.** Traditional blepharoplasty technique. **A:** The caudal margin of the excision is marked and **(B)** the upper eyelid skin is pinched. Skin and muscle are excised **(C, D, E);** excess or herniated fat is removed from medial and lateral compartments **(F, G, H);** and the wound is closed **(I).** On the lower lid, the traditional approach is flap elevation, consisting of skin or skin with attached muscle **(J, K).** The skin is draped upward and outward so the surgeon can assess and remove excess skin **(L, M).** (Reproduced with permission from Flowers RS, DuVal C: Blepharoplasty and periorbital aesthetic surgery. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)

**Usual preop diagnosis:** Brow ptosis; brow droop; upper facial rhytids (wrinkles or creases)

### Blepharoplasty (or Lidlift)



**Description:** Blepharoplasty ([Fig. 11.1-6](#)), or lidlift, is the surgical rejuvenation of the periorbital region to eliminate the tired and aged appearance of the eyes. Westernizing the Asian eyelid also has become quite commonplace. Presenting complaints include excess lid skin, prominent periorbital fat, and absence of upper lid folds. Blepharoplasty can involve resection of skin, muscle (orbicularis oculi), and fat. Many patients presenting for this procedure will require a simultaneous browlift to re-establish the baseline position of the brows, revealing the true amount of upper-lid redundancy. Eyelid ptosis repair also can be achieved in the same surgery.

Although a seemingly benign procedure, the manipulation of periorbital fat can have very serious consequences. Retrobulbar hematoma and blindness can occur postoperatively, and the oculocardiac reflex (OCR) can complicate the intraoperative course with bradycardia and hypotension. This generally resolves with elimination of the stimulus.

Blepharoplasty, as an isolated procedure, is often performed with local anesthetic and intravenous sedation so that patients can open and close their eyes during the surgery. This helps to achieve a good result and decreases the risk of lagophthalmos, which is especially important if a ptosis repair is also planned.

**Variant Procedures or Approaches:** CO<sub>2</sub> laser blepharoplasty techniques have proven effective, but must be done under the safety parameters of eye protection and fire and burn prevention (see [p. 1080](#)). With this technique, the fat and skin resections are achieved with a laser, replacing the use of a scalpel. Using the laser to gain some of the skin tightening associated with blepharoplasty has also been described.

**Usual preop diagnosis:** Blepharochalasis; periorbital fat; blepharoptosis; dermatochalasis; supratarsal fold absence; Asian eyelid

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## Anesthetic Considerations

(Procedures covered: facelift, necklift; browlift, blepharoplasty)

### Preoperative

Cosmetic facial surgery is elective and should be performed preferably on ASA I or II patients. Often, several cosmetic procedures (including facial laser resurfacing) are performed during the same surgical session. A preop discussion (*Print pagebreak 1076*) with the surgical team is important to help define the anesthetic plan. The above procedures are predominantly done under GA in the hospital, but can also be done under MAC with local anesthesia.

#### Airway

A careful inspection of the airway should be performed. Surgeon may request intraop manipulation of the oral ETT from side-to-side.

#### Cardiovascular

A thorough cardiovascular evaluation should be performed, because HTN is the most common medical condition in this patient population. Many procedures involve the use of significant amounts of local anesthetic with epinephrine, placing the patient at higher risk for HTN, dysrhythmias, and coronary artery spasm. Additionally, consider patient suitability for the use of controlled, mild controlled ↓ BP (particularly the facelift patient).

#### Hematologic

**Tests:** ECG, if indicated from H&P.

for recent aspirin/NSAID use.

#### Laboratory

**Tests:** CBC, if indicated from H&P.

#### Premedication

Others tests as indicated from H&P.

Preop sedation with clonidine (adjunctive hypnotic and antihypertensive agent) or midazolam usually is appropriate. Preop steroids (dexamethasone 4–8 mg) also may be used to reduce postop pain and PONV, as well as swelling.

### Intraoperative

**Anesthetic technique:** Cases are predominantly done under GA, using an ETT or LMA, as appropriate. Several authors describe the use of a propofol/ketamine MAC or “dissociative anesthetic” in the office-based setting. There are varying descriptions of this technique, generally involving a propofol infusion with incremental ketamine boluses or infusion, resulting in elimination or significant reduction in the administration of iv opiates.

MAC with local anesthetic also is an option and may be advantageous for certain patients (e.g., with Hx of PONV) or for cases that benefit from a patient's intraop ability to follow commands (e.g., ptosis repair).

#### Induction

For those procedures done under GETA, a standard induction (see [p. B-2](#)) is appropriate. An oral RAE ETT may be used to minimize intrusion into the surgical field. For cases involving a laser, a shielded ETT manufactured for laser surgery should be used and the cuff filled with NS and methylene blue, rather than air. (Note: no cuffed ETT is 100% laser-proof; always use standard precautions.)

#### Maintenance

Standard maintenance (see [p. B-2](#)) with volatile anesthetic ± propofol infusion is appropriate in most cases. Muscle relaxation should be avoided in cases with facial nerve monitoring. Mild, controlled ↓ BP may be requested and used to facilitate hemostasis. HTN should be avoided and treated immediately if it occurs. Maintain anesthesia during application of head/face wrap.

#### Emergency

Antiemetic prophylaxis (e.g., ondansetron 4 mg iv) is recommended, as postop emesis greatly increases the likelihood of hematoma formation. Perform thorough oropharyngeal suctioning and ensure that all throat packing has been removed. A smooth emergence with no notable increase in



	BP is preferred.
	Blood loss generally minimal
<b>Blood and fluid requirements</b>	IV: 18 ga × 1 NS/LR @ 2–4 mL/kg/h
<b>Monitoring</b>	Standard monitors (see <a href="#">p. B-1</a> )
<b>Control of blood loss</b>	Local infiltration with epinephrine Surgical hemostasis Mild degree of ↓ BP
<b>Positioning</b>	and pad pressure points. Rotate OR table 90–180°. OCR
<b>Complications</b>	Local anesthetic toxicity Retrobulbar hematoma
	Scleral shields ± ophthalmic ointment Remove inciting stimulus. Consider atropine 0.5 mcg and deepening anesthetic.

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## Postoperative

<b>Complications</b>	PONV	Vigorous treatment of nausea is important.
<b>Pain management</b>	Local infiltration + iv/po narcotics, if needed	R/O expanding hematoma as cause of increasing pain.

## Suggested Readings

1. Aasboe V, Raeder JC, Groegaard B: Betamethasone reduces postoperative pain and nausea after ambulatory surgery. *Anesth Analg* 1998; 87:319–23.
2. Friedberg BL: Propofol ketamine anesthesia for cosmetic surgery in the office suite. *Int Anesthesiol Clin* 2003; 41(2):39–50.
3. Richard MJ, Skues MA, Jarvis AP, et al: Total iv anesthesia with propofol and alfentanil: dose requirements for propranolol and the effect of premedication with clonidine. *Br J Anaesth* 1990; 65:157–63.
4. Yoho RA, Romaine JJ, O'Neil D: Review of the liposuction, abdominoplasty, and face-lift mortality and morbidity risk literature. *Dermatol Surg* 2005; 31:733–43; Erratum in: *Dermatol Surg* 2005; 31(9 Pt 1):1158.

## Rhinoplasty

### Surgical Considerations

**Description:** Rhinoplasty, one of the greatest challenges of plastic surgery, is the surgical manipulation of the nasal form for aesthetic and/or functional improvement. In combination with nasal septal surgery, it is called **septorhinoplasty**. Common patient requests are for dorsal hump reduction and improved tip definition. Cosmetic surgery of the nose can be divided into four major types: **tip rhinoplasty**, **dorsal rhinoplasty**, **alarplasty**, and **septoplasty**, in addition to other ancillary procedures to enhance airway function.

**Tip and dorsal procedures** may be accomplished by either **reduction** or **augmentation**. Augmentation can be achieved with synthetic materials such as silicone, expanded fibrillated polytetrafluoroethylene polymer (Gore-Tex), porous polyethylene implants (Medpore), and hydroxyapatite. Cadaveric or autologous tissue (cartilage, bone, fascia, or dermis) also are utilized. Common donor sites for cartilage are the ear concha (via an anterior or posterior approach), the nasal septum (internal nasal approach), and the ribs. Bone harvest sites may include the outer table of cranium, the iliac crest, and the ribs. Dermal graft is commonly harvested from the groin and fascial graft harvest is often taken from the temporoparietal region. ([Table 11.1-1](#) shows the range of open and closed rhinoplasty techniques.)



A throat pack is useful to prevent aspiration or ingestion of blood, as significant blood pooling can occur in the naso/oropharynx area, especially with nasal osteotomies used to narrow or straighten the nasal dorsum. Cases where such pooling is expected are safer under GA with a throat pack. Often rhinoplasties are done with local or regional (nasociliary and infraorbital blocks) anesthesia with sedation. Vasoconstrictor-soaked nasal packs (cocaine vs epinephrine vs oxymetazoline) are placed before the first incision.

The decision of open versus closed technique is based on patient requirements and surgeon preference. An **open approach** will utilize a transcolumellar incision to allow elevation of a nasal skin flap and degloving of the lower alar cartilages for direct and wide exposure of the nasal framework. **Closed approaches** use intercartilaginous, intracartilaginous, infracartilaginous, rim, hemitransfixion, and transfixion incisions (all hidden within the nose).

A typical **closed rhinoplasty** (Fig. 11.1-7) begins with dorsal work through intercartilaginous incisions. The dorsum may be reduced using a scalpel and/or rasps beneath the undermined dorsal skin and periosteum. The septum is addressed as necessary through a hemitransfixion incision ( $\pm$  cartilage harvest). Tip reduction by scalpel or scissor resection of the lower alar cartilage  $\pm$  tip suture is next. Nasal osteotomies with an osteotome and mallet begin at the base of the nasal bones along the piriform aperture. Digital manipulation completes the fractures, and this is when most of the blood loss occurs. Dorsal and tip grafts are applied as necessary, with alar modifications made last. **Alar reduction** entails wedge resection of the lateral alar base and primary closure.

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**Table 11. 1-1.** Rhinoplasty Techniques

Open	Closed/Open	Closed
	Intercartilaginous/transfixion incisions	Transcartilaginous/transfixion incision
↓	↓	↓
Incisions/skin flap elevation	Skin elevation/extramucosal tunnels	Skin elevation/extramucosal tunnels
↓	↓	↓
Tip analysis/cephalic crura excision	Rasp bony hump/excise cartilaginous hump	Rasp bony hump/excise cartilage hump
↓	↓	↓
Extramucosal tunnels	Radix reduction	Radix reduction
↓	↓	↓
Dorsal modification	Check profile line/septal angle	Check profile line/septal angle
↓	↓	↓
Caudal septum/anterior nasal spine	Caudal septum/anterior nasal spine	Caudal septum/anterior nasal spine
↓	↓	↓
Septoplasty/harvest	Infracartilaginous/transcolumellar incisions	Septoplasty/harvest
↓	↓	↓
Osteotomies	Tip exposure and analysis	Infracartilaginous incisions
↓	↓	↓
Graft preparation	Septal correction/harvest	Alar cartilage delivery
↓	↓	↓
Definitive dorsum/spreader grafts	Osteotomies	Excision/incision/sutures
↓	↓	↓
Tip: Columella strut/tip sutures	Definitive dorsum/spreader grafts	Osteotomies
↓	↓	↓
Closure	Tip/columellar modification (excision/sutures/grafts)	Grafts (spreader/dorsum/columella/tip)
↓	↓	↓
Alar base modification	Closure	Closure
↓	↓	↓
Dressing/postop management	Alar base modification	Alar base modifications
	↓	↓
	Dressing	Dressing

Note: Only those steps appropriate for the individual case are performed.

Depending on the type of rhinoplasty performed, different dressings will be applied at the end of the procedure. When nasal bone



osteotomies are used, the patient will require a dorsal nasal splint ± bilateral nasal packing. Nasal packing is generally removed at 24–72 hours postoperatively. When septal manipulation is needed, nasal packing or some sort of septal splint may be placed. The packs are generally removed within three days, but the splints can be maintained much longer and the nasal airways kept patent with vasoconstrictor nasal sprays.

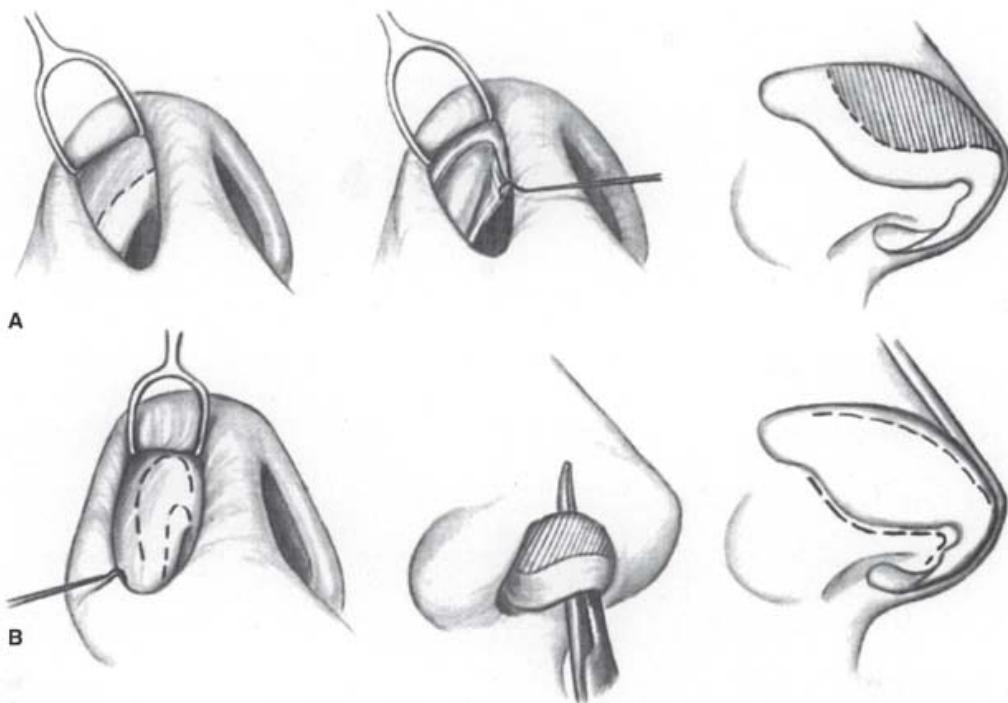
**Variant procedures or approaches:** Placement of a **columellar strut (cartilage graft)** and **release of the tip depressor muscle** often are achieved via intraoral vestibular incisions (behind the upper lip).

**Usual preop diagnosis:** Posttraumatic nasal deformity (including disordered breathing, “saddle nose,” crooked nose, septal deviation); developmental nasal deformities (bulbous tip, flat tip, drooping tip, broad dorsum, dorsal hump, alar widening, “Pinocchio nose”); congenital nasal malformation (cleft nasal deformities)

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## Summary of Procedures

<b>Position</b>	Supine, table may be rotated 180°. If GA: oral ETT toward foot of bed, shoulder roll, neck extended, scleral lubricant, shields
<b>Incision</b>	External vs internal nasal incisions
<b>Special instrumentation</b>	Headlight
<b>Unique considerations</b>	Throat pack for expected nasopharyngeal bleeding. Intranasal vasoconstrictors.
<b>Antibiotics</b>	Cefazolin 1 g iv
<b>Surgical time</b>	1–2.5 h
<b>Closing considerations</b>	Suction stomach via OG tube at the end of surgery. <b>Remove throat pack prior to extubation.</b> Internal and/or external nasal splints are placed for dressings. Tip rhinoplasty: 20 mL Dorsum with osteotomies: 75–150 mL Septoplasty: + 50 mL PACU → room (most patients are home the same day). Ensure minimal PONV; elevate head of bed; no pressure on nose (e.g., O <sub>2</sub> mask).
<b>EBL</b>	Rare
<b>Postop care</b>	Infection: > 1% Adverse cosmetic result: Alar notching Alar collapse Dorsal irregularity Asymmetry Tip droop Adverse functional result (i.e., poor airway) Septal perforation
<b>Mortality</b>	
<b>Morbidity</b>	
<b>Pain Score</b>	3 (4 with osteotomies)



**Figure 11.1-7. 7. Closed rhinoplasty. A:** Transcartilaginous approach using an intracartilaginous incision. **B:** Delivery approach, using a high intercartilaginous incision and a marginal incision to facilitate delivery of the lateral crura. (Reproduced with permission from Daniel RK: Rhinoplasty. In *Grabb & Smith's Plastic Surgery*, 5th edition. Aston SJ, Beasley RW, Thorne CHM, eds. Lippincott-Raven: 1997.)

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## Patient Population Characteristics

<b>Age Range</b>	Most $\geq$ 15 yr
<b>Male:Female<sup>1</sup></b>	1:1.7
<b>Incidence<sup>1</sup></b>	307,258 (third most common cosmetic procedure in the United States, 2006)
<b>Etiology</b>	Developmental; acquired (post-traumatic); congenital (see <a href="#">Secondary Cleft Lip and Nasal Surgery, p. 1418</a> ).
<b>Associated conditions</b>	Breathing difficulties; psychosocial issues (body dysmorphic disorder)

## Anesthetic Considerations

See [Anesthetic Considerations for Nasal and Sinus Surgery, p. 245](#).

## Suggested Readings

1. American Society of Plastic Surgeons web site: [www.plasticsurgery.org](http://www.plasticsurgery.org), 444 East Algonquin Rd, Arlington Heights, IL 60005-4664.
2. Becker DG, McLaughlin RB, Loevner LA, et al: The lateral osteotomy in rhinoplasty: clinical and radiographic rationale for osteotome selection. *Plast Reconstr Surg* 2000; 105(5): 1806–19.
3. Byrd HS, Salomon J, Flood J: Correction of the crooked nose. *Plast Reconstr Surg* 1998; 102(6):2148–57.



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11. Owsley TG, Taylor CO: The use of Gore-Tex for nasal augmentation: A retrospective analysis of 106 patients. *Plast Reconstr Surg* 1994; 94(2):241–50.
12. Sheen JH: Adjunctive techniques in rhinoplasty: harvesting cranial bone for nasal grafts. In *Video Perspectives in Plastic Surgery*. Quality Medical Publishing, St. Louis: 1989, 1–32.
13. Tebbetts JB: Shaping and positioning the nasal tip without structural disruption: A new, systematic approach. *Plast Reconstr Surg* 1994; 94(1):61–77.

Also see [References for Secondary Cleft Lip/Nasal Surgery, p. 1421](#).

## Otoplasty

See [Chapter 12.8 Surgery for Craniofacial Malformations, Otoplasty, p. 1423](#).

## Facial Laser Resurfacing

**Description:** Laser resurfacing is a technique by which a controlled burn is administered to the skin of the face with laser technology, creating a healing process which reduces the signs of aging or acne. **CO<sub>2</sub> laser resurfacing** is commonly used with facial cosmetic procedures. It is used widely for the periorbital and perioral creases and wrinkles not addressed by previously described facial cosmetic surgical techniques. Nerve blocks, local anesthesia, intravenous sedation, and GA are all possibilities for laser treatment. The choice of anesthetic depends more on the specific surgical procedures to be performed first, as the laser procedure is usually adjunctive and added at the end. Facial laser resurfacing is done frequently in an office-based setting (see [Chapter 14.0 Office-Based Procedures, p. 1512](#)). Because laser resurfacing is usually an adjunct to another facial cosmetic procedure, the following discussion pertains primarily to the unique set of **safety issues** that must be addressed in the OR.

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**Ocular Hazards:** These include direct and reflected injury to the eye. Everyone present, including the patient and all medical personnel, requires laser-specific (i.e., wavelength-specific) safety eyewear. Laser-specific scleral shields must be available for the patient in cases where the patient's eyewear would be in the operative field. Protective eyewear must be undamaged and have:

- Permanent labels with wavelength and optical density tolerance
- Side shields
- Damage threshold of > 10 sec



- No surface reflection
- Good fit
- Approval from the laser safety officer

**Fire and reflectivity hazards:** Many items used in the OR (e.g., drapes, sponges, plastic cannulas, etc.) are made of materials that can be fire hazards if not kept from interacting with the laser beam. Protection from fire and reflectivity is provided by:

- Having fire-retardant or moist draping
- Having water basin available
- Having a fire extinguisher readily available
- Avoiding all alcohol-containing prep solutions
- Avoiding use of plastic and rubber instruments (may melt or ignite)
- Using special fire-resistant ETTs or wet sponge protection for plastic ETTs to decrease the possibility of tube breach or ignition
- Avoiding open sources of O<sub>2</sub> (nasal cannulas, etc.)
- Avoiding metal or other reflective materials

**Airborne contaminants:** The laser destruction of cells releases carbon particles, microbials, DNA, and toxic fumes. Protection for the patient and medical personnel is provided by:

- Utilizing a smoke evacuation system 2 cm from created plume
- Wearing high-filtration masks. Note that these masks become less effective if moistened from perspiration during a long case; if the laser is to be used at the end of a case, changing masks before using the laser may be prudent.

## Anesthetic Considerations

See [Anesthetic Considerations following Browlift and Blepharoplasty, p. 1075](#), or [Office-Based Laser Skin Resurfacing, p. 1513](#).

## Suggested Readings

1. Alster TS, Apfelberg DB, eds: *Cosmetic Laser Surgery: A Practitioner's Guide*, 2nd edition. Wiley-Liss, New York: 1999.
2. Blakeley KR, Klein KW, White PF, et al: A total intravenous technique for outpatient facial laser resurfacing. *Anesth Analg* 1998; 87:827–9.