Blepharoplasty

SYNOPSIS

- Blepharoplasty is a vital part of facial rejuvenation. The traditional removal of tissue may or may not be the preferred approach when assessed in relation to modern cosmetic goals.
- A thorough understanding of orbital and eyelid anatomy is necessary to understand aging in the periorbital region and to devise appropriate surgical strategies.
- Preoperative assessment includes a review of the patient’s perceptions, assessment of the patient’s anatomy, and an appropriate medical and ophthalmologic examination.
- Surgical techniques in blepharoplasty are numerous and should be tailored to the patient’s own unique anatomy and aesthetic diagnosis.
- Interrelated anatomic structures, including the brow and the infraorbital rim, may need to be surgically addressed for an optimal outcome.

Brief introduction

- The eyelids are vital, irreplaceable structures that serve to protect the globes. Their shutter-like mechanism is essential to clean, lubricate, and protect the cornea. Any disruption or restriction of eyelid closure will have significant consequences for both the patient and the surgeon.
- Instead of the common practice of excising precious upper and, to a somewhat lesser degree, lower eyelid tissue, it is preferable to focus on restoration of attractive, youthful anatomy.
- One should first conceptualize the desired outcome, then select and execute procedures accurately designed to achieve those specific goals.
- Several important principles are advocated (Box 1.1).

Anatomical pearls

Osteology and periorbita

- The orbits are pyramids formed by the frontal, sphenoid, maxillary, zygomatic, lacrimal, palatine, and ethmoid bones (Fig. 1.1).
- The periosteal covering or periorbita is most firmly attached at the suture lines and the circumferential anterior orbital rim.
- The investing orbital septum in turn attaches to the periorbita of the orbital rim, forming a thickened perimeter known as the arcus marginalis.
- This structure reduces the perimeter and diameter of the orbital aperture and is thickest in the superior and lateral aspects of the orbital rim.
- Certain structures must be avoided during upper lid surgery.
  - The lacrimal gland, located in the superolateral orbit deep to its anterior rim, often descends beneath the orbital rim, prolapsing into the postseptal upper lid in many persons.
  - The trochlea is located 5 mm posterior to the superonasal orbital rim and is attached to the periorbita. Disruption of this structure can cause motility problems.

Lateral retinaculum

- Anchored to the lateral orbit is a labyrinth of connective tissues, known as the lateral retinaculum, that are crucial to maintenance of the integrity, position, and function of the globe and periorbital.
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A deep component connects directly to the Whitnall tubercle and is classically known as the lateral canthal tendon (Fig. 1.3).

The tarsal strap is a distinct anatomic structure that inserts into the tarsus medial and inferior to the lateral canthal tendon.

The tarsal strap attaches approximately 3 mm inferiorly and 1 mm posteriorly to the deep lateral canthal tendon, approximately 4–5 mm from the anterior orbital rim.

It shortens in response to lid laxity, benefitting from release during surgery to help achieve a long-lasting restoration or elevation canthopexy (Fig. 1.4).

Controversy exists surrounding the naming of the components of the lateral canthal tendon.

A superficial component is continuous with the orbicularis oculi fascia and attaches to the lateral orbital rim and deep temporal fascia by means of the lateral orbital thickening.

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Anatomical pearls

- The frontalis will give the appearance of deep horizontal creases in the forehead (Fig. 1.8).
- The vertically oriented procerus is a medial muscle, often continuous with the frontalis, arising from the nasal bones and inserting into the subcutaneous tissue of the glabellar region. It pulls the medial brow inferiorly and contributes to the horizontal wrinkles at the root of the nose. More commonly, these wrinkles result from brow ptosis and correct spontaneously with brow elevation.
- The obliquely oriented corrugators muscle arises from the frontal bone and inserts into the brow tissue laterally, with some extensions into orbicularis and frontalis musculature, forming vertical glabellar furrows during contraction.

Medial orbital vault

- A hammock of fibrous condensations suspends the globe above the orbital floor. The medial components of the apparatus include medial canthal tendon, the Lockwood suspensory ligament, and check ligaments of the medial rectus.
- The medial canthal tendon, like the lateral canthal tendon, has separate limbs that attach the tarsal plates to the ethmoid and lacrimal bones.
- Each limb inserts onto the periorbital of the apex of the lacrimal fossa. The anterior limb provides the bulk of the medial globe support (Fig. 1.5).

Forehead and temporal region

- The forehead and brow consist of four layers: skin, subcutaneous tissue, muscle, and galea.
- There are four distinct brow muscles: frontalis, procerus, corrugator superciliiarius, and orbicularis oculi (Fig. 1.6).
- The frontalis muscle inserts predominately into the medial half or two-thirds of the eyebrow (Fig. 1.7), allowing the lateral brow to drop hopelessly ptotic from aging, while the medial brow responds to frontalis activation and elevates, often excessively, in its drive to clear the lateral overhand. Constant contraction of the frontalis will give the appearance of deep horizontal creases in the forehead (Fig. 1.8).

Figure 1.4 The lateral canthal tendon inserts securely into the thickened peristeum overlying Whitnall tubercle. The tarsal strap is a distinct anatomic structure that suspends the tarsus medial and inferior to the lateral canthal tendon to lateral orbital wall, approximately 4–5 mm from the orbital rim.

Figure 1.5 The medial canthal tendon envelops the lacrimal sac. It is tripartite, with anterior, posterior, and superior limbs. Like the lateral canthal tendon, its limbs are continuous with tarsal plates. The components of this tendon along with its lateral counterpart are enveloped by deep and superficial aspects of the orbicularis muscle. (Adapted from Spinelli HM. Atlas of Aesthetic Eyelid and Periocular Surgery. Philadelphia: Saunders; 2004:13.)

Figure 1.6 Facial muscles of the orbital region. Note that the preseptal and pretarsal orbicularis muscles fuse with the medial and lateral canthal tendons.
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The orbicularis muscle, which acts as a sphincter for the eyelids, consists of orbital, preseptal, and pretarsal segments.

The pretarsal muscle segment fuses with the lateral canthal tendon and attaches laterally to Whitnall tubercle. Medially it forms two heads, which insert into the anterior and posterior lacrimal crests (see Fig. 1.6).

Upper eyelid

- The orbital septum originates superiorly at the arcus and forms the anterior border of the orbit. It joins with the levator aponeurosis, just superior to the tarsus. The sling formed by the union of these two structures houses the orbital fat.
- The levator palpebrae superioris muscle originates above the annulus of Zinn. It extends anteriorly for 40 mm before becoming a tendinous aponeurosis below Whitnall ligament. The aponeurosis fans out medially and laterally to attach to the orbital retinacula. The aponeurosis fuses with the orbital septum above the superior border of the tarsus and at the caudal extent of the sling, sending fibrous strands to the dermis to form the lid crease. Extensions of the aponeurosis finally insert into the anterior and inferior tarsus. As the levator aponeurosis undergoes senile attenuation, the lid crease rises into the superior orbit from its remaining dermal attachments while the lid margin drops.
- Müller muscle, or the supratarsal muscle, originates on the deep surface of the levator near the point where the muscle becomes aponeurotic and inserts into the superior tarsus. Dehiscence of the attachment of the levator aponeurosis to the tarsus results in an acquired...

Eyelids

- There is much similarity between upper and lower eyelid anatomy. Each consists of an anterior lamella of skin and orbicularis muscle and a posterior lamella of tarsus and conjunctiva (Fig. 1.9).

Figure 1.7 The frontalis muscle inserts predominantly into the medial half or two-thirds of the eyebrow. The medial brow responds to frontalis activation and elevates, often excessively, in its drive to clear lateral overhang.

Figure 1.8 Frontalis action. The frontalis muscle inserts into the medial two-thirds of the brow. Exaggerated medial brow elevation is required to clear the lateral overhang and to eliminate visual obstruction. Constant contraction of the frontalis will give the appearance of deep horizontal creases in the forehead. This necessarily means that when the lateral skin is elevated or excised, the over-elevated and distorted medial brow drops profoundly.

Figure 1.9 Eyelid anatomy. Each eyelid consists of an anterior lamella of skin and orbicularis muscle and a posterior lamella of tarsus and conjunctiva. The orbital septum forms the anterior border of the orbital fat.
ptosis only after the Müller muscle attenuates and loses its integrity.

- In the Asian eyelid, fusion of the levator and septum commonly occurs at a lower level, allowing the sling and fat to descend farther into the lid. This lower descent of fat creates the characteristic fullness of their upper eyelid. In addition, the aponeurotic fibers form a weaker attachment to the dermis, resulting in a less distinct lid fold (Fig. 1.10).

**Septal extension**

- The orbital septum has an adhesion to the levator aponeurosis above the tarsus. The septum continues beyond this adhesion and extends to the ciliary margin. It is superficial to the preaponeurotic fat found at the supratarsal crease. The septal extension is a dynamic component to the motor apparatus, as traction on this fibrous sheet reproducibly alters ciliary margin position (Fig. 1.11). The septal extension serves as an adjunct to, and does not operate independent of, levator function, as mistaking the septal extension for levator apparatus and plicating this layer solely results in failed ptosis correction.

**Lower eyelid**

- The anatomy of the lower eyelid is somewhat analogous to that of the upper eyelid.
- The retractors of the lower lid, the capsulopalpebral fascia, correspond to the levator above.
- The capsulopalpebral head splits to surround and fuse with the sheath of the inferior oblique muscle. The two heads fuse to form the Lockwood suspensory ligament, which is analogous to Whitnall ligament.
- It fuses with the orbital septum 5 mm below the tarsal border and then inserts into the anterior and inferior surface of the tarsus.
- The inferior tarsal muscle is analogous to Müller muscle of the upper eyelid and also arises from the sheath of the inferior rectus muscle. It runs anteriorly above the inferior oblique muscle and also attaches to the inferior tarsal border.
- The combination of the orbital septum, orbicularis, and skin of the lower lid acts as the anterior barrier of the orbital fat. As these connective tissue properties relax, the orbital fat is allowed to herniate forward, forming an unpleasing, full lower eyelid. This relative loss of orbital volume leads to a commensurate, progressive hollowing of the upper lid as upper eyelid fat resects.
- The capsulopalpebral fascia and its overlying conjunctiva form the posterior border of the lower orbital fat. Transection of the capsulopalpebral fascia during lower lid procedures, particularly transconjunctival blepharoplasty, releases the retractors of the lower eyelid, which can reduce downward traction and allow the position of the lower lid margin to rise.

**Retaining ligaments**

- A network of ligaments serves as a scaffold for the skin and subcutaneous tissue surrounding the orbit. The orbital retaining ligament directly attaches the orbicularis at the junction of its orbital and preseptal components to the periorbital of the orbital rim and, consequently, separates the prezygomatic space from the preseptal space. This ligament is continuous with the lateral orbital thickening, which inserts onto the lateral orbital rim and deep temporal fascia. It also has attachments to the superficial lateral canthal tendon (see Figs. 1.3, 1.12, 1.13). Attenuation of these ligaments permits descent of orbital fat onto the cheek. A midfacelift must release these ligaments to achieve a supported, lasting lift.

**Blood supply**

- The internal and external carotid arteries supply blood to the orbit and eyelids (Fig. 1.14).
- The ophthalmic artery is the first intracranial branch of the internal carotid; its branches supply the globe, extracocular muscles, lacrimal gland, ethmoid, upper eyelids, and forehead.
- The external carotid artery branches into the superficial temporal and maxillary arteries. The infraorbital artery is a continuation of the maxillary artery and exits 8 mm below the inferomedial orbital rim to supply the lower eyelid.
- The arcade of the superior and inferior palpebral arteries gives a rich blood supply to the eyelids. The superior palpebral artery consists of a peripheral arcade located at the superior tarsal border – the area where surgical dissection occurs to correct lid ptosis and to define lid folds. Damage to a vessel within this network commonly results in a hematoma of Müller muscle, causing lid ptosis for 2–8 weeks postoperatively. Likewise, on the lower lid, the inferior palpebral artery lies at the inferior border of the inferior tarsus.
- The supratrochlear, dorsal nasal, and medial palpebral arteries all traverse the orbit medially. Severing these arteries during fat removal, without adequately providing hemostasis, may lead to a retrobulbar hematoma, a vision-threatening complication of blepharoplasty.

**Innervation: trigeminal nerve and facial nerve**

- The trigeminal nerve, along with its branches, provides sensory innervations to the periorbital region (Fig. 1.15).
- A well-placed supraorbital block will anesthetize most of the upper lid and the central precoronal scalp.
- The maxillary division exits the orbit through one to three infraorbital foramina. It provides sensation to the skin of the nose, the lower eyelids, and the upper lid.
- The facial nerve supplies motor function to the lids (Fig. 1.16).
- Innervation of facial muscles occurs on their deep surfaces.
- Interruption of the branches to the orbicularis muscle from the periorbital surgery or facial surgery may result in atonicity due to partial denervation of the orbicularis with loss of lid tone or anomalous reinnervation and possibly undesirable eyelid twitching.
- The frontal branch of the facial nerve courses immediately above and is attached to the periosteum of
Figure 1.10 The anatomic variations in the upper eyelid displayed by different ethnic groups and the changes associated with senescence within each group allow for a convergence of anatomy. (A) The normal youthful Asian upper eyelid has levator extensions inserting onto the skin surface to define a lid fold that averages 6–8 mm above the lid margin. The position of the levator-skin linkage and the anteroposterior relationship of the preaponeurotic fat determine lid fold height and degree of sulcus concavity or convexity (as shown on the right half of each anatomic depiction). (B) In the case of levator dehiscence from the tarsal plate, the upper lid crease is displaced superiorly. The orbital septum and preaponeurotic fat linked to the levator are displaced superiorly and posteriorly. These anatomic changes create a high lid crease, a deep superior sulcus, and eyelid ptosis. (C) In the aging eyelid, the septum becomes attenuated and stretches. The septal extension loosens, and this allows orbital fat to prolapse forward and slide over the levator into an anterior and inferior position. Clinically, this results in an inferior displacement of the levator skin attachments and a low and anterior position of the preaponeurotic fat pad. (D) The youthful Asian eyelid anatomically resembles the senescent upper lid with a low levator skin zone of adhesion and inferior and anteriorly located preaponeurotic fat. The characteristic but variable low eyelid crease and convex upper eyelid and sulcus are classic. (Adapted from Spinelli HM. Atlas of Aesthetic Eyelid and Periocular Surgery. Philadelphia: Saunders; 2004:59.)
**Anatomical pearls**

**Figure 1.11** The orbital septum has an adhesion to the levator aponeurosis above the tarsus. The septal extension begins at the adhesion of the orbital septum to the levator and extends to the ciliary margin. It is superficial to the preaponeurotic fat found at the supratarsal crease. (Adapted from Reid RR, Said HK, Yu M, et al. Revisiting upper eyelid anatomy: introduction of the septal extension. *Plast Reconstr Surg*. 2006;117(1):65–70.)

**Figure 1.12** The orbicularis muscle fascia attaches to the skeleton along the orbital rim by the lateral orbital thickening (LDT) in continuity with the orbicularis retaining ligament (ORL). (Adapted from Ghavami A, Pessa JE, Janis J, et al. The orbicularis retaining ligament of the medial orbit: closing the circle. *Plast Reconstr Surg*. 2008;121(3):994–1001.)

**Figure 1.13** The orbital retaining ligament (ORL) directly attaches the orbicularis oris (OO) at the junction of its pars palpebrarum and pars orbitalis to the periosteum of the orbital rim and, consequently, separates the prezygomatic space from the preseptal space. (Adapted from Muzaffar AR, Mendelson BC, Adams Jr WP. Surgical anatomy of the ligamentous attachments of the lower lid and lateral canthus. *Plast Reconstr Surg*. 2002;110(3):873–884.)

**Figure 1.14** Arterial supply to the periorbital region.

**Figure 1.15** Sensory nerves of the eyelids.
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Patients of Indo-European and African decent show 1 to 2 mm lower than European ethnicities.

The ratio of distance from the lower edge of the eyebrow (at the center of the globe) to the open lid margin to the visualized pretarsal skin should never be less than 3:1 (see Fig. 1.1), preferably more.

Scleral show is the appearance of white sclera below the lower border of the cornea and above the lower eyelid margin. In general, scleral show is contradictory to optimal aesthetics and may be perceived as a sign of aging, previous blepharoplasty, or orbital disease (e.g., thyroid disease).

More than 0.5 mm of sclera show beneath the cornea on direct, forward gaze begins to confer a sad or melancholy aura to one’s appearance.

The intercanthal axis is normally tilted slightly upward (from medial to lateral) in most populations.

Exaggerated tilts are encountered in some Asian, Indo-European, and African-American populations.

Preoperative considerations

A thorough history and physical examination should be obtained – including an ophthalmic history (see Box 1.2).

Physical exam should include evaluation for symmetry; globe shape, position, and appearance; signs of aging; lid appearance; lid function; and relative laxity.

In the upper lid, excessive skin due to loss of elasticity and sun damage is one of the major causes of an aged appearance in the periorbital area.

In addition to relaxed skin changes, excessive fat herniation can cause bulging, resulting in a heavy appearance to the upper lid area.

Aging changes in the lower lid include relaxation of the tarsal margin with scleral show, rhytides of the lower lid, herniated fat pads resulting in bulging in one or all of

Youthful, beautiful eyes

The characteristics of youthful, beautiful eyes differ from one population to another, but generalizations are possible and provide a needed reference to judge the success of various surgical maneuvers.

Attractive, youthful eyes have globes framed in generously sized horizontal apertures (from medial and lateral), often accentuated by a slight upward tilt of the intercanthal axis (Fig. 1.17).

The aperture length should span most of the distance between the orbital rims.

In a relaxed forward gaze, the vertical height of the aperture should expose at least three-quarters of the cornea, with the upper lid extending down at least 1.5 mm below the upper limbus (the upper margin of the cornea) but no more than 3 mm. The lower lid ideally covers 0.5 mm of the lower limbus but no more than 1.5 mm.

In the upper lid, there should be a well-defined lid crease lying above the lid margin with lid skin under slight stretch, slightly wider laterally.

Ideally, the actual pretarsal skin visualized on relaxed forward gaze ranges from 3 to 6 mm in European ethnicities.

The Asian lid crease is generally 2–3 mm lower, with the distance from lid margin diminishing as the crease moves toward the inner canthus.

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the three fat pocket areas, and hollowing of the nasojugal groove and lateral orbital rim areas.

Hollowing of the nasojugal groove area appears as dark circles under the eyes, mostly because of lighting and the shadowing that result from this defect.

- Contact lens wear poses particular risks when eyelid surgery is performed.
- Long-term contact lens wearing hastens the process of drying out the eyes.
- Traditional blepharoplasty techniques consistently produce vertical dystopia with increased scleral exposure, making the lens wear difficult if not dangerous.
- Ptosis and canthopexy surgery may alter the corneal curvature and require that contacts be refitted.
- The patient should discontinue contact lens wear in the perioperative period to allow healing without the need to manipulate the eyelids.
- Dry, irritated eyes before surgery will lead to irritated eyes after surgery, and the surgeon may be blamed.
- Treatment options include artificial tears, ointment, anti-inflammatory drops, and punctal plugs or punctal closure.
- Exophthalmos, unilaterally or bilaterally, associated with a thyroid disorder, should be completely stabilized for approximately 6 months before elective aesthetic surgery.
- Eyelid measurements are documented for use during ptosis surgery and, if necessary, for insurance purposes.
- In the typical person with the brow in an aesthetically pleasing position, 20 mm of upper lid skin must remain between the bottom of the central eyebrow and the upper lid margin to allow adequate lid closure during sleep, a well-defined lid crease, and an effective and complete blink.
- In the eyelid of the white individual, the aperture (distance between the upper and lower eyelids) average is 10–12 mm.

**BOX 1.2 Important information to obtain during history and physical examination**

- Medication use: particularly anticoagulants, anti-inflammatory and cardiovascular drugs, and vitamins (especially vitamin E).
- Herbal supplement use: herbs represent risks to anesthesia and surgery, particularly those affecting blood pressure, blood coagulation, the cardiovascular system, and healing.
- Allergies: medication and type.
- Past medical history: especially hypertension, diabetes, cardiovascular and cerebrovascular disease, hepatitis, liver disease, heart disease or arrhythmias, cancer, thyroid disease, and endocrine disease.
- Bleeding disorders or blood clots.
- Psychiatric disease.
- Alcohol and smoking history.
- Recreational drug use, which may interact with anesthesia.
- Exposure to human immunodeficiency virus and hepatitis virus.
- Any history of facial herpes zoster or simplex.

- Exophthalmos, unilaterally or bilaterally, associated with a thyroid disorder, should be completely stabilized for insurance purposes when a levator aponeurosis repair or an excisional blepharoplasty is planned.
- Pseudoptosis occurs when excess upper lid skin covers the eyelid, depressing the eyelashes, forming hooding, and simulating ptosis.
- The ability to differentiate the causes of droopy eyelids — brow ptosis (brow weight resting on the eyelids), dermatochalasis (excess skin), and blepharoptosis (levator attenuation or dehiscence) — will enable the surgeon to select the proper correction.
- There is a normal 10–12 mm projection of the globe seen in a lateral, as measured from the lateral orbital rim at the level of the canthal tendon to the pupil.
- Proptosis and enophthalmos are relative anterior and posterior displacement of the globe, respectively. Hertel exophthalmometry can be used to quantitate the degree of relative projection for documentation purposes.
- Assessment of tear production is a necessary but unreliable task.
- The Schirmer test:
  - Placing filter paper strips in the lateral third of the lower eyelid.
  - After 5 min, normal tear production should be greater than 15 mm; 5–10 mm indicates borderline tear secretion, and below 5 mm is hyposecretion.
- No other area of cosmetic surgery is more dependent on accurate photography than the periorbital region (Box 1.3).
- Before surgical planning, one must have a meaningful conceptualization of the desired result. Only then can the surgical maneuvers required be organized in a meaningful way (Box 1.4).
The preoperative periorbital plan should include the following:

- The patient’s specific concerns and desires for improvement.
- Brow position.
- Lower eyelid tonicity.
- Eyelid ptosis, retraction, or levator dehiscence.
- Exophthalmos or enophthalmos.
- Supraorbital rim prominence or hypoplasia.
- Suborbital malar and tear trough deformities.
- Excision of necessary skin, muscle, and fat – only if necessary.

**Orbital fat excision**

- A relative excess of retroseptal fat may be safely excised through an upper eyelid blepharoplasty incision.
- A small septotomy is made at the superior aspect of the skin excision into each fat compartment in which conservative resection of redundant fat has been planned.
- The fat is teased out bluntly and resected using pinpoint cautery.
- This fat usually includes the medial or nasal compartment, which contains white fat.
- Yellow fat in the central compartment is usually more superficial and lateral.
- Gentle pressure on the patient’s globe can reproduce the degree of excess while the patient lies recumbent on the operating room table (Fig. 1.21).
- Overall, undercorrection is preferred to prevent hollowing, which can be dramatic and recognized as an A-frame abnormality.
- The attenuated orbital septum may be addressed by using selective diathermy along the exposed caudal septum.
- Inflammation-mediated tightening can enhance septal integrity.
- Septal plication aid is unnecessary and may induce a brisk, restrictive inflammatory response.

**Blepharoptosis**

- During upper blepharoplasty, with the septum open and the aponeurosis and superior tarsus exposed, there is an ideal opportunity to adjust the level of the aperture.
- Inappropriate aperture opening can be due to upper lid ptosis or upper lid retraction.
- True ptosis repair involves reattachment of the levator aponeurosis to the tarsus, with or without shortening of applicable structures (e.g., aponeurosis, Müller muscle, and tarsus).
- There are a variety of techniques to address blepharoptosis, but they are outside the scope of this chapter. There is a significant learning curve to performing a ptosis repair, and even then, the ability to get perfect symmetry is elusive.
- In the setting of mild upper eyelid ptosis (~1 mm), where the decision has been made to avoid a formal lid ptosis procedure, selective myectomy of the upper eyelid orbicularis can be performed to widen the lid aperture.
- The amount of muscle to be resected depends on a host of factors, including the severity of relative lid ptosis.
Operative techniques

■ Leaving a small cuff of filmy connective tissue (~1 mm) on the tarsus will minimize bleeding from the richly vascularized area.
■ Ensure that there is complete hemostasis by use of a fine forceps cautery, lifting all lid tissues away from the cornea and globe before cauterizing.
■ Anchor the upper third of the tarsus to the remaining levator with 5–0 silk suture, placed as a horizontal mattress.
■ The lid should be flipped to ensure that the suture is not exposed posteriorly on the tarsus, which could cause a troublesome corneal abrasion.
■ If performed under sedation or local anesthetic, the level should be checked by having the patient open the eye.

Figure 1.18 Simple skin excision blepharoplasty. (A) Digital traction and light pressure by the surgeon allow smooth, quick incisions. (B) The skin may be elevated with the orbicularis muscle in one maneuver, proceeding from lateral to medial. (C) The orbital septum is then opened, exposing the preaponeurotic space. The underlying levator aponeurosis is protected by opening the septum as cephalad as possible. (Adapted from Spinelli HM. Atlas of Aesthetic Eyelid and Periocular Surgery. Philadelphia: Saunders; 2004:64.)

brow position, and fold disparity (Fig. 1.22) and is titrated depending on the amount of effect desired.
■ For 1 mm or less of relative upper lid ptosis, resection of at least 3–4 mm of orbicularis is required.
■ No attempt is made to close orbicularis muscle in this resection, which could increase the risk of lagophthalmos.

The key components of formal lid ptosis correction include:
■ Correct identification of the distal extensions of the aponeurosis and the orbital septal extension.
■ The superior edge of the tarsus is freed from any dermal or tendinous extensions.
Both sides should be completed before the suture is permanently tied.

**Lower lid blepharoplasty**

- Lower blepharoplasty has evolved substantially. Although excellent aesthetic results can be achieved with transcutaneous lower blepharoplasty, lid retraction and ectropion are concerning complications. Conservative excisional techniques center on the concept of fat preservation. Transconjunctival lower blepharoplasty, although more conservative, does not eliminate the risk of lid malposition. An effective, lasting procedure should address the extrinsic and intrinsic support of the eye, which is weakened during the aging process.

**Transconjunctival blepharoplasty**

- Transconjunctival blepharoplasty is the preferred procedure for fat reduction in patients without excess skin and with good canthal position.
- It is less likely to lead to lower lid malposition than a transcutaneous approach.
- It minimizes but does not eliminate postoperative lower lid retraction.
- Transection of the lower lid retractors can cause a temporary rise in the lid margin, especially if they are suspended during the healing period.
- Previously suspected septal scarring through transconjunctival fat excision has not been shown to significantly alter lid posture or tonicity.
- The lower lid retractors (capsulopalpebral fascia and inferior tarsal muscle) and overlying conjunctiva lie directly posterior to the three fat pads of the lower lid.
- A broad and deep transconjunctival incision severs both conjunctiva and retractors but typically should not incise the orbital septum, orbicularis, or skin.
- The conjunctival incision is made with a monopolar cautery needle tip at least 4 mm below the inferior border of the tarsus – never through the tarsus (Fig. 1.23).
Operative techniques

- Conjunctival closure, when it is elected, is simplified by a monofilament pull-out suture that enters the eye externally, closes the conjunctiva, and exits through the skin and is taped.
- The incision through the conjunctiva and retractors gives excellent access to the orbital fat.
- A 6–0 silk traction suture passed through the inferior conjunctival wound and retracted over the globe gives wide access to the orbital fat, even helping to prolapse the fat into the wound. The thin film of synovium-appearing capsule encasing the orbital fat is opened, releasing the fat to bulge into the operative field (Fig. 1.24).
- Once fat is removed through a transconjunctival incision, excess skin can be removed through a subciliary position.
- Fat reduction may leave skin excess, leading to wrinkling.
- A conservative “skin pinch” can be done to estimate skin removal, or alternatively, skin can be tightened by skin resurfacing with chemical or laser peels (Fig. 1.25).
- One should be careful not to incise the orbital septum, which leads to increased postoperative retraction.
- This procedure works particularly well when there is an isolated fat pad, especially medially, accessed through a single stab incision through the conjunctiva.

Transcutaneous blepharoplasty

- A subciliary incision can be used to develop a skin flap or a skin–muscle flap.
- With either method, pretarsal orbicularis fibers should remain intact.
- For the skin–muscle flap, skin and preseptal orbicularis are elevated as one flap, while with a skin flap, the muscle and its innervation can be preserved.
- Periorbital fat, muscle, and skin can be addressed with either approach.
- Once the plane deep to the orbicularis is entered, dissection continues between the muscle and the orbital septum down to the level of the orbital rim.
- Periorbital fat can be excised through small incisions in the septum.
- The fat can also be retropositioned using capsulopalpebral fascia placation, or it can be transferred into the nasojugular fold.

Orbicularis muscle fibers and skin can be excised at closure.

Care must be taken with muscle excision, which can lead to orbicularis denervation and lid malposition.

Orbital fat transposition

- An alternative to excising prominent orbital fat is to redrape the pedicled fat onto the arcus marginalis.
- Patients with tear trough deformities who have prominent medial fat pads are excellent candidates.
- Access to the medial and central fat pads is by the subciliary or transconjunctival incision.
- The minor degree of lateral fat pad prominence is generally insufficient to affect any change with repositioning.
Capsulopalpebral fascia plication

- The capsulopalpebral fascia can be plicated to the orbital rim either through a transcutaneous or a transconjunctival approach.
- In the transcutaneous method, dissection is carried out between the orbicularis and the septum down to the orbital rim; the capsulopalpebral fascia is then sutured to the orbital rim.
- In the transconjunctival method, the capsulopalpebral fascia is divided from the tarsus, and orbital fat is retroplaced, its position maintained by suturing the capsulopalpebral fascia to the periosteum of the orbital rim using a continuous running 6–0 nonabsorbable suture.
- The conjunctival gap of a few millimeters is allowed to reepithelialize (Fig. 1.27).
- One advantage of the transconjunctival approach is the division of lower eyelid depressors, which helps maintain the lower eyelid at an elevated level due to the unopposed action of the pretarsal orbicularis.

Orbicularis suspension

- Orbicularis repositioning can be used to eliminate hypotonic and herniated orbicularis muscle, soften palpebral depressions, and shorten the lower lid to cheek distance.

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**Figure 1.22 (A,B)** Once the upper lid is incised, the levator may be modified (shortened/lengthened) in a number of ways, including simple plication. A suborbicularis skin flap can also be developed, allowing access to preaponeurotic fat. (Adapted from Spinelli HM. Atlas of Aesthetic Eyelid and Periocular Surgery. Philadelphia: Saunders; 2004:69).
Operative techniques

Conjunctiva is divided longitudinally just below the tarsal plate

Retroseptal approach
Pretroseptal (suborbicularis) approach
Nonconductive retractor

Figure 1.23 The transconjunctival approach to the retroseptal space may be in one of two ways: preseptal or retroseptal. The preseptal route requires entry into the suborbicularis preseptal space above the fusion of the lower lid retractors and the orbital septum. This will allow direct visualization of the septum, and each fat pad can be addressed separately in a controlled fashion. (A) A conjunctival stay suture is placed deep in the fornix, and traction is applied superiorly while the lid margin is everted. This causes the inferior edge of the tarsal plate to rise toward the surgeon. (B) The conjunctiva and lower lid retractors are incised just below the tarsal plate entering the suborbicularis preseptal space. This plane is developed to the orbital rim with the assistance of the traction suture and a nonconductive instrument. (C) The conjunctiva and lower lid retractors are incised just below the tarsal plate entering the suborbicularis preseptal space. This plane is developed to the orbital rim with the assistance of the traction suture and a nonconductive instrument. (Adapted from Spinelli HM. Atlas of Aesthetic Eyelid and Periocular Surgery. Philadelphia: Saunders; 2004:86.)

- The main steps include:
  - Elevation of a skin muscle flap.
  - Release of the orbicularis retaining ligament and resuspension of the orbicularis – frequently after lateral canthopexy.
  - Along the entire infraorbital rim, the orbicularis retaining ligament is divided.
- Additional medial dissection is performed to release the levator labii when a tear trough deformity is present.
- The skin muscle flap is draped in a superior lateral vector rather than a pure vertical vector.
- Excision of skin and muscle are performed by removing a triangle of tissue lateral to the canthus,
Blepharoplasty

This technique is best suited for patients with scleral show, lid laxity, and a negative vector, which put them at risk for lid malposition in the postoperative period.

Disadvantages are it inherently disrupts the orbicularis, which may lead to denervation, and mobilization of the levator labii muscles may put the buccal branch of the facial nerve at risk.

- The lateral suspension of the orbicularis is to the orbital periosteum.
- Lower lid support is gained by resuspension of the anterior (skin and muscle) and posterior lamellae (tarsus by canthopexy).

thereby minimizing the amount of tissue removed along the actual lid margin.

- The lateral suspension of the orbicularis is to the orbital periosteum.
- Lower lid support is gained by resuspension of the anterior (skin and muscle) and posterior lamellae (tarsus by canthopexy).

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- Disadvantages are it inherently disrupts the orbicularis, which may lead to denervation, and mobilization of the levator labii muscles may put the buccal branch of the facial nerve at risk.
Operative techniques

A double-armed 4–0 Prolene or Mersilene is used to suture the tarsal plate and lateral retinaculum to the inner aspect of the lateral orbital rim periosteum above the Whitnall tubercle.

Periosteum is thickest at the superior and lateral orbital rim, making it a secure suture site.

The mattress suture is placed through the periosteum within the lateral orbital rim to maintain the posterior position of the lid margin against the globe.

Bone canthopexy is technically possible through upper and lower lid incisions but is technically demanding.

Wide exposure through a coronal brow lift provides the ideal environment and access.

Bone fixation gives a profoundly longer-lasting result than does periosteal fixation.

Drill holes (1.5 mm drill bit) are placed 2–3 mm posterior to the lateral orbital rim.

Canthopexy

- A lateral canthopexy can establish an aesthetically and functionally youthful eyelid and reduce the incidence of lower lid malposition and scleral show (Fig. 1.28).
- It has become an integral part of a lower lid blepharoplasty and midface lifting.
- A lateral canthopexy is recommended for moderate lid laxity, which is considered <6 mm of lid distraction away from the globe.
- This technique takes advantage of a bluntly dissected tunnel extending from the lateral upper lid blepharoplasty incision into the lateral aspect of a lower lid incision.
- Next, the lateral retinaculum and tarsal strap are bluntly dissected off the periosteum 5 mm in both directions (Figs. 1.4, 1.29).
- A double-armed 4–0 Prolene or Mersilene is used to suture the tarsal plate and lateral retinaculum to the inner aspect of the lateral orbital rim periosteum above the Whitnall tubercle.
- Periosteum is thickest at the superior and lateral orbital rim, making it a secure suture site.
- The mattress suture is placed through the periosteum within the lateral orbital rim to maintain the posterior position of the lid margin against the globe.
- Bone canthopexy is technically possible through upper and lower lid incisions but is technically demanding.
- Wide exposure through a coronal brow lift provides the ideal environment and access.
- Bone fixation gives a profoundly longer-lasting result than does periosteal fixation.
- Drill holes (1.5 mm drill bit) are placed 2–3 mm posterior to the lateral orbital rim.
The middle third of the face, or midface, lies between the lateral canthal angle and the top of the nasolabial fold. It includes the lateral canthal tendon; the skin, fat, and orbicularis oculi muscle of the lower eyelids; the suborbicularis oculi fat pad; the malar fat pad; the orbitomalar ligament (orbicularis ligament); the orbital septum; and origins of the zygomaticus major and minor muscles and levator labii superioris.

When evaluating the midface for aesthetic surgery, all the structures listed above must be considered.

The author’s preferred technique includes approaching the midface through a transconjunctival incision.

After repositioning or resection of orbital fat, the midface is elevated in a supraperiosteal plane.

The attachment of the orbicularis oculi muscle to the orbital septum is preserved.

Adequate release of the remaining, lax orbitomalar ligament then permits malar fat pad suspension in a superolateral vector to the lateral orbital rim and temporoparietal fascia (Fig. 1.31).

Canthopexy is then performed to redrape lower eyelid skin and recreate a youthful intercanthal angle. Finally, a skin-only resection of the lower lid may be necessary to address any redundancy.
Postoperative considerations

- All patients are advised to expect swelling, bruising, some degree of ptosis, and tugging sensation on gazing upward. Although complete recovery takes months, patients generally look presentable approximately 2–3 weeks after surgery.
- Surgical literature has not advocated compression bandaging of the eyes after surgery. If one chooses not to use gently compressive bandages, postoperative edema can be reduced with cool compresses for up to 20 min intermittently during the initial 36 h postoperatively.
- Patients are advised against using frozen compresses directly over their face in the setting of previous anesthetic use and pain medication.
- Additional recommendations include having the patient lie in a semi-recumbent position while resting and to avoid bedrest.
- Prescriptions for rewetting drops, Lacri-Lube, and antibiotic ophthalmic ointment can be given to reduce the incidence of exposure keratoconjunctivitis and dry eye symptoms in the immediate postoperative period.

Figure 1.28 (A) Preoperative and (B) 5-year postoperative photograph of a patient with a lower lid blepharoplasty and canthopexy.

Figure 1.29 (A–C) Periosteal canthopexy. The inferior ramus of the lateral canthal tendon is secured and elevated to a raised position inside the orbital rim. Tension-free suspension occurs with release of the tarsal strap and lateral orbital thickening.
in the lower lid margin and fixed to the brow suspends the lid during early healing.

**Complications and outcomes**

- Asymmetry is common postoperatively and can be caused by edema, bruising, and asymmetric sleep posture, but it also predictably follows undiagnosed preoperative asymmetry, including mild ptosis, made worse by the weight of postoperative edema.
- Patients should be advised that no reoperations are indicated before 8 weeks, and then only if the lids have stabilized and no edema or bruising is seen.
- The need for reoperations is infrequent, but when ptosis or exophthalmos is involved, incidence increases significantly to 10–30%.
- Retrobulbar hemorrhage is the most feared complication of eyelid surgery. Any complaint of severe orbital pain needs to be examined immediately, especially that of sudden onset.
- Acute management involves immediate evaluation, urgent ophthalmologic consultation, and a return to the operation for evacuation of the hematoma.
- Medical treatments, in addition to operative exploration, include administration of high-flow oxygen, topical and systemic corticosteroids, and mannitol.
- Acute loss of vision mandates bedside suture removal and decompressive lateral canthotomy.
- Peribulbar hematoma, in contrast, does not threaten vision. It usually results from bleeding of an orbicularis muscle vessel. Small hematomas may resolve spontaneously, though larger hematomas can be evacuated in the office.
- Visual changes, including diplopia, are generally temporary and can be attributed to wound reaction, edema, and hematoma. Any damage to the superficial lying oblique muscles can be permanent and lead to postoperative strabismus. Conservative management is recommended; refractory cases should be referred to an ophthalmologist.
- The most common complication after blepharoplasty is chemosis. Disruption of ocular and eyelid lymphatic drainage leads to development of milky, conjunctival, and corneal edema.
- Chemosis can be limited by atraumatic dissection, cold compresses, elevation, and massage.
- It is usually self-limited and resolves spontaneously, though prolonged chemosis can be treated with topical steroids.
- Dry eye symptoms are also frequently cited in the postoperative phase. Patients may complain of foreign body sensation, burning, secretions, and frequent blinking.
- Ocular protection can be achieved medically with liberal use of corneal lubricants.
- Additional complications such as lower lid malposition, lagophthalmos, undercorrection, asymmetry, and iatrogenic ptosis all require careful observation and photographic documentation.
- Reoperation should be performed no earlier than 3 months later.

![Figure 1.30 The canthopexy suture series for a two-layered canthopexy. (A) The canthopexy suture fixating the tarsal tail into the drilled hole. (B) The second-layer orbicularis suture. (C) Lateral sutures fix the lateral orbicularis to the deep temporal fascia. (D) If a midface lift is elected, an inferior drill hole can be made to fixate the midface tissues. (E) Bury the knot into the drill hole.](image)

Few's survey-based study shows that one must prioritize a patient’s ethnic identity and heritage when approaching the periorbital area in African Americans.


**Further Reading**


**Figure 1.31** Midface lift. (A) The arrow in red depicts the plane of dissection to the midfacial structures in the cheek in a supraperiosteal approach. (B) Wide undermining of the periorbital ligamentous structures and lateral retinaculum may be transconjunctival or through the upper blepharoplasty incision. (C) Canthopexy and cheek suspension then proceed sequentially. (Adapted from Spinelli HM. *Atlas of Aesthetic Eyelid and Periocular Surgery.* Philadelphia: Saunders; 2004:129.)
Flowers and colleagues detail the anatomy of the lateral orbital retinaculum and highlight the importance of full dissection to achieve a tension-free canthopexy.


Results shown in Mendelson’s article demonstrate the safe, reproducible outcomes of a skin-only blepharoplasty, and help swing the pendulum away from aggressive fat-excisional techniques.


This cadaveric and histologic study identifies an extension of the orbital septum that must be identified and spared when performing a levator advancement for blepharoptosis.

This continuing medical education article provides a concise description of upper eyelid aging and a step-by-step guide to popular rejuvenation techniques.
