

# Rejuvenation of the Upper Eyelid

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## KEYWORDS

• Upper eyelid • Blepharoplasty • Eyelid rejuvenation

The eyes are the most captivating feature of the face. Furthermore, attractive eyes are an important feature of the youthful face. Although attention is drawn to the eyes, the surrounding structures that frame the eye are key contributors to facial beauty. The frame of the eye extends down to the lower eyelid-cheek junction and up to the upper eyelid-brow unit. Thus, the periocular region is a complex that should be broadly defined to include the eyebrow and midface. It is a surgeon's job to carefully analyze the underlying anatomy to determine the surgical approach to achieve the best aesthetic result.

The youthful upper eyelid is full, not hollow or overskeletonized. There is a crisp upper lid crease with elastic support of the underlying soft tissue, creating a smooth, taut pretarsal and preseptal upper eyelid. The eyebrow is often addressed in conjunction with the upper eyelid in upper face rejuvenation. This article focuses solely on surgical rejuvenation of the upper eyelid. The goal of rejuvenation of the upper eyelid should be a more youthful but natural-appearing result.

Upper eyelid surgery is the most requested and performed facial rejuvenation surgery in the United States.<sup>1</sup> The excision of the eyelids dates back 2000 years. The cauterization of excess eyelid skin to reduce drooping is described in the Sanskrit document, the *Sushruta*.<sup>2</sup> American surgeons began to write about cosmetic surgery in 1907, with Conrad Miller's *Cosmetic Surgery and the Correction of Feature Imperfections*.<sup>3</sup> Over the subsequent decades, surgeons advocated the removal of herniated fat pads and orbicularis oculi muscle excision. Over the past 20 years, the emphasis on technique has shifted to conservation of fat, skin and muscle excision

to avoid a deep, hollow, and skeletonized appearance to the eyelids.

## EYELID ANATOMY

The position and form of the eyebrow has a deep impact on the appearance of the upper eyelid and eye below. A precise analysis of eyebrow position and form is a critical first step in the evaluation of the upper eyelids, a full analysis of which is beyond the scope of this article. A few salient points are discussed. The female brow is arched with the most superior aspect of the brow positioned directly above the lateral limbus. Laterally the brow sits above the orbital rim, and centrally there should be a high arch with a deep superior sulcus. The ideal position of the female brow differs from that of the male brow. The male brow is relatively straight, lying at the level of the orbital rim, and runs perpendicular to the nose with a minimal sulcus and a low subtle lid crease 8 mm above the lash line.<sup>4</sup>

**Fig. 1** depicts many anatomic relationships that must be understood when evaluating the eyelid and assessing what needs to be addressed to restore youthfulness. The lateral canthus is typically 2 to 4 mm superior to the medial canthus. The adult palpebral fissure averages 10 to 12 mm vertically and 28 to 30 mm horizontally. The distance from the lateral canthus to the orbital rim is typically 5 mm. At rest, the upper eyelid covers the superior limbus by 1 to 2 mm. The highest point of the upper lid margin is just nasal to a vertical line drawn through the center of the pupil. This contour should be noted preoperatively when evaluating patients for rejuvenation of the upper eyelid so it can be addressed during surgery

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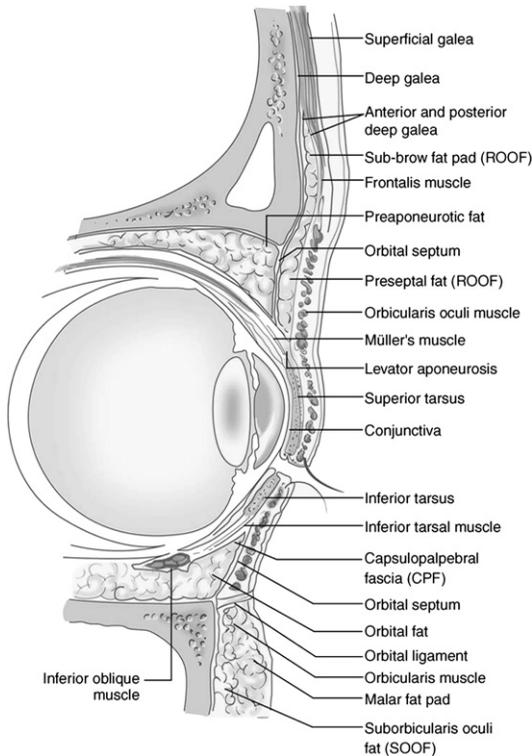
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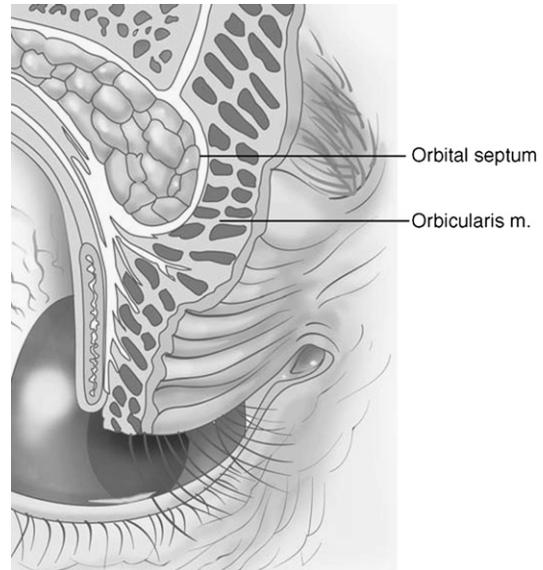


**Fig. 3.** Cross-sectional anatomy of the upper and lower lids. The capsulopalpebral fascia and inferior tarsal muscle are retractors of the lower lid whereas Müller muscle and the levator muscle and its aponeurosis are retractors of the upper lid. Note the preseptal positioning of the ROOF and suborbicularis oculi fat (SOOF). The orbitomalar ligament arises from the arcus marginalis of the inferior orbital rim and inserts on skin of the lower lid, forming the nasojugal fold. (From Most SP, Mobley SR, Larrabee WF Jr. *Anatomy of the eyelids*. *Facial Plast Surg Clin North Am* 2005;13:487–92; Elsevier; with permission.)

the redundant skin hangs lower, and the distance between the eyebrow and eyelashes is shortened. The weakening of the orbital septum also causes herniation of the orbital fat (Fig. 4). The lateral orbital region skin will develop rhytids, or crow's feet. The orbicularis oculi muscle may hypertrophy over time, causing the preseptal portion to become redundant and roll over the firmly attached pretarsal orbicularis, exacerbating the redundancy.<sup>8</sup> These factors all contribute to patients complaining of “looking tired, old, and not alert.”

## CLINICAL EVALUATION

As with any elective cosmetic procedure, the decision to perform a procedure to rejuvenate the upper eyelid is based on a thorough



**Fig. 4.** The aging upper eyelid. Weakening of the orbital septum is thought to cause herniation of orbital fat in the upper and lower lids. (From Most SP, Mobley SR, Larrabee WF Jr. *Anatomy of the eyelids*. *Facial Plast Surg Clin North Am* 2005;13:487–92; Elsevier; with permission.)

evaluation of the general medical history, ophthalmologic history, and psychological motivations of a patient. Medical history should include a history of chronic illnesses, hypertension, diabetes, bleeding disorders, and any anti-coagulant medications. Key points in the history include any previous ophthalmologic procedures, history of thyroid eye disease, previous facial trauma, recent botulinm toxin type A treatments, and a history of dry eyes. Dry eye syndrome can be associated with medical systemic diseases, such as Sjögren syndrome, collagen vascular diseases, Wegener granulomatosis, and Stevens-Johnson syndrome. If a patient has dry eyes, a Schirmer test can be performed, but referral to an ophthalmologist is recommended.

An in-depth discussion between patient and surgeon must address their concerns and expectations. This allows both parties to ensure fluid communication, determine whether or not their assessments coincide, and reaffirm there are no unrealistic expectations. Surgeons must critically analyze and elicit patients' expectations and explain thoroughly that results can differ based on preoperative findings and ethnicity. For example, the Asian eyelid has more fullness of the upper eyelid, a lower lid crease, more narrow palpebral fissures, and possibly a medial epicanthal fold. Surgeons must discuss lid crease position with patients to determine their desires

regarding postoperative lid crease position. Standardized preoperative photo documentation should be obtained. The authors also routinely obtain close-up views of the eyes in primary up gaze and down gaze in the frontal and in both lateral views.<sup>9</sup> Another helpful tool is reviewing patients' pictures from an earlier age. Analysis of such photos may help determine the contribution of brow ptosis to upper lid aging.

A physical examination must include a general overview of a patient's face, eyes, and eyelids. It is paramount to determine the brow contribution to aging of the upper lids when counseling patients for upper eyelid surgery, because this can alter a surgical plan. If there is any asymmetry of the palpebral fissures, it must be pointed out. Asymmetry is unmasked after a blepharoplasty and can become a source of dissatisfaction and a focus of attention for patients. It is imperative to also document visual acuity and extraocular movements and assess for dry eye, proptosis, and ptosis. If visual field obstruction is a concern, it is prudent to consult with an ophthalmologist for documentation and to determine whether or not the obstruction is clinically significant. The documentation of concurrent ptosis of the upper eyelid should also include measurements to the nearest 0.5 mm, if possible, using margin-to-reflex distance and levator excursion.<sup>10</sup> Surgeons must also check the conjunctiva for any erythema or edema. Finally, surgeons can assess how much skin can be excised by using the pinch technique to grasp redundant skin with a forceps to ensure that there is no elevation of the lid margin. This reaffirms that excision of this skin can be safely undertaken without causing lagophthalmos.

## SURGICAL TECHNIQUE

The authors prefer to obtain initial preoperative markings with patients in the upright position in neutral gaze. This is especially important if patients are to have a general anesthetic (eg, if the upper blepharoplasty is performed in conjunction with other procedures). In this position, the midpoint, medial extent, and lateral extent of the natural supratarsal creases on each side are marked. The lateral extent of the natural crease is noted—this approximates the lateral extent of the incision. The amount of lateral hooding is marked. The amount of redundant skin is noted. If a patient is to undergo browlift, the brows are elevated slightly and the amount of redundant skin noted. The brow is operated on first when done in conjunction with upper blepharoplasty because it reduces the amount of upper lid skin excision. If excess skin

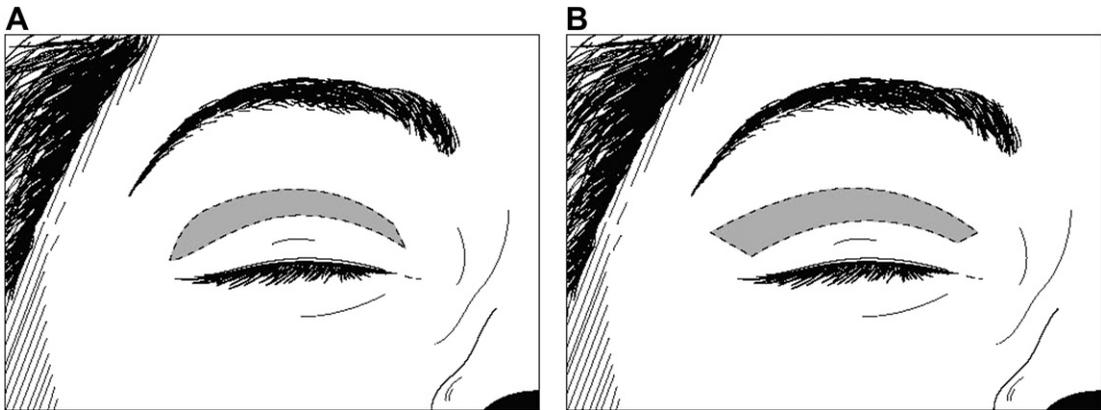
is removed from the upper eyelid without browlifting, the brow can be drawn further downward.

In the operating room, patients are placed supine. The lid crease markings are noted. Using a caliper, the previously performed markings are measured (**Fig. 5**). In occidental lids, the female upper lid crease is ideally placed 10 to 12 mm above the lid margin whereas in the male the ideal is 8 to 10 mm.<sup>4</sup> In many cases, the lid creases are noted as asymmetric. Typically, the authors select the side closest to the ideal for a patient and re-draw the lower limb incision on the opposite side to match this.

Surgeons must be mindful of going far lateral past the lateral canthus because the incision becomes more visible in this area, especially in patients with thick skin. The lateral extent of the crease, noted preoperatively, is used as a guide. The pinch test is used to determine the amount of redundant skin that can be excised without causing lagophthalmos. In this test, a Green or Brown forceps is used to gently pinch the upper lid skin. The lower tine is placed on the proposed lower lid incision, and the upper tine position is varied until, when pinched, the upper lid lashes just begin to evert. This is the position of the superior incision. The medial extent of the incision is the punctum. If an excessive amount of skin is going to be excised medially, a W-plasty may need to be performed.<sup>11</sup> The point of maximal excision is lateral to the midpupillary line. The lateral extent of the incision can vary, depending on the extent of lateral hooding, patient acceptance of more visible scars, and the extent of the natural lid crease. Generally, it extends 5 to 10 mm beyond the lateral canthus. If the redundant skin extends well beyond the lateral canthus and the incision is performed more laterally, it may leave a visible scar. The thicker eyebrow skin that is removed laterally does not align favorably with the thinner eyelid skin inferiorly.



**Fig. 5.** A caliper is used to measure from the lid margin to the proposed upper lid crease.



**Fig. 6.** Panels A & B represent two variations of the lenticular incision used in upper blepharoplasty. The medial extent is the punctum. The lower incision is 6 to 8 mm from the lid margin. The upper incision follows the contour of the brow.

The shape of the lower limb can vary medially and laterally (**Fig. 6**). Some surgeons prefer to converge the upper and lower limb incisions curvilinearly whereas others prefer a slight upturn to the lower limb medially and laterally. The authors prefer the latter, because it allows the upper and lower limb incision lengths to match more precisely, reducing the likelihood of redundancy of the upper limb skin at the medial and lateral extents of the incision (see **Fig. 6**).

Upper lid blepharoplasty can be performed under local anesthesia with or without sedation or under general anesthesia. A subcutaneous injection with 1% lidocaine with 1:100,000 units of epinephrine using a 1.25-inch, 27-gauge needle is performed. Local anesthetic should be injected superficial to the muscle to reduce the likelihood of formation of a hematoma. Incisions are made with a no.15 scalpel through the skin only. The strip of skin is removed with fine tip scissors (**Fig. 7**). In some cases, a 2- to 3-mm strip of orbicularis muscle is excised at the junction of the upper one-third and lower two-thirds of the wound



**Fig. 7.** A strip of skin is excised from the upper eyelid.

site. The excision of orbicularis oculi muscle is intended to define a good eyelid crease definition. Patients with thin skin usually require little or no muscle excision, whereas patients with thick skin with redundant orbicularis muscle may require considerably more excision. In cases where medial fat excision is required, a small incision into the orbital septum is made medially. The medial fat is typically paler than the preaponeurotic fat and is more fibrous. Only fat that comes easily into the wound is excised. Meticulous hemostasis is maintained. The fat is labeled and kept so a surgeon can compare the amount of tissue removed from each eyelid. The authors avoid removal of the preaponeurotic fat to avoid a hollow, overoperated look. The skin incision may be closed with a running or interrupted suture using various absorbable or permanent sutures. The authors prefer a running 7-0 prolene suture. Immediately after surgery, antibiotic ophthalmic ointment is placed over the incisions and into the cornea. Patients are asked to apply antibiotic ointment twice per day. Sutures should be removed within 5 to 7 days. Patients may resume light aerobic activity at that time but must avoid bending over or lifting more than 8 pounds for 2 weeks. Nonsteroidal anti-inflammatory medicines must be avoided for 2 weeks pre- and postoperatively.

## COMPLICATIONS

Complications from upper lid rejuvenation are infrequent and usually minor and transient. The most serious complication is partial or complete visual loss secondary to ischemic optic neuropathy or retrobulbar hemorrhage.<sup>12</sup> This complication is rare but treatment should be on an emergency

basis. These patients complain of severe orbital pain and visual deficits. Physical examination shows proptosis, tense globe, chemosis, increased intraocular pressures, and ophthalmoplegia. Emergency treatment involves exploration of the affected eye with evacuation of hematoma if present. If the vision is rapidly decomensating and intraocular pressures are high, lateral canthotomy and cantholysis with administration of ocular hypotensive agents may be necessary. The other visual complications can include an oculomotor disorder, epiphora, chemosis of lymphatic origin, and keratoconjunctivitis sicca.

A common complaint after surgery is a sensation of a dry or itchy eye. If this does not resolve after a few days, it should not be discounted as a corneal abrasion, but dry eye syndrome must be considered, which is a group of disorders caused by reduced tear production or excessive tear evaporation that may cause disease of the ocular surface. The pathophysiology can be explained by postoperative edema interfering with normal production and flow of tears. It is imperative to recognize preoperative risk factors through history and physical examination. Initially, dry eye syndrome is treated with artificial tears, ophthalmic lubricants, topical antibiotic, and steroid drops to help reduce the inflammatory response and prevent conjunctivitis.<sup>13</sup> Systemic corticosteroids can be added and tapered over 5 days. If the problem persists for more than 2 weeks, damage to the lacrimal gland should be ruled out. The presence of chemosis may alter management. If symptoms persist, an ophthalmologist should be consulted.

More common are eyelid issues from overresection or asymmetry.<sup>12</sup> These include ptosis of the upper lid, lagophthalmos, and eyelid fold anomalies. Ptosis is most often hidden on physical examination in patients with extreme dermatochalasis. If ptosis exists preoperatively, it can be addressed during the blepharoplasty. Lagophthalmos is frequent but transient and should be treated conservatively with lubricating substances and closure of the eyelids at night. Up to 3 to 4 mm of initial (eg, intraoperative and temporary) lagophthalmos may be observed after wound closure.<sup>14</sup> As the swelling resolves, the lagophthalmos improves. If there is a significant degree of lagophthalmos (up to 6 mm centrally and 1 to 2 mm medially), the excised eyelid skin should be replaced with a full-thickness skin graft.<sup>14</sup> If patients are refractory to medical treatment, reconstruction of the anterior lamella with a full-thickness skin graft should be considered.<sup>12</sup> If there is postoperative asymmetry, surgical revision can be discussed.



**Fig. 8.** Preoperative (*top*) and 4-month postoperative (*bottom*) images of patient who underwent conservative upper lid blepharoplasty and endoscopic browlift. Note that preoperatively, this patient had very full upper lids, particularly laterally. This fullness was not a result of aging, and reduction of this would not rejuvenate this patients eyelids. Preservation of epicanthal contour was important and this anatomy was maintained. Postoperatively, the patient has regained her more youthful, but full, upper eyelid/brow contour.

## SUMMARY

Rejuvenation of the upper eyelid has undergone a change in philosophy over the past 20 years with the realization that preservation of facial volume, and periocular volume in particular, is desirable in most cases. An attractive face is characterized by lateral fullness of the upper eyelid/brow area with wide-open eyes and tight upper eyelid skin. The authors advocate minimal excision of skin, muscle, and fat to preserve a fuller, more natural look of the youthful eyelid (**Fig. 8**). Surgical

rejuvenation of the upper eyelid can be achieved through various methods, including brow lift, frontotemporal lift, endoscopic forehead lift, Botox treatment, autologous fat tissue transplantation, and the use of injectable materials. The standard decision is whether or not to excise skin; skin and muscle; or skin, muscle, and fat.

There are a few new directions surgeons are taking in standard upper eyelid blepharoplasty that warrant mention. One group has espoused removal, cutting, and reimplantation of the medial fat pad within an imbricated layer of orbicularis oculi muscle.<sup>15</sup> This technique is designed to enhance a lateral, convex fullness and recreate key characteristics of the youthful eyelid. Fat can also be harvested and transplanted into upper eyelid tissue.<sup>16</sup> It remains to be seen if these techniques become widely adopted by facial plastic surgeons.

Rejuvenation of the upper eyelid is a dynamic surgical procedure that should be highly successful. A detailed understanding of the anatomic relationships of the eyelid is needed to achieve a nice aesthetic outcome. The keys to a good result are careful analysis on physical examination and of preoperative photos. The brow must also be analyzed and addressed if necessary. Standard resection of muscle and fat during upper lid blepharoplasty is no longer done routinely because the philosophy for conservative excision has become more accepted. The focus of resection should be on conservative reduction of redundant soft tissue. A youthful periocular region has subtle highlights and lateral fullness of the upper eyelid, creating an attractive frame for the eyes.

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