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## Upper Eyelid Blepharoplasty

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### History

Animation of the skin and facial musculature around the eye is an important part of non-verbal communication and conveyance of emotion. Moreover, the structure and shape of the lids, lid crease and brow can represent youth, aging, health and beauty.[1] Features of youthful eyelids include a relatively full brow positioned at the orbital rim, a crisp lid crease less than 10 mm from the lid margin, and a lateral lid free of skin draping over the lateral orbital rim[2,3]. Additionally, the sulcus below the orbital rim should not actually define the bony margin. The contemporary aesthetic ideal is that of healthy, assertive youth[3], and this archetype of beauty has replaced the high, deep lid fold that was the standard in prior decades. Blepharoplasty is now focused on modest skin, muscle and fat sculpting to achieve the desired youthful, natural-appearing eyelid.

### Classification

#### History of the Procedure

Periocular surgery dates back to the eighteenth century BC. Hammurabi's code describes the contract between a surgeon and patient and the subsequent lancing of an infected lacrimal



gland [4]. The Edwin Smith papyrus (1650 BC) provides the earliest known description of suturing of the eyebrow[5]. Further advancements in the management of a variety of ocular conditions, such as chalazion, cysts, dermoids, ankyloblepharon, dacryocystitis, lagophthalmos, trichiasis, ectropion, entropion, and eyelid tumors were made as surgical therapies gained more widespread acceptance during the time of the Romans (circa 30BC)[6].

Roman medicine, which derived much of its practices and knowledge from those of its Greek forebears, was preserved and expanded in Arabia in the 7<sup>th</sup> century AD. Many works sprung forth from this era and one of the earliest descriptions of upper eyelid blepharoplasty can be found in the *Tadhkirat al-Kahhalin* by Ali ibn Isa of Baghdad (AD 940–1010)[7]. Albucasis, a contemporary of Ali ibn Isa, was the first to describe crescent-shaped cauterization of the skin above the eye and eyebrow to correct ptosis[8].

Etymologically, blepharoplasty is derived from the Greek term *blepharon*, or “eyelid,” and *plastos*, meaning, “formed.”[9] Its introduction into the medical literature can be traced to a treatise written by Carl Ferdinand von Graefe in 1818[9]. In this original description, he used the term in the context of eyelid reconstruction using a cheek advancement flap[9]. Originally, the term blepharoplasty was used in a broader sense to imply any surgery of the eyelids[9]. The first illustration depicting the excess folds of the upper eyelid is attributed to Beer’s 1817 text[10]. In 1844, Jules Sichel made the first accurate portrayal of orbital fat herniation in association with excess eyelid skin[11]. A number of years later, Fuchs recognized that excess skin was caused by weakening of fascial attachments of the skin and tendon of the levator muscle. He subsequently described the benefits of not only removing excess skin, but also of re-attaching the levator tendon to the top of the tarsus[12]. Fuchs is also credited with originating the often misused term *blepharochalasis* in 1896.[13] It was not until 56 years later that Fox introduced the term *dermatochalasis* to describe the apparent excess eyelid skin associated with aging.[13, 14]

Textbooks of cosmetic surgery began to appear early in the twentieth century. In 1907, Conrad Miller published *Cosmetic Surgery: The Correction of Featural Imperfections*. This was the first book of its kind[15]. Shortly thereafter, in 1911, Kollé published the second text devoted to cosmetic surgery[16]. His chapter on blepharoplasty is thought to be the first to highlight the importance of pre-operative measurements and markings in anticipation of skin excision[17, 18]. In the 1920s, Bettman expounded upon the contributions of Miller and Kollé. He championed precautions that would minimize post-operative scarring. He extolled gentle treatment of tissues, exact apposition of wound edges, elimination of tension on all wound edges and timely suture removal. In 1929, Julian Bourguet described the two separate fat compartments of the upper lid and advocated their removal.[13] It is Bourguet and Suzanne Noel, one of the first female cosmetic surgeons, who are largely credited with expanding the value of photographic documentation and its role in the practice of modern cosmetic surgery.[13]

The modern technique of blepharoplasty is attributed to Castañares in his landmark 1951 article. This article focused on removal of excess eyelid skin, removal of herniated orbital fat, and creation of an eyelid crease. It was the first to include a detailed description of the orbital fat compartments[19]. In the years following his initial article, he expanded his descriptions to include treatment for blepharochalasis, dermatochalasis, hypertrophy of the orbicularis muscle, protrusion of intraorbital fat, combinations of these conditions, hooding of upper lids due to brow ptosis, and lid-cheek bags[19].



In the 1970s, the focus shifted to the levator aponeurosis and crease-fold complex. In 1974, Sheen recognized the low eyelid crease as the cause of apparent failure in many Caucasian patients undergoing upper lid blepharoplasty[13]. Over the past 25 years, the basic upper lid operation has evolved and the number of different technical procedures has increased. In the 1970s, dry-eye syndrome after blepharoplasty was first reported. As such, recommendations advocated function over cosmesis in patients with decreased tear production[13]. This has led to modifications of the procedures from its original descriptions. This was done to produce functional outcomes by addressing the upper eyelid in the context of the brow-eyelid complex as a whole. Contemporary surgery now emphasizes techniques that conserve fat, skin and muscle to avoid a deep, hollow and skeletonized appearance of the eyelids[20]

## General Principles

- The upper lid begins to show evidence of aging almost before any other facial feature[21]
- As the face ages, a variety of changes take place as a result of intrinsic and extrinsic factors:
  - **Intrinsic:** natural process of aging causing thinning of the epidermis and dermis with advancing age. This includes atrophy of the underlying musculature as well as a quantitative decrease in the number of collagen and elastic fibers.[22]
  - **Extrinsic:** gravity, smoking and sun exposure. These factors ultimately lead to pigmentary changes, rhytids and textural irregularities.[22]
- A common feature of aging is that the eyes appear to shrink. It is thought this is due to a variety of contributing factors. These include medialization of the lateral canthal tendon, a mild degree of lid ptosis (1-2 mm) and horizontal shortening of the eyelid aperture.[13]
- Upper lid blepharoplasty can alter skin, orbicularis oculi and fat pseudo herniation.
- Lateral ptosis of the eyebrow may add to fullness of the upper eyelid compounding and exacerbating the effect of redundant skin[20]
- **Dermatochalasis** refers to excess laxity of the upper eyelid skin
- **Blepharoptosis** may become apparent as the source for the patients' concerns, and is caused by disinsertion of the levator aponeurosis tendon. This must be differentiated from dermatochalasis.
- **Eyelid Ptosis** (Ptotic Eyelids, or Ptosis) – eyelids with aponeurotic defects characteristically have a high or absent upper eyelid crease secondary to upward displacement or loss of the insertion of levator fibers into the skin[23]
- **Blepharochalasis** is a rare entity that leads to atrophic, thinned skin as a result of recurrent episodes of upper eyelid edema.[24] It is an inflammatory condition of the eyelids due to a histamine response and increased IgE. In contrast to dermatochalasis, it is difficult to correct and likely to recur.[2]
- Periorbital Swelling can also be associated with systemic conditions such as allergies, and thyroid disease. Local conditions such as lacrimal gland hypertrophy,



lymphangiomas, hemangiomas, lipomas and foreign body reactions can also contribute[24]

- In the upper eyelid, it is typically the medial fat compartment where herniated fat is encountered[25]

### Normal Eyelid Anatomy and Dimensions

- Ideally, the palpebral fissures are almond shaped and symmetric between the two eyes. The palpebral fissure is typically 28-30 mm in the horizontal dimension and 9-10 mm vertically.[22]
- The Lateral canthus is located 2-4 mm higher than the medial canthus[22]
- The distance from the lateral canthus to the orbital rim is typically 5 mm[25]
- At rest, the upper eyelid normally lies at a point between the superior corneal limbus and the pupil. Typically, it covers the superior limbus by 1-2 mm[25]
- The highest point of the upper lid margin is at the medial limbus.[22]
- The upper lid crease lies 8-11 mm above the lash line, but can vary with ethnic backgrounds. The lid crease is higher in women than in men. Typically, these distances are 10-12 mm and 7-8 mm, respectively.[22]

### Surgical Anatomy of the Upper Lid

- The eyelids form the protective covering of the eyes and are the thinnest skin of the body ranging from 0.6 -1.0 mm in thickness and are unique in that they lack subcutaneous fat [25]. It is loose and mobile over the underlying structures. As one moves laterally, it becomes thicker, coarser and more sebaceous beyond the orbital margins [22].
- From superficial to deep, the eyelid is composed of skin, orbicularis oculi, tarsus and orbital septum, orbital fat, lid retractors and conjunctiva. This can be further divided into the anterior and posterior lamellae. The anterior lamella consists of the skin and orbicularis oculi. The posterior lamella consists of tarsus and conjunctiva. The lamellae are separated by the fibers of lid retractors and have separate blood supplies [22] (Fig. 1)
- The upper lid crease is formed by the insertion of the levator aponeurosis and orbital septum into the orbicularis oculi and skin. The crease is usually located at the level of the upper edge of the tarsal plate [25] (Fig. 2)
- The orbicularis oculi functions as the sphincter of the eye and can be further sub-classified into pre-tarsal, pre-septal and ocular segments. Superiorly it interdigitates with frontal and corrugator supercilii muscles as it extends over the orbital rim. The pre-tarsal portion is securely attached to the tarsus via anterior fibrous projections from the levator aponeurosis through the muscle to the overlying skin. Laterally and medially, the pretarsal muscles form parts of the medial and lateral canthal tendon, respectively.[25]
- Along the lid margin, the muscle is at its most superficial. Clinically, this corresponds to the grey line [26]

- Between the orbicularis oculi and orbital septum exists a submuscular fibroadipose layer.[25]

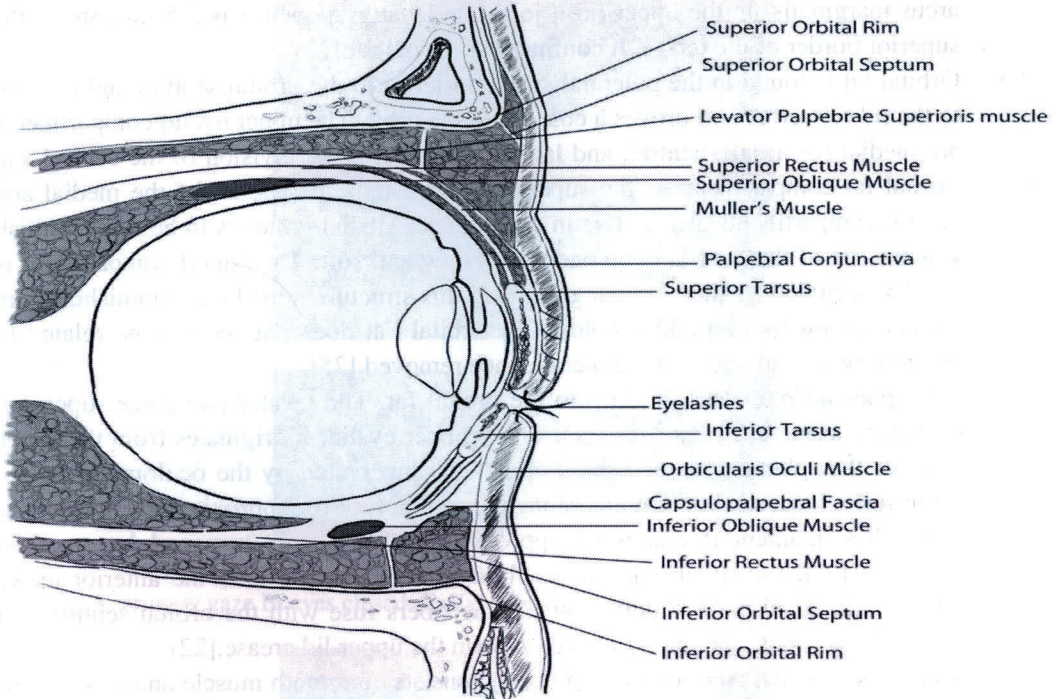


Figure 1. Anatomy of the Eyelids. Sagittal section depicting layers of upper and lower eyelid.

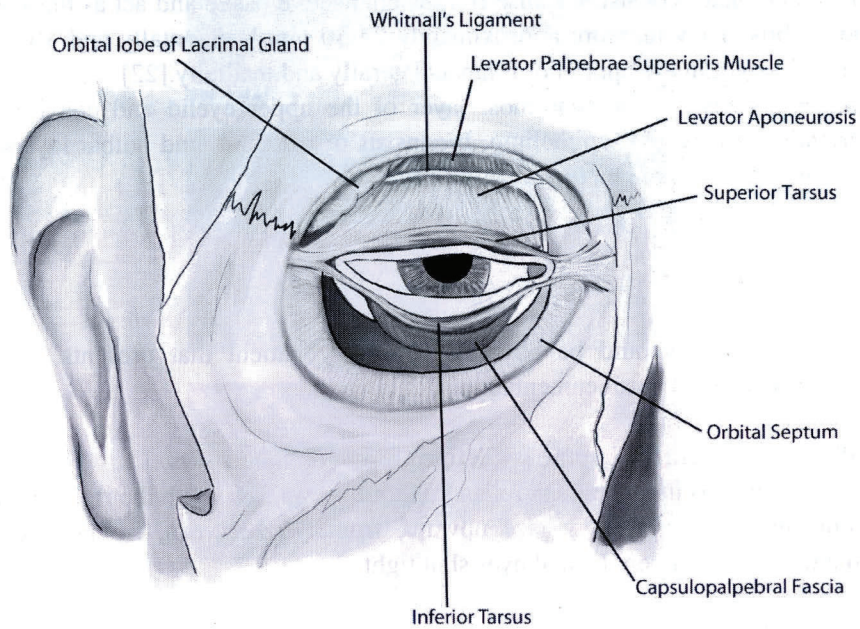


Figure 2. Schematic of levator aponeurosis insertion on upper tarsus.



- The orbital septum is a downward continuation of the periorbita into the eyelid proper. It extends from the orbital margin at a thickening of periosteum termed the arcus marginalis. In the upper lid it joins the levator aponeurosis 2-5 mm above the superior border of the tarsus. It confines the orbital fat.[25]
- Orbital fat is found in the potential space posterior to the orbital septum and anterior to the lid retractors and proves a cushion to the orbit. The upper eyelid compartments are medial (or nasal), central, and lateral (temporal). The division of the central and medial fat compartments is the superior oblique muscle. The fat of the medial and central compartments also differs in appearance. Medial fat tends to be more whitish whereas fat of the central component is yellow and soft. The lateral compartment is usually occupied by the lacrimal gland and this structure must be distinguished from the central fat by its pinkish color [22] Orbital Fat does not seem to be related to other body fat and does not regenerate once removed [25]
- The upper lid retractors lie deep to the orbital fat. The levator palpebrae superioris (Levator) acts as the major retractor of the upper eyelid. It originates from the lesser wing of the sphenoid at the orbital apex. It is innervated by the oculomotor nerve. Posteriorly, it travels horizontally along the orbital roof for approximately 36 mm. At Whitnall's ligament it makes an approximately 90 degree turn and becomes an aponeurosis. It travels an additional 14-20 mm and inserts onto the anterior upper third of the tarsal plate. Additionally, some fibers fuse with the orbital septum and together insert onto the upper lid skin to form the upper lid crease.[22]
- Mueller's muscle (superior tarsal muscle) consists of smooth muscle and arises from the undersurface of the levator aponeurosis. It is innervated by cervical sympathetic nerve fibers. It provides an additional 2-3 mm of lid retraction.[25]
- The tarsal plates consist of dense fibrous connective tissue and act as the skeleton of the eyelids. They measure approximately 25-30 mm horizontally and 10-12 mm in vertical height in the upper lid. It tapers laterally and medially.[22]
- The conjunctiva is the innermost layer of the upper eyelid and consists of non-keratinizing squamous epithelium. It consists of palpebral and bulbar layers that are continuous at the conjunctival fornix [22].

### Photodocumentation (Fig 3-5)

Digital photography should be obtained for every patient that presents for surgical evaluation of the eyelids. This documentation should include:

- Full Face photographs in primary, left, right and oblique views
- Eyes and eyelids in frontal, lateral and oblique views from both the right and left side
- Frontal eyes open, frontal gaze upward, frontal gaze down, frontal eyes closed, frontal eyes wide open, frontal eyes shut tight



Figure 3. A. primary gaze B. eyes closed, C. Eyes shut tight.

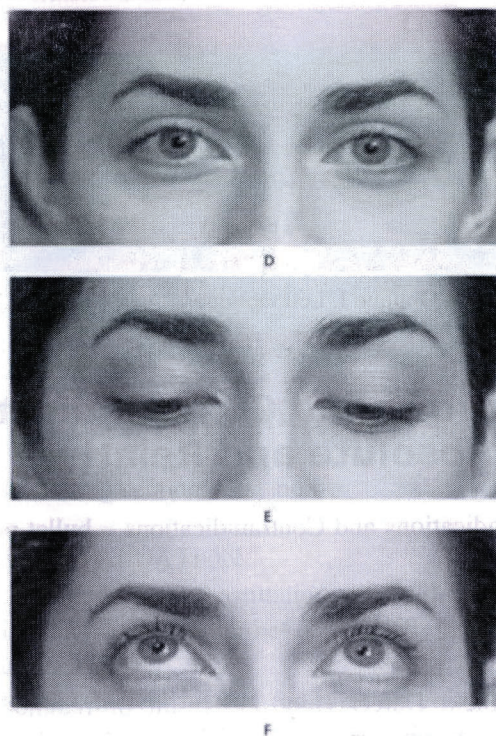


Figure 4. D. Primary Gaze E. Down gaze F. Up-gaze.



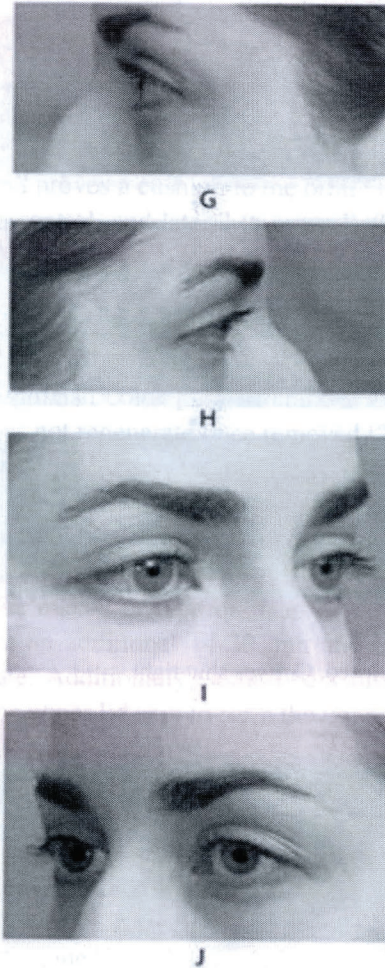


Figure 5. G. Left H. Right I. Right Oblique J. Left Oblique.

## Indications and Contraindications (Absolute and Relative)

Summary box titled Indications and Contraindications – bullet points detailing section's key points

Indications:

- Dermatochalasis (Fig. 6)
- Superior Visual Field Defect (Fig. 7)– result of redundant upper lid skin that overhangs the upper lid margin
- Orbital Fat herniation
- Lateral Hooding (Fig. 7)
- Orbicularis Oculi Hypertrophy

### Contraindications

- **Dry Eye Syndrome** – patients with this condition are likely not candidates for upper lid blepharoplasty as it can precipitate dry eye syndrome by altering the upper lid visor function[21]
- **Unrealistic expectations**
- **Thyroid Disease** – oftentimes, medical not surgical therapy is required in these cases. Furthermore, patients with thyroid disease must be followed up for at least 6 months until their eyelid retraction measurements and eyelid edema and herniated fat are stable before surgery can be considered[13]
- Systemic Collagen diseases (Rheumatoid arthritis, systemic lupus erythematosus, periarteritis nodosa)-increased risk of associated dry eye syndrome[14]

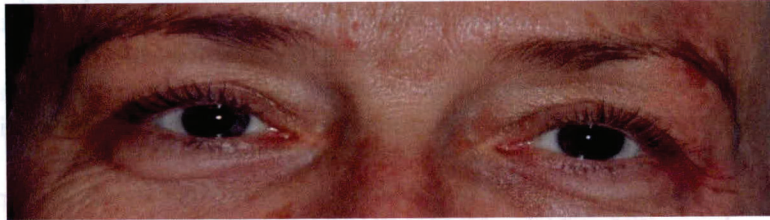


Figure 6. Aging Eyes with Dermatochalasis.



Figure 7. Aging Eyes with hooding of lateral eyelid.

## Techniques

Bulleted techniques detailing section's key points

- **PRE-OPERATIVE EVALUATION**
  - The pre-operative consultation should emphasize prevention of complications and should be considered the foremost concern prior to blepharoplasty[3]
  - A thorough Medical history focusing on conditions that may increase the likelihood of unfavorable outcomes should be elicited from the patient. This should focus on chronic illness, hypertension, diabetes, liver disease, bleeding disorders, thyroid disease, collagen vascular disease, and allergic dermatitis.[3]



- Medications should be documented, including herbal and over-the-counter medications as these can interfere with clotting. Steroids, hormones, beta-blockers and aspirin-containing medications should be sought specifically.[30]
- According to a 2001 JAMA article, Garlic, Ginseng and Ginko Biloba have anti-coagulant properties and should be stopped prior to surgery.[24]
- A social history should also be obtained, as the patient will be instructed to avoid alcohol in the post-operative period.[3] The social history should include smoking history, number of cigarettes smoked per day and any history of drug use[30].
- A history of any facial muscle weakness (**Bell's Palsy, trauma, facial nerve surgery**) should be elicited as incomplete return of facial nerve function can adversely affect the expected results from a cosmetic blepharoplasty.[30]
- The skin type (Fitzpatrick Scale), pigmentary changes and other periorbital lesions (e.g. xanthelasma) should be noted. In the case of a malignant lesion, preservation of local tissue to perform the reconstruction is essential. This may postpone or eliminate the possibility of cosmetic blepharoplasty.[30]
- When examining the forehead and eyebrow, one should look primarily for brow ptosis which can cause excessive upper lid folds.[13] In patients with apparent dermatochalasis of the upper lid excising upper eyelid skin without addressing the brow will only minimally improve if not worsen the appearance.[13]
- The patient can be evaluated for brow ptosis by elevating his or her brow with the surgeon's finger while the patient is in a sitting position. This may eliminate much of the extant dermatochalasis, underscoring the need to address the concurrent brow ptosis.
- Ophthalmologic history should be sought to include corrective lenses, past or current history of xerophthalmia. More specifically, the patient should be questioned about superior visual impairment owing to dermatochalasis.[3]
- A thorough Ophthalmologic examination should be performed. It is essential that a vision test be documented pre-operatively[22]. Additionally, the upper lid protective mechanism should be evaluated by checking the following parameters: **Bell's phenomenon, lagophthalmos, facial nerve function, corneal sensitivity, and decreased blinking**[22]. Extraocular muscle function should also be documented.
- Special consideration must be given to patients who have previously undergone LASIK (laser in situ keratomileusis) corrective surgery. Because LASIK and blepharoplasty both may cause dry eye symptoms, the possible cumulative effect of these surgeries is a serious consideration[25] It should be assumed that tear function is not normal for at least 6 months, and possibly longer, after a LASIK procedure. A patient who has undergone LASIK within the past year should be informed that there is probably a greater than average chance of having dry eye symptoms following blepharoplasty. If a patient already has dry eye symptoms after LASIK, consider delaying the blepharoplasty. [28]



- Pre-operative asymmetry should be noted by the surgeon and pointed out to the patient at the time of the pre-operative visit. Oftentimes, patients are unaware of their facial asymmetry but may become more aware of these asymmetries following surgery.[13] Moreover, asymmetry can be a large component of the patient's displeasure with his or her aging.[13] Brow position can be influenced by the upper lid, especially in patients who reflexively elevate their ipsilateral eyebrow in response to ptosis of the eyelid. Any correction of inherent asymmetry should be undertaken with caution as the patient may interpret achievement of post-operative symmetry as if they were "out of balance" (seeing as they have lived with asymmetrical features for most of their lives). [13] Ultimately, the evaluation of periorbital asymmetry should be used to tailor procedures to optimize results by either maintaining the asymmetric appearance, or improving symmetry so the asymmetric appearance does not become more obvious following surgery.[13]
- Determination of the patient's motivations and expectations are critical. Every effort to obtain any prior consultations with other aesthetic surgeons should be made and documented.[3]
- DESCRIPTION OF THE TECHNIQUE [13] (Figures 8 to 17))
  - Blepharoplasty is typically performed in an outpatient setting and can be performed under local, conscious sedation, monitored anaesthesia care (MAC), or general anesthesia. If performed in conjunction with browlift, the incisions for blepharoplasty should be performed following completion of the browlift.
  - Marking the eyelids for upper lid blepharoplasty is the single most important step of the procedure. This should be performed with the patient in the supine position. This eliminates any effects gravity may have on the position of the brow and lid. Prior to marking, the skin should be cleaned thoroughly to remove any skin oils of make-up.
  - The lower marking should be at the natural skin crease of the upper lid or 1 mm above this crease. Typically, the creases are symmetric, however should this not be the case, a caliper can be used to correct for any asymmetry.
  - A line is drawn at the site of the pre-determined eyelid crease. The eyebrow should be elevated at this time to reduce the upper eyelid skin fold and to make the upper lid skin taut and lashes slightly everted
  - A caliper is then used to measure distances from the lid margin to fashion the lower incision. In women, the temporal mark is placed 10 mm above the eyelid margin, the central mark 11 mm, and the nasal mark 9 mm above the lid margin. In men, the marks are 9 mm temporally, 10 mm centrally and 8 mm nasally. The dots are then connected and at the lateral canthus should curve upward in a natural skin crease. It should extend to the lateral orbital rim. Especially in males, care should be taken not to extend the incision past the rim, as this may cause an unsightly scar. Unlike in females, application of periorbital make-up post-operatively is typically not an option. (**Figures 8 and 9**)



- A forcep is then used to determine the amount of skin to be excised. The lower tine of the forceps should grasp the skin at the previously delineated mark and should pinch the skin of the upper eyelid until slight eversion of the eyelids (but not exposure of the eye) is achieved. Palpation of the upper eyelid skin will then reveal the transition between the skin of the upper lid and that of the thicker eyebrow skin. This prevents lagophthalmos post-operatively. Furthermore, leaving at least 20 mm of lid skin helps to prevent this complication.
  - A fusiform area of skin to be excised is then completed with angles of 30 degrees at both the medial and lateral portions of the incisions. This superior marking should be at least 13 mm from the lid-brow transition. The skin can be pinched and should be adjusted as needed.
  - The opposite eyelid is then marked in an identical fashion and comparisons are made to ensure symmetrical amounts to be excised.
  - At this point, local anesthetic is infiltrated in the immediate subcutaneous plane. The skin is typically taken as a single layer.
  - A no. 15 scalpel is then used to make the incision along the inferior limb. **(Figure 10)** The depth should be through skin only, leaving the orbicularis muscle intact. Following incision of the lower limb, the upper limb is also incised using the scalpel **(Figure 11)**.
  - The lateral edge of the incised skin is then gently grasped with fine forceps and elevated from the underlying orbicularis. This is done initially with a scissor **(Figure 12)** The skin is then raised from the underlying orbicularis using a fine needle-tip cautery **(Figure 13 and 14)**
- Following excision of the skin, hemostasis is achieved using electrocautery **(Figure 15)**
- The wound is then closed in a single layer using 6-0 fast absorbing gut in a simple interrupted fashion **(Figure 15 and 16)**
  - No dressing is applied to the eyelid, however ophthalmic bacitracin is used post-operatively. **(Figures 18, 19 and 20,21)**

Below is a description of techniques to address orbicularis hypertrophy and pseudo-herniation of orbital fat. These procedures are not typically performed and should be undertaken with caution.

- In instances of orbicularis hypertrophy, skin and orbicularis can be taken together. This however is uncommon and beyond the scope of this text. Alternately, the orbicularis can be excised via a second step. A button hole incision is made in the orbicularis using a blunt Wescott scissors. The sub-orbicularis space is then entered and undermined. A Colorado needle-tip bovie is then used to excise the skin and orbicularis.
- Resection of the orbicularis allows for identification of the orbital septum and fat beneath the septum. The fat pseudo-herniation is then addressed using one of two methods. Bovie cautery of the orbital septum causes contraction and thusly a decrease in the amount of herniation. Alternately, the septum can be opened and a variable amount of fat can be excised. Gentle pressure is applied to the globe and fat will protrude into the wound. This should serve as a guide for the amount

to be resected as more aggressive fat removal can lead to a hollowed look post-operatively

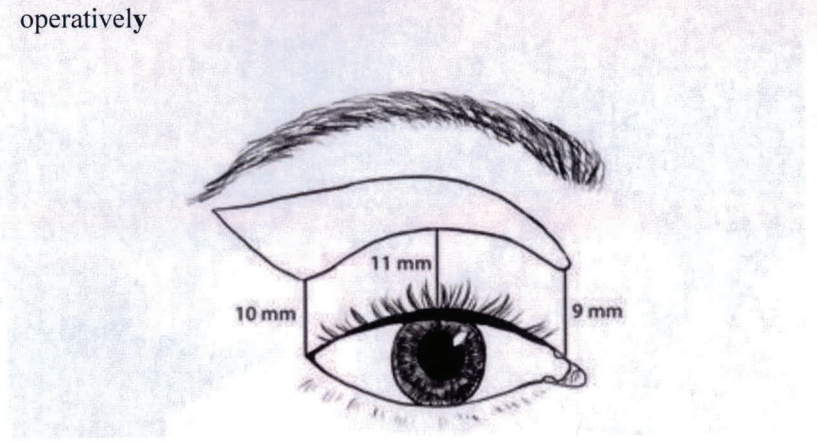


Figure 8. Female incision design.

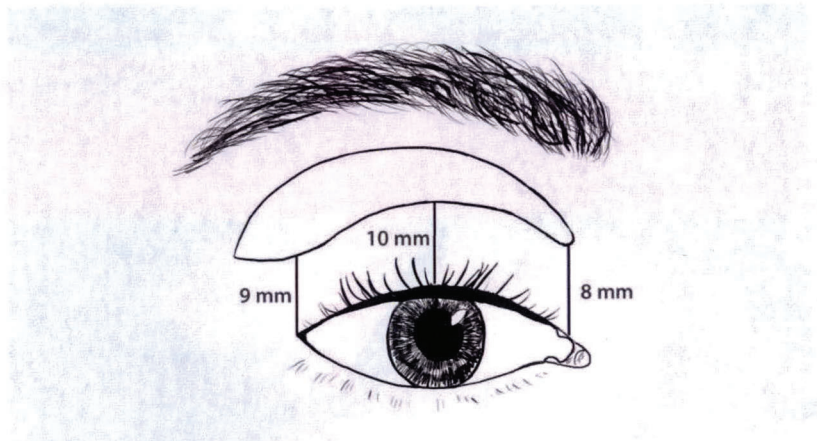


Figure 9. Male incision design.

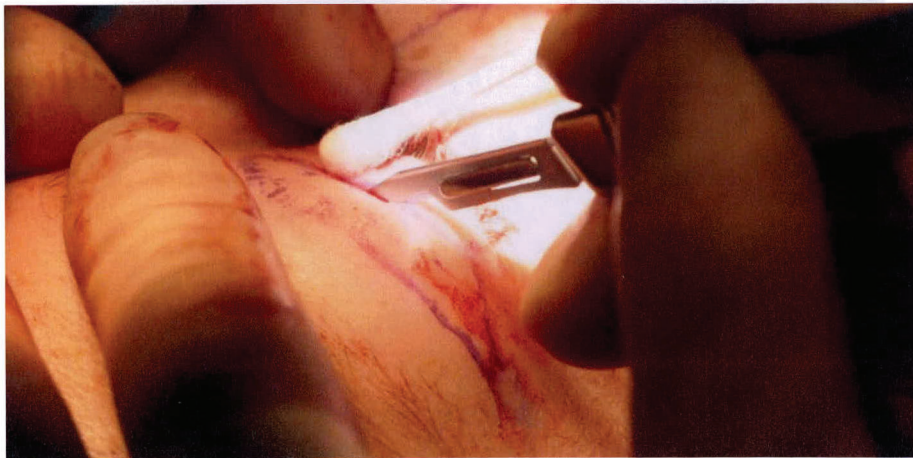


Figure 10. Incision along inferior limb.



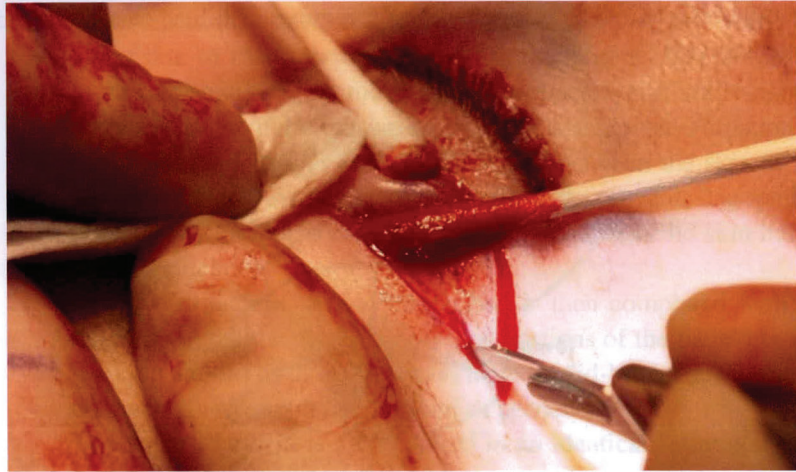


Figure 11. Incision along superior limb.

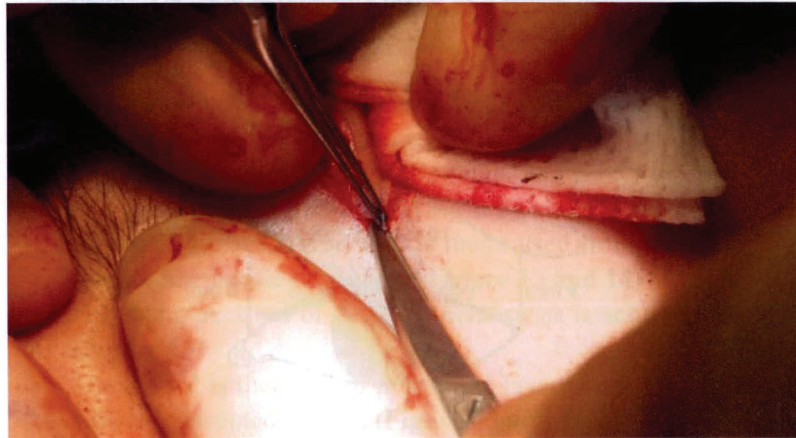


Figure 12. Lateral corner being trimmed with scissor.



Figure 13. Skin excision.

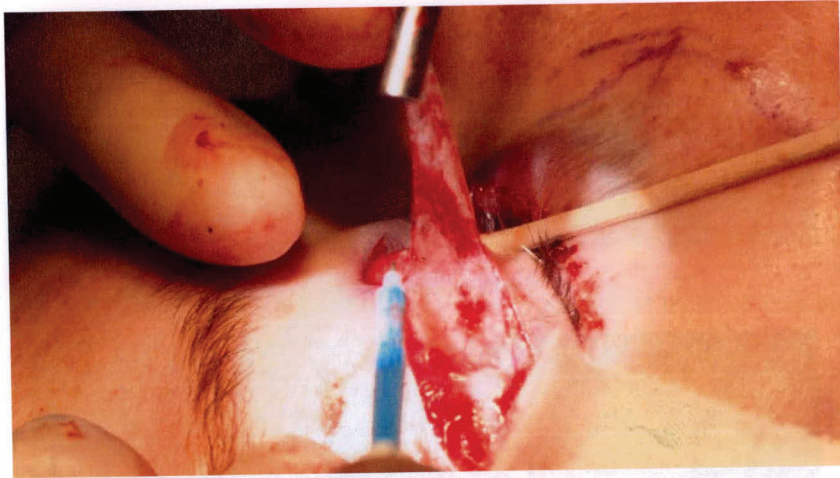


Figure 14. Skin excision.

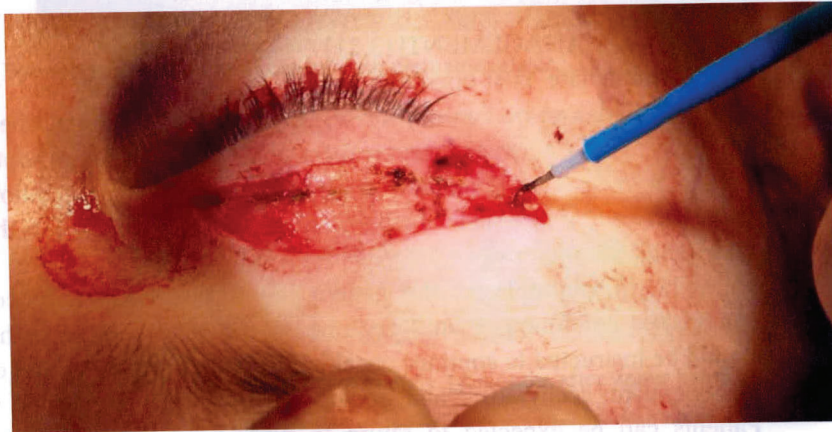


Figure 15. Hemostasis.



Figure 16. Wound Closure.





Figure 17. Final result following closure.

- POST-OPERATIVE MANAGEMENT[13,21]
  - In the immediate post-operative period vision is keenly and frequently observed. This can be done by having the peri-operative staff check for the ability to count fingers and ensure there is no severe pain or proptosis. Any change in these regards should prompt immediate medical attention as these may indicate retrobulbar hemorrhage, which is a vision-threatening complication.
  - Following blepharoplasty, the patient is instructed to apply cool moist compresses continuously until bedtime. The patient and his or her family should be instructed to continue checking for visual or peri-orbital changes.
  - Postoperative ecchymosis and edema of the eyelid are to be expected. Patients can be expected to return to work approximately 7 days post-operatively.
  - Post-operative pain is not usually a major problem and can typically be managed with acetaminophen with or without codeine.
  - Anything causing vasodilation should be avoided. This includes avoidance of coffee, alcohol, and highly spiced foods.
  - Exertion should be kept to a minimum.
  - Sutures are to be removed between days 4-7 post-operatively dependent on type of suture material used.



Figure 18. Pre-operative photograph in a woman with dermatochalasis.



Figure 19. Post-operative result 12 months after blepharoplasty.



Figure 20. Pre-operative image in a woman with dermatochalasis.



Figure 21. Post-operative image taken approximately 18 months after upper blepharoplasty.

## Complications

- **SIDE EFFECTS/COMPLICATIONS**—Complications from upper lid blepharoplasty are infrequent and usually minor and transient[20] The treatment of these complications “begins” with their prevention by appropriate pre-operative assessment of “at-risk” patients.[29] Furthermore, the intraoperative use of corneal protectors and frequent use of liquid and viscous ocular lubricants during and after blepharoplasty can minimize complications[30]
- **Major Complications**
  - **Blindness/Irreversible Visual loss**

The most serious complication of blepharoplasty is partial or complete visual loss secondary to ischemic optic neuropathy or retrobulbar hemorrhage.[29] This is very rare in upper blepharoplasty, however it is a complication that must be addressed immediately. Causal Factors include intraorbital and retrobulbar hemorrhage leading to retinal ischemia or compression of the optic nerve. The patient will complain of severe orbital pain and visual deficits. Exam findings include proptosis, tense globe,



chemosis, increased intraocular pressure and ophthalmoplegia. Treatment involves exploration of the affected eye with evacuation of hematoma. Lateral canthotomy and cantholysis should be considered if there is rapid decompensation of vision. Ophthalmology consultation should be mandatory under these circumstances. Treatment must be performed on an emergent basis as the visual outcome is directly related to early diagnosis and treatment.[29]

- **Oculomotor Anomalies**

Diplopia after blepharoplasty is rare. This is typically due to injury to the superior oblique. It can be transient owing to an edematous reaction, hematoma, trauma with neuromuscular paresis or muscular toxicity due to local anesthesia. Permanent diplopia results from direct trauma to the muscle or its nerve. Persisting diplopia beyond 6 months after blepharoplasty can be an indication for muscular surgery in accordance with an orthoptic evaluation and a lesional mechanism.[29]

- **Dry Eye Syndrome (Sicca Syndrome)**

Dry keratitis is a severe and frequent complication often discovered when carrying out blepharoplasty in patients above the age of 50.[31] Risk factors include a previous sensation of dryness, tearing with lacrimal hyposecretion, proptosis, lower lid laxity, scleral show, maxillary hypoplasia, and lagophthalmia. This is best avoided by careful screening in the pre-operative period. This serves to reiterate the importance of pre-operative consultation with an ophthalmologist should features consistent with dry eyes be present at initial consultation.

- **Hematoma of the Upper Lid**

This is a rare complication after upper lid blepharoplasty. Unilateral swelling and discoloration immediately postoperatively should raise concerns about hematoma. This must be differentiated from periorbital ecchymosis, which is commonly seen following blepharoplasty and poses no long-term threat. This can be done by discerning palpable firmness associated with hematoma. Should a hematoma be encountered post-operatively, the wound is re-opened, any bleeding vessels are cauterized and the wound is again closed. Meticulous hemostasis intra-operatively is the most effective means of avoiding this complication

- **Minor Complications**

- **Asymmetry of the eyelid creases and folds**

This includes asymmetrical scarring, webbed scars from taking the upper lid incision too far medial onto the nasal skin. Slight asymmetry usually resolves spontaneously over the first few months post-operatively.[20]

- **Epiphora**

Epiphora can be a result of reflex hypersecretion due to lagophthalmia with corneal exposure, ocular hyperpressure, post-operative edema or lacrimal canicular distortion. [29]



- **Chemosis**

This is typically a transient finding, especially with trauma to the lymphatic circulation. Resolution usually takes place within 2-4 months and recovery can be accelerated with topical lubricants and anti-inflammatory agents.[29]
- **Suture Cysts**

Suture cysts are common and believed to occur by entrapment of keratinocytes beneath the skin where sutures are in place. They can be removed 2 months post-operatively by gently pricking/unroofing using a 18g needle.
- **Ptosis of the Upper Lid**

This can be seen before blepharoplasty and as above should be noted in the pre-operative evaluation as blepharoplasty should be combined with ptosis repair. If ptosis is seen in the post-operative period, it may be transient due to edema, hematoma, anesthetic toxicity, septal adhesions, or incorrect formation of the upper lid crease.[29] Permanent post-operative ptosis can be due to trauma to the levator aponeurosis and should be noted and repaired intraoperatively. When persistent postoperative ptosis occurs, it is recommended to wait for at least 3 months before considering surgical exploration. Nonetheless, very early reintervention can be discussed if trauma to the levator muscle is suspected.[29]
- **Lagophthalmos**

Can be present for a short time after upper lid blepharoplasty. It is usually mild and causes minor tearing and burning. The use of artificial tears and ointment usually alleviates the symptoms until healing allows for resolution of the issue.[20] Persistent lagophthalmos can be due to either excessive cutaneous resection or septal retraction. Treatment is conservative in the form of lubricating substances and occlusion of the eyelids while the patient is asleep.[29] Surgical correction can be considered if medical therapy fails.
- **Epicanthus**

Epicanthus can be the result of an excessively medial incision inside the lacrimal point during upper lid incision.[29] If this complication occurs, it must be treated with local massage and steroids. Surgical correction can only be undertaken 3-6 months after the initial procedure and typically requires z-plasty for correction.[29]
- **Subconjunctival Ecchymosis**

This is an unusual finding following blepharoplasty and its cause in routine cases may remain unexplained. It will typically resolve in ~ 3 weeks without further intervention. Reassuring the patient in these instances is of utmost importance as significant apprehension can accompany this finding.[20]



## Keys to Success and Pearls to Remember

Bulleted points highlighting the take home message for best results of the procedure or technique

- Successful Blepharoplasty depends on the surgeon's understanding of the interplay of aesthetic components contributing to the appearance of the upper lid with respect to the periorbital region and face as a whole
- Pre-operative screening is critical in avoiding untoward complications and undesirable patient outcomes
- Pre-operative marking is the most important step in performing upper lid blepharoplasty. If upper lid blepharoplasty alone has been deemed as the appropriate procedure for correction of the patient's aesthetic complaint, marking should be done with the patient in the upright position prior to infiltration of local anesthetic
- Pre-operative asymmetry must be noted and pointed out to the patient as this will guide the individual operative approach. Furthermore, asymmetry may become more apparent to the patient post-operatively and be a source of significant concern.
- Blepharoptosis is a condition that is seen frequently in patients presenting for blepharoplasty and requires reinsertion of the levator aponeurosis. This procedure is beyond the scope of this chapter, however.
- Brow Ptosis is a common feature of aging and is a common condition affecting the population of patients that may present in consultation for cosmetic blepharoplasty. This is a feature that must be addressed as failure to recognize brow ptosis as the source of the patient's problem can result in worsening of the patient's appearance
- Concurrent brow lift and blepharoplasty can be a challenging proposition and requires extensive experience with the techniques involved. Oftentimes, one should choose to stage the procedures with elevation of the brow preceding cosmetic blepharoplasty.

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