

Fig. 1.1 Measurements of palpebral fissure (PF) (a), palpebral fissure on downgaze (dPF) (b), margin reflex distance 1 (c), margin crease distance (d), margin fold distance (e), and inferior limbus to brow (f). Measurements are done with the contralateral eyelid elevated, as seen in Fig. 1.2.

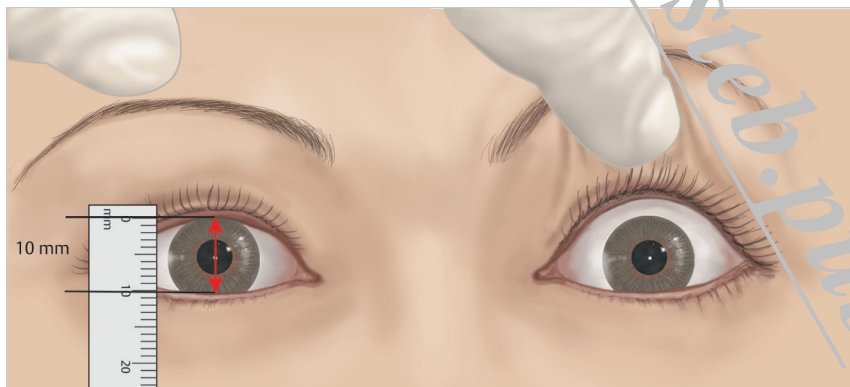


Fig. 1.2 Measuring the palpebral fissure (PF) with a ruler. Note that the contralateral eyelid is elevated while measuring the eyelid opening in primary gaze.

upper eyelid. In bilateral ptosis, the fellow eyelid will drop when lifting the more severely ptotic eyelid (► Fig. 1.3). In pseudoeyelid retraction, the fellow eyelid will return to normal position.

Insurance companies frequently require visual field testing prior to eyelid surgery. It is performed first with the patient gazing straight ahead while the eyelid and eyebrow are relaxed, and then with the eyelid and eyebrow taped up to a normal position. The difference in visual field between the two positions is considered the deficit produced by the eyelid and/or eyebrow malposition. Typically, a 20 to 30% upper visual field change is considered a functional deficit and is covered by

insurance. Testing with an automated perimeter or a tangent screen perimeter will document the visual field deficits.

Eye Protective Measurements

An adequate assessment of eye protective mechanisms is critical prior to surgery. The surgeon must explain to the patient that the eyelids and eyebrows are not purely decorative; they are designed to protect the cornea and preserve eye function. When lifting a ptotic eyelid, it is important to make sure that the eye remains adequately protected and can tolerate greater exposure to the outside world. The surgeon must document

description may not be as universal as was once thought, and that the preauricular node may be important for medial drainage in addition to lateral drainage.²⁰ More work will be necessary to clarify these patterns. Clinically, these drainage patterns are important for understanding hematogenous metastatic spread of eyelid tumors, though basal cell carcinoma, the most common eyelid malignancy, tends not to spread in this way.^{8,11}

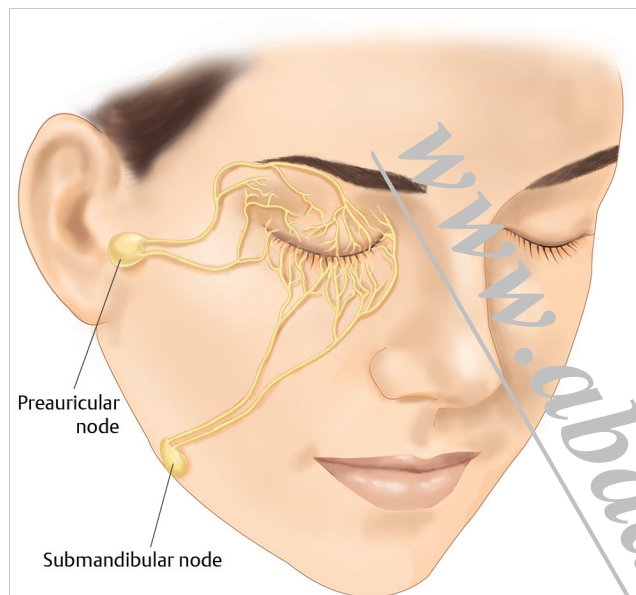


Fig. 2.11 Lymphatic drainage of the upper eyelid and forehead. Demonstration of the lymphatic drainage of the upper eyelid and forehead, showing lateral drainage to the preauricular node and medial drainage to the submandibular node. (Reproduced with permission from <https://www.slideshare.net/hindalshawadify/eye-lymphatics>.)

2.11 Unique Considerations for the Upper Facial Surgeon: Facial Danger Zones

See ► Fig. 2.12 and ► Table 2.1.

2.12 Unique Anatomical Considerations for the Eyelid Surgeon

The structures of the eyelid are grouped into lamellae, a distinction that has important clinical and surgical implications. The anterior lamella consists of skin and the orbicularis oculi; the middle lamella consists of the orbital septum, preaponeurotic fat pads, and retractor muscles; and the posterior lamella consists of tarsus and conjunctiva. Cicatrization of any lamella results in a distinct clinical picture, and the oculofacial surgeon must recognize the results of damage to each structure during preoperative planning. For example, anterior lamella scarring or shortening can lead to eyelid eversion, or ectropion, whereas posterior lamella shortening can lead to eyelid inversion, or entropion. Middle lamella scarring can lead to difficult dissection in the ptosis reoperation patient. All of these entities can be addressed surgically by lengthening the affected lamella.

2.12.1 Anterior Lamella

The skin and orbicularis oculi muscle of the anterior lamella have been discussed. The surgeon performing blepharoplasty and external ptosis repair must remain cognizant and vigilant regarding the amount of eyelid skin to remain after resection, as discussed previously. Traditional thought is that the surgeon should leave behind 20 mm of eyelid skin between the eyelid margin and inferior eyebrow hairs to allow for proper eyelid closure. Overresection causing anterior lamellar shortening may lead to lagophthalmos and induced eyebrow ptosis.

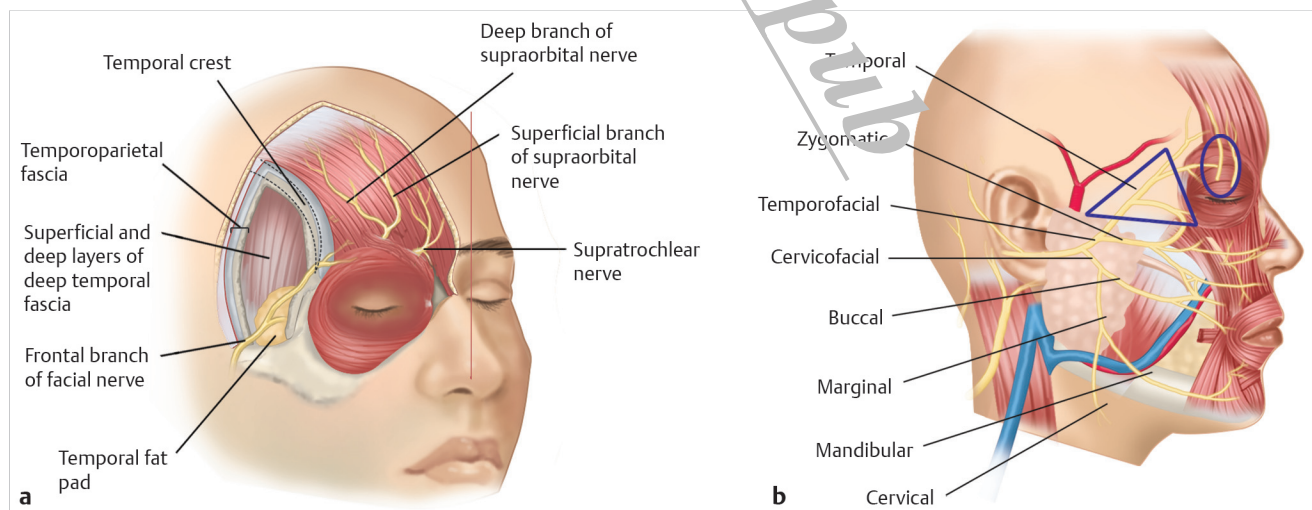


Fig. 2.12 (a, b) Danger zones in the upper face. Illustration of the course of the temporal branch of the facial nerve in the upper face and the supraorbital and supratrochlear nerves in the medial forehead and the areas in which these nerves are at particular risk for surgical damage. Note that in the temporal region, the temporal branch of the facial nerve runs in the temporoparietal fascia superficial to the deep temporalis fascia. (a: adapted from: La Trenta GS. Atlas of Aesthetic Face and Neck Surgery. Philadelphia, PA: Saunders Elsevier; 2004 (Print); Part 2: Seckel.²¹)

obstruction producing periocular edema and a mechanical ptosis.⁹ Treatment in all cases of systemic malignancy is aimed at the underlying disease and should be coordinated with an oncologist.

4.4 Orbital Lesions

Mechanical ptosis may be a presenting sign or complaint in patients with an anterior orbital lesion. Examples of such lesions include dermoid cyst, lacrimal gland tumors, lymphoproliferative malignancies, rhabdomyosarcoma, and orbital metastases. In addition to mechanical ptosis, clinical examination of these patients often shows nonspecific findings such as periorbital fullness, a palpable mass, chemosis, or skin discoloration.

Orbital dermoid cysts are benign choristomas, containing skin and dermal appendages. They most commonly occur at the frontozygomatic suture but may also be found at the frontonasal suture (► Fig. 4.6). These lesions typically present as a slowly progressive, painless mass in the superotemporal or superonasal quadrant of the orbit in a child. Intervention is usually performed to improve cosmesis, though rarely these lesions may become large enough to cause mechanical ptosis and occlude the visual axis. Orbital dermoid cysts are usually readily accessible through an eyelid crease incision and should be completely excised.

Rhabdomyosarcoma is a highly malignant mesenchymal tumor associated with significant morbidity and mortality if untreated. When arising in the orbit, the classic presentation is a new, rapidly progressive unilateral proptosis with globe

displacement in a child. Mechanical ptosis is a presenting sign in 30 to 50% of patients, typically with overlying skin changes such as edema and erythema (► Fig. 4.7). After establishing the diagnosis, the mainstay of treatment is radiation and systemic chemotherapy. If detected early, these tumors have a relatively good prognosis. Small, encapsulated lesions may be surgically excised in conjunction with radiation and chemotherapy.¹⁰

Adult patients with a history of malignancy presenting with an orbital lesion causing mechanical ptosis should elicit a high suspicion for metastatic disease (► Fig. 4.8a, b). Breast and lung carcinomas are the most common primary malignancies to metastasize to the orbit (► Fig. 4.9). Orbital metastases from breast carcinoma may show a unique scirrhous reaction in which orbital soft tissues fibrose and retract, often causing enophthalmos, ptosis, and restricted ocular motility. The clinician should consider metastatic disease in any patient with a history of breast cancer presenting with this triad or any of its permutations. Treatment of orbital metastases is usually palliative and may involve local radiation therapy.

4.5 Periorbital Infections and Inflammation

Both preseptal and orbital cellulitis commonly present with mechanical ptosis. Eyelid changes include edema, erythema, and warmth; the edema is often significant enough to cause inferior displacement of the upper eyelid (► Fig. 4.10). Medical management includes treating the underlying infectious process with the appropriate antimicrobials. If an eyelid abscess is



Fig. 4.6 Orbital dermoid cyst on the right side along the frontal-nasal suture line resulting in mechanical ptosis of the right upper eyelid.



Fig. 4.7 Orbital rhabdomyosarcoma of the left superior orbit causing mechanical ptosis of the left upper eyelid. The overlying skin of the left upper eyelid is erythematous, and there is also tumor protruding into the superior fornix.

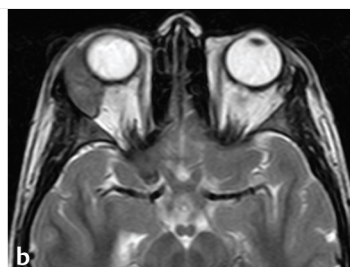


Fig. 4.8 (a) Leukemic infiltrate of the right lacrimal gland causing mechanical ptosis of the right upper eyelid with an S-shaped configuration to the eyelid. (b) Axial cut of the orbital magnetic resonance imaging (MRI) show significant enlargement of the right lacrimal gland.

- Patient satisfaction, optimized by preoperative expectation management.

5.3 Risks

- Vision loss from orbital hemorrhage.
- Temporary lagophthalmos.
- Temporary eyelid edema.
- Worsening dry eye.
- Undercorrection.
- Overcorrection.
- Visible scar.
- Wound dehiscence.
- Acute or delayed infection.⁴

5.4 Benefits

When performed correctly, patients undergoing upper eyelid blepharoplasty can expect an improvement in their superior visual field, improvement in the sensation of heaviness from upper eyelid skin, lessened need for chronic frontalis and eyebrow elevation, and improved cosmesis.

5.5 Informed Consent

All patients should be informed of the risks as described above and that, as with any surgery, every patient may heal differently and results are never guaranteed. Surgery should never proceed without a signed consent from the patient or guardian acknowledging an understanding of the risks, benefits, and alternatives to surgery.

5.6 Indications

- Upper eyelid skin resting on or below eyelashes.
- Superior visual field obstruction that improves with elevation of eyelid skin.
- A displeasing facial aesthetic.



Fig. 5.3 Poor candidate for upper blepharoplasty alone as the patient's eyelid descent is related to involutional blepharoptosis and not redundancy of upper eyelid skin.

5.7 Contraindications

- Upper eyelid skin deficiency from previous blepharoplasty.
- Suspicion for cutaneous periocular malignancy and need for possible rotation flap or skin graft.
- Upper eyelid descent secondary to levator aponeurosis dehiscence and minimal upper eyelid skin (► Fig. 5.3).
- Unrealistic patient expectations.

5.8 The Procedure

It can be performed in an office-based procedure room or surgery center.

5.8.1 Preoperative Checklist

- Signed consent in chart.
- Documentation of symptoms and signs of preoperative dry eye:
 - Dry eye complaints.
 - Ocular surface examination.
 - Schirmer's testing in patients with dry eye.
- Blood thinners have been stopped at an appropriate interval before surgery.
- Sterile instrumentation on hand.
- Preoperative photographs documenting the eyelid malposition, primary and oblique angles.

5.8.2 Instruments Needed (► Fig. 5.4)

- Sterile marking pen.
- Skin ruler or Jameson caliper (Bausch & Lomb E2410).
- Scalpel and #15 blade or diamond knife.
- Skin hook (single).
- Skin rake: three-prong or four-prong.
- Toothed forceps (0.5 Castroviejo or other but should avoid larger Adson-like teeth on delicate eyelid skin).
- Blunt-tip Westcott scissors.
- Castroviejo needle drivers.
- Cautery: Bovie, needle tip (Colorado type) or bipolar.

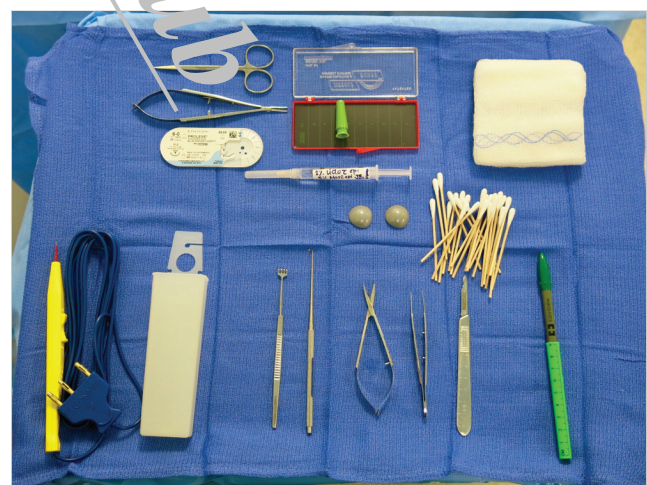


Fig. 5.4 Upper blepharoplasty surgical instrumentation.



Fig. 5.8 Multidirectional countertraction and skin flap elevation facilitates (a) creation of skin-only flap with minimal hemorrhage and (b) preservation of healthy orbicularis with undisturbed vascularity and innervation.



Fig. 5.9 Selective medial orbital fat excision.



Fig. 5.10 Sutured wound with air knot medially for ease of postoperative removal.

used to cauterize the base of the pedicle, and cutting cautery is used for excision (► Fig. 5.9).

- Although beyond the scope of this chapter, any adjunctive procedures such as medial or preaponeurotic fat pedicle repositioning, fat grafting, or brow stabilization suture can be performed here.
- Placement of a single skin hook at the lateral apex of the wound facilitates easier wound orientation for closure that minimizes risk of poor skin alignment or dog-ear (► Fig. 5.8b). The wound is closed with a running 6–0 Prolene or 6–0 plain suture. If Prolene suture is used, an air knot can be placed at the beginning of the wound, and the suture can be tied onto itself at the end of the wound to facilitate ease of removal at the postoperative appointment (► Fig. 5.10).
- The face and wound are cleaned with sterile saline-soaked gauze and ophthalmic antibiotic ointment is placed on the incision site.
- In the recovery area, the head of bed is elevated 30° and ice compresses are placed over the upper eyelids.
- Typical pre- and postoperative results are shown in ► Fig. 5.1a, b.

5.8.5 Expert Tips/Pearls/ Suggestions

- Local anesthetic pearls:

Place commercially available or compounded lidocaine topical anesthetic cream on the upper eyelid skin 15 minutes before marking to dull the discomfort from the needle stick during injection. Cream should be wiped off well before marking.

- The addition of sodium bicarbonate 8.4% to the local anesthetic mixture buffers the medication closer to physiologic pH, which minimizes burning during injection. Add the equivalent of approximately 0.5 mL of bicarbonate to every 10 mL of anesthetic solution.
- The addition of hyaluronidase to the local anesthetic aids in hydroenzymatically dissecting skin from tightly adherent underlying orbicularis in preparation for preserving orbicularis during the procedure.
- Management of the deflated eyebrow:
 - Patients with preoperative brow deflation and descent are at higher risk of postoperative dissatisfaction with the appearance of residual hooding after upper eyelid blepharoplasty alone. Telltale signs of predisposed brows include the lack of brow convexity on side profile view and the presence of “brow whiskers,” which are noticeable rhytids oriented superotemporally throughout the lateral half of the brow (► Fig. 5.11a, b).
 - Management of these patients include:
 1. Preoperative education on the limitation of results from blepharoplasty alone.
 2. Consideration for concurrent temporal browlift with possible fat grafting.

- The eyelid crease is set based on the patient's wishes, usually at 4 to 7 mm, based on the patient's preference for eyelid crease (► Fig. 6.4).
 1. Usually, the eyelid crease is set at or slightly below the maximum tarsal height.
- A decision is made with the patient about the preservation of the medial canthal fold.
 1. For a parallel crease, a more level and equidistant crease is demarcated.
 2. For a medial canthal tapered incision, the incision should fall into the fold medially.
 3. To change a medial epicanthal fold to a parallel eyelid crease, a Z-plasty may need to be performed.
- A decision is made as to how much eyelid skin to be shown (margin fold distance) postoperatively.
- A preoperative decision is made as to how to shape the lateral canthal incision.
 1. Whether the patient wishes to have an upward widening of the margin fold distance or a leveled configuration.
- Local anesthesia is injected and massaged into place, waiting 5 to 10 minutes for the full anesthetic and hemostatic effect.
 - Hyaluronidase is used to help spread the local anesthetic with minimal injection sites.
- A traction suture may or may not be placed.
- An incision is made with a #15 blade or diamond knife (► Fig. 6.5).
- A skin-only blepharoplasty is performed, preserving orbicularis muscle using the Colorado needle tip, Westcott scissors, or diamond blade (► Fig. 6.6). Some subdermal tissue (subcutaneous fat) may be removed.
 - By preserving the orbicularis muscle, eyelid closure is not affected.
 - Orbicularis excess may be sculpted with gentle cautery of the Colorado needle tip.
- A 2- to 3-mm strip of pretarsal orbicularis is removed above the incision line—no septum (► Fig. 6.7).
- If there is fatty prominence, a small amount of fat may be removed or sculpted by buttonholing through orbicularis and the nasal and central septum with Westcott scissors.
 - Typically, in the Asian eyelid, minimal fat is removed.



Fig. 6.4 An example of eyelid crease placement for double eyelid surgery.



Fig. 6.5 The incision is made with a #15 blade, preserving the medial epicanthal fold.



Fig. 6.6 Dissection of a skin and subcutaneous fat plane in double eyelid surgery; orbicularis muscle is preserved.



Fig. 6.7 Removal of a 2-mm strip of pretarsal orbicularis muscle.

measure the amount of descent when the eyebrow is dropped. The same height is measured and marked cephalically to the brow.

- Another mark may be placed laterally to raise the lateral third of the brow (► Fig. 9.3).
- A third marking is placed to localize the medial supraorbital notch.
- A standard blepharoplasty mark is finally performed, taking into account the final brow position.
- Topical proparacaine is instilled in both eyes prior to injection and before preparation of the face with povidone-iodine.
- Pain during anesthetic infiltration may be reduced by injecting a 1:5 mixture of anesthetic (lidocaine 2% with epinephrine:sterile saline) to the surgical area.
 - A higher concentration of local anesthetic (lidocaine 2% with epinephrine and/or bupivacaine 0.75%) may then be



Fig. 9.3 Preoperative marking. Lateral markings indicate the level of desired eyebrow elevation at each point. Supraorbital notch location is marked medially.

painlessly infiltrated in each eyelid and brow area (► Fig. 9.4a).

- A bilateral standard upper eyelid blepharoplasty is performed.²¹
- Using blunt scissors or a monopolar cautery, dissection is carried out superiorly in the suborbicularis plane until the orbital rim is reached (► Fig. 9.4b).
- Stevens scissors are used for blunt dissection superficial to the ROOF, using a vertical and horizontal spreading motion (► Fig. 9.4c).
 - The goal is to create a pocket 1.5 to 2 cm above the superolateral orbital rim, being careful not to extend nasally to the previously marked supraorbital neurovascular bundle.
- Brow fat debulking has been described to thin lateral fullness.²² We prefer not to do it as we believe this is important for the maintenance of a more natural and youthful volume and contour in this area.
- If there is significant medial brow ptosis, the medial depressor muscles (corrugator, depressor supercilii, and procerus) can be released/divided.^{5,10}
 - The dissection proceeds medially in a suborbicularis plane using a scissor-spreading technique until the corrugator, depressor supercilii, and procerus are identified.
 - Care should be taken during dissection to minimize damage to supraorbital and supratrochlear neurovascular bundles to avoid sensory paresthesias.
 - The muscles are selectively divided using cautery and scissors to titrate protractor release.

Note: Too much muscle destruction may widen the intra-brow distance in an aesthetically displeasing way.

- A 4-0 polyglactin 910 suture is passed transcutaneously at the previously marked eyebrow location into the dissected plane. The suture is placed through the superior orbital rim ROOF and periosteum and passed through the sub-brow tissue.

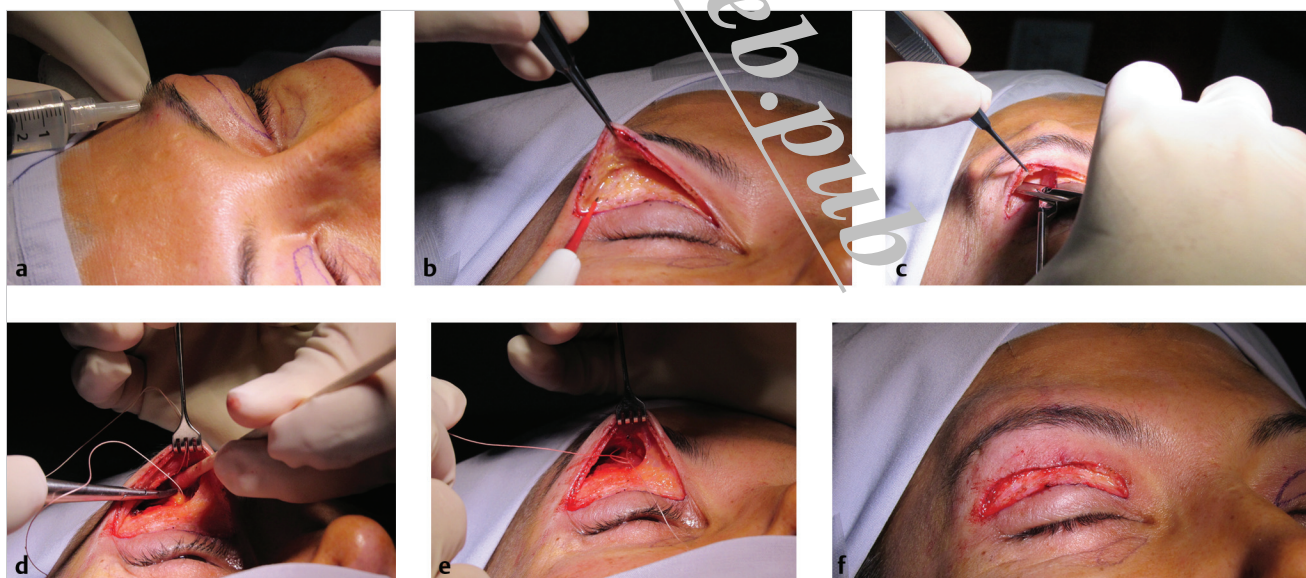


Fig. 9.4 Internal browlift technique. (a) Local anesthetic is infiltrated in the upper eyelid and brow area. (b) After upper blepharoplasty, dissection in the suborbicularis plane is performed to reach the orbital rim. (c) Blunt dissection is completed above the ROOF, using a spreading motion with Stevens scissors. (d) A 4-0 Vicryl suture is passed transcutaneously into the dissected pocket and placed through the superior orbital rim ROOF and periosteum and passed through the sub-brow tissue. (e) The suture is pulled from the skin into the dissected plane and tied. A second suture may be placed laterally. (f) Blepharoplasty incision is closed.

Likewise, the undermined plane may be subcutaneous and superficial to all major neurovascular bundles or deep to the galea (► Fig. 10.5). Care is taken medially and laterally to avoid damage to nerves. After undermining and any galeal advancement, the undermined soft tissues and forehead skin are elevated and overlapped to determine if the proposed excision from the initial markings is appropriate and any adjustments made.

- Hemostasis is achieved with cautery.
- The skin is excised on each side (matching prior vertical or beveled incision).
- A two-layer closure is achieved using interrupted inverted, 4–0 or 5–0 polyglactin 910 (Vicryl) deep sutures (► Fig. 10.6). The skin is closed in a running vertical mattress fashion to

achieve optimal wound approximation and eversion of wound edges (► Fig. 10.7).

- Typical preoperative and postoperative results are shown in ► Fig. 10.8 and ► Fig. 10.9 for unilateral and bilateral cases, respectively.
 - In bilateral cases, the incisions are usually staggered vertically.
 - There is no need for a surgical drain.

10.9 Expert Tips/Pearls/ Suggestions

- The beveled incision should be at a same angle at both inferior and superior skin incisions as with a trichophytic technique.
- Avoid deeper dissection to prevent injury to the neurovascular structures.
- A key to good cosmesis lies in good wound closure with appropriate tension and wound edge eversion.

10.10 Postoperative Care Checklist

- Ice is applied as tolerated to the operative sites for 48 hours.
- The patient is advised to sleep with the head of the bed elevated.
- Postoperative medications are given:
 - Antibiotic ointment (Neosporin or bacitracin) three times a day.
 - Oral pain medication, typically acetaminophen/hydrocodone, 5 mg/325 mg.
- Postoperative wound check at 7 to 10 days for suture removal.



Fig. 10.5 Undermining is performed subcutaneously to elevate the brow. Care is taken to avoid injury to neurovascular bundles.

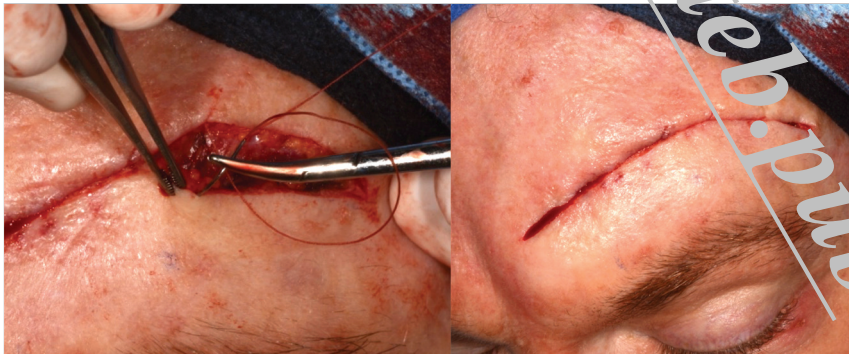


Fig. 10.6 Deep closure is performed using interrupted 5–0 polyglactin sutures.



Fig. 10.7 Superficial skin is closed in a running vertical mattress fashion using 5–0 polypropylene suture.

- If horizontal brow rhytids are to be addressed, scoring the frontalis muscle from the undersurface of the forehead flap to weaken the frontalis muscle may be performed at this step.
- A marking pen and ruler are used to mark the desired amount of skin and soft tissue to excise (► Fig. 11.14).
 - The amount of resection is determined preoperatively. In general, removing approximately 8 to 10 mm of tissue centrally and 12 to 15 mm temporally will result in an appropriate aesthetic result.
 - In a subcutaneous dissection, 10- to 15-mm central resection and 15- to 20-mm temporal resection will result in an optimal result.
- The incision is initially closed with 35 regular staples centrally and at the area of maximal elevation on both sides (► Fig. 11.15). The symmetry of the browlift is checked.
 - If further elevation is required, an additional tissue flap may be resected.
 - If one side or both eyebrows are overcorrected, posterior subgaleal dissection will lower the flap.

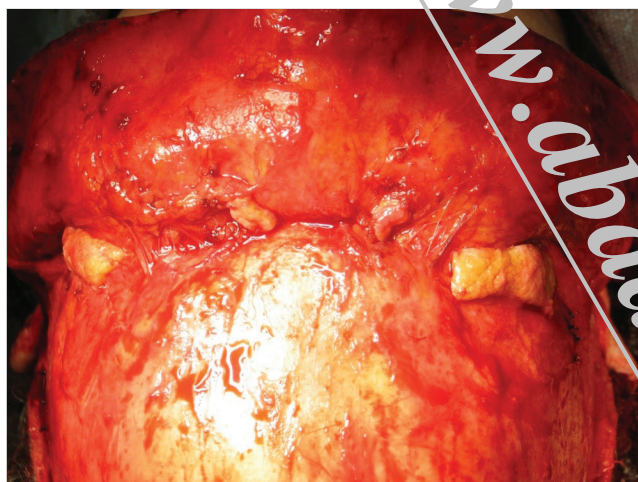


Fig. 11.13 The same fibrofatty tissue may be sutured to the free edges of the resected corrugator muscle centrally to avoid subcutaneous dimpling and maintain corrugator recession.



Fig. 11.15 Approximately 35 regular staples are used to fixate the advanced forehead flap. Symmetry is evaluated prior to excision of the scalp tissue.

- A #10 or #11 blade and facelift scissors are used to remove the pretrichial skin (► Fig. 11.16).
- The incision is closed with approximately 35 regular stainless steel skin staples as well as sutures along the irregular incision line (► Fig. 11.17).



Fig. 11.14 After scalp flap release at the supraorbital rim, the forehead flap is advanced superiorly. The preoperatively planned amount of tissue to be excised is marked, and back cuts are made at the central (widow's peak) and area of maximal elevation (typically 5 cm on either side of the widow's peak).



Fig. 11.16 Segmental excision of the scalp flap tissue. The excised tissue may be used for volume augmentation as seen in ► Fig. 11.11, ► Fig. 11.12, ► Fig. 11.13.



Fig. 18.6 To avoid having to remove the whole suture or use multiple double-armed sutures, a 22-gauge needle can be used to pass through the new desired position on the levator.



Fig. 18.8 Once the ideal contour and height are achieved, the sutures are permanently tied down one by one, being careful to not adjust the levator aponeurosis position from the desired temporarily tied location. One should not overtighten the suture.



Fig. 18.7 After both levator aponeuroses have been temporarily advanced, the lids are assessed for symmetry, height, and contour.

18.9 Expert Tips/Pearls/ Suggestions

- Other periocular concerns must be addressed when present.
 - Severe dermatochalasis can cause mechanical eyelid ptosis and blepharoplasty may augment the surgical result.
 - Brow ptosis may contribute to mechanical eyelid ptosis. At times, concurrent eyebrow ptosis repair may need to be performed to adequately improve the superior visual field, especially laterally.
 - Lacrimal gland prolapse should be noted and addressed (See Chapter 26).
- Crease formation:
 - Set the crease at 8 to 10 mm in Europeans.
 - Set the crease at 6 to 8 mm in East Asians who desire a double eyelid.
- Excising too much eyelid skin can cause lagophthalmos.
- Measure twice and cut once.
- If simultaneous blepharoplasty is planned, check the preoperative markings in the supine position by remeasuring the patient using Castroviejo calipers to ensure at least 20 mm of skin remains for adequate lid closure. For example, if the upper eyelid crease is set at 8 mm from the margin, one leaves at least 12 mm superiorly between the superior skin incision and inferior edge of the eyebrow. The amount of skin to be excised should be confirmed with the pinch test to prevent postoperative lagophthalmos.
 - Many patients remove some of their brow hairs (cilia); therefore, measure from the transition from thin eyelid skin to thicker eyebrow skin rather than where the brow cilia begin.
 - Slightly less than 20 mm of skin remaining can be acceptable if there will be uncorrected brow ptosis and the pinch test demonstrates additional skin may be removed.