



Eyebrow ptosis occurs in older people as a result of a syndrome produced by the effects of gravity. Tissues of the forehead, eyelids, and upper face develop laxity with time, permitting the eyebrow to move inferiorly. As a person ages, the normal, delicate attachments of the eyebrow to the periosteum become attenuated. As the eyebrow moves inferiorly, the frontalis muscle is recruited to elevate the eyebrow, which may result in deep horizontal forehead furrows. The lateral eyebrow lacks deep structural attachments to the periosteum and is especially susceptible to laxity. Furthermore, the frontalis muscle fibers do not extend to the lateral brow, and, thus, despite maximum frontalis contraction, lateral eyebrow ptosis often persists. In severe cases, the lateral eyebrow may actually encroach on the eyelid space.

Patients with eyebrow ptosis may complain of dermatochalasis. However, when the eyebrows are raised to their normal position, there is often much less redundant upper eyelid skin than anticipated. Thus, the eyebrow position must be evaluated before an upper blepharoplasty is performed. Patients with eyebrow ptosis also show horizontal and vertical redundancy in the multicontoured areas of the medial and lateral canthi. These redundancies are a challenge for the aesthetic surgeon and are poorly rectified by an upper blepharoplasty alone.

It is imperative that the surgeon and patient understand that excision of tissue above the eyebrow raises the brow. Excision of tissue beneath the brow (i.e., the eyelid) lowers the eyebrow. Thus, if a patient with eyebrow ptosis has an upper blepharoplasty, the eyebrow position will be further lowered.

The normal position of the medial eyebrow is approximately 1 cm above the medial aspect of the superior orbital rim. In women, a high eyebrow arch is present, with the apex of the arch located over the lateral limbus. In men, the eyebrow takes a gentler curve and is straighter, more diffuse, and located more inferiorly. By manually raising the medial and lateral aspect of the eyebrow during an examination, the normal anatomy as well as improvement of the tissue redundancies of the medial and lateral canthi can be demonstrated to the patient. The surgeon must be careful to preserve the structural integrity of the eyebrows and the eyelids. After eyebrow and upper eyelid surgery, the patient should be able to simultaneously raise the eyebrows and close the eyelids. For this reason, eyebrow elevation should be performed before upper blepharoplasty.

There are nine general types of eyebrow elevation procedures: (1) standard direct eyebrow elevation, (2) paralytic eyebrow lift (variation of direct eyebrow lift), (3) gull-wing direct eyebrow lift, (4) orbicularis plication, (5) mid-forehead eyebrow lift, (6) temporal eyebrow lift, (7) coronal forehead and eyebrow lift, (8) internal eyebrowpepxy and transeyelid eyebrow lift, and (9) endoscopic eyebrow lift.

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## Direct Eyebrow Lift

The direct eyebrow lift affords the greatest elevation per millimeter of tissue excised. This approach is useful in those men in whom coronal or temporal lifts are not advised because of the tendency toward, and progression of, male pattern baldness or in patients who do not want to undergo endoscopic surgery. The standard direct brow lift is excellent for lateral segmental brow lift in men and women. It does not

address medial brow ptosis, nor does it reduce horizontal or vertical glabellar folds.

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### **Paralytic Eyebrow Lift (Variation of Direct Eyebrow Lift)**

Eyebrow ptosis may also be seen in patients with seventh nerve palsies. Surgical intervention is indicated when the brow ptosis is longstanding and reinnervation of the nerve has not occurred. Because lagophthalmos is often present with many seventh nerve palsies, it is imperative that the brow not be overelevated. This would worsen the lagophthalmos. The essential part of paralytic eyebrow surgery is a direct eyebrow lift with placement of permanent sutures between the eyebrow and the periosteum to overcome the effects of gravity.

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### **Gull-Wing Direct Eyebrow Lift**

Modification of the standard direct brow lift by extension of the incision into the glabellar region, in a gullwing fashion, can also correct medial brow ptosis and the glabellar folds. The incision in the glabellar region is hidden in the horizontal fold created by the action of the procerus muscle. This procedure achieves excellent elevation of the entire brow and glabellar region. However, it is reserved for patients who wear spectacles or who are willing to tolerate a scar in the glabellar region.

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### **Orbicularis Plication**

Orbicularis plication is useful in patients who need brow stabilization while undergoing blepharoplasty. A small, horizontal, 1.5-cm incision is made above the lateral two-thirds brow junction in a horizontal fold. The orbital portion of the orbicularis muscle is plicated superiorly to the periosteum. This is an elegant technique that can be used on a patient who does not want to undergo a more involved procedure or who has minimal brow ptosis.

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### **Mid-Forehead Eyebrow Lift**

The mid-forehead lift is also effective in correcting eyebrow ptosis and glabellar folds. The incision can be hidden in a prominent forehead furrow. Because the procedure may lower the frontal hairline, it is reserved for men with prominent forehead furrows and a high, sparse frontal hairline. Patients with no forehead furrows may be poor candidates for this procedure because a prominent scar may be seen.

### **Temporal Eyebrow Lift**

The temporal eyebrow lift is especially useful in patients with lateral eyebrow ptosis and lateral canthal ptosis. The incision is hidden within the hairline and is useful in young women where only the temporal eyebrow has become ptotic. There is no elevation of the medial brow, and a slight elevation of the temporal hairline may occur with this procedure.

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### **Coronal Forehead and Eyebrow Lift**

The coronal eyebrow and forehead lift is a very effective brow lift. It successfully raises the medial and lateral brow, reduces glabellar folds, and smoothes the forehead. The incision is placed entirely within the hair-bearing scalp, camouflaging the scar. The procedure is most appropriately used in women or men older than 55 years of age who have no familial tendency toward male pattern baldness. In men, the coronal incision is modified to a gull-wing configuration (do not confuse this with the gull-wing direct eyebrow lift). The hairline may be slightly elevated by this procedure. In a woman with a low hairline, this often improves the aesthetic appearance of the face. In men or women who are concerned with elevation of the hairline, the anterior portion of the incision may be placed along the hairline, effectively lowering it. This is called the pretrichial coronal eyebrow and forehead lift. Hair loss and persistent numbness posterior to the incision are potential significant limitations of this procedure.

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### **Internal Browpexy and Transeyelid Eyebrow Lift**

Internal browpexy is useful in patients undergoing concurrent blepharoplasty. This procedure plicates the eyebrow at or above the level of the superior orbital rim through an upper blepharoplasty incision. Internal browpexy is often combined with blepharoplasty and debulking of the sub-brow fat pads. The main advantage of the browpexy is that it limits postblepharoplasty eyebrow descent. The main disadvantage is that tenderness and dimpling of the brow can occur in the region of the plication. The internal browpexy is usually used as a stabilizing suture (i.e., "brassiere" suture), and actual brow lifting is difficult to produce without pleating. A modification involves suturing the superior cut edge of the orbicularis muscle to the superior, lateral arcus marginalis. Usually two to three absorbable sutures are placed, which achieves fullness to the lateral brow and prevents descent of the roof fat pad.

## Endoscopic Eyebrow Lift

Endoscopic eyebrow and forehead lifting has become one of the primary means of raising the eyebrows and forehead. This method is accomplished through easily hidden incisions in the hair-bearing scalp. Endoscopic forehead lift can achieve many goals, including elevation of the eyebrows and glabella, smoothing forehead furrows, and decreasing glabellar folds. Like the coronal lift, this technique is most appropriate in women and men who do not have a predilection for male pattern baldness. The advantages of the endoscopic forehead lift over the coronal methods include smaller incisions, decreased risk of alopecia, and decreased postoperative recovery time and discomfort. Various incision patterns may be used, with the most traditional being five incisions within the hair-bearing scalp. Titrated dissection in the glabella and lateral brow, including differential release of the periosteum and arcus marginalis, combined with strategic fixation of the degloved scalp to the underlying frontal bone provide effective means of restoring brow symmetry. Myriad fixation techniques are used, including the use of titanium or resorbable screws, fibrin glue, and suture with or without bone tunnels. Surgeons are encouraged to try various techniques and find the ones that give the best result in their hands. The authors have used all of the above techniques and have found that the best long-term result with little morbidity, such as alopecia, is suture fixation through a bone tunnel.

Familiarity with the endoscopic view of the forehead and eyebrow anatomy, including key landmarks like the conjoint tendon, deep temporalis fascia, Yassergil's fat pad, lateral canthal tendon, supraorbital neurovascular complex, supra-trochlear neurovascular complex, and eyebrow depressor muscles, requires experience. Most complications with this procedure are related to incorrect identification of anatomic structures and planes.

## Surgical Procedures

### Direct Eyebrow Lift

#### Step 1

With the patient in the sitting position, the proposed incision site is marked just above the most superior eyebrow hairs. The eyebrow is digitally elevated to the desired level, and the marking pen is placed near, but not touching, the superior brow border (Fig. 11.1). When the brow is released, the point beneath the pen tip represents a point on the superior incision line (Fig. 11.2). This marking technique is repeated along the entire incision line above the brow (Fig. 11.3a).

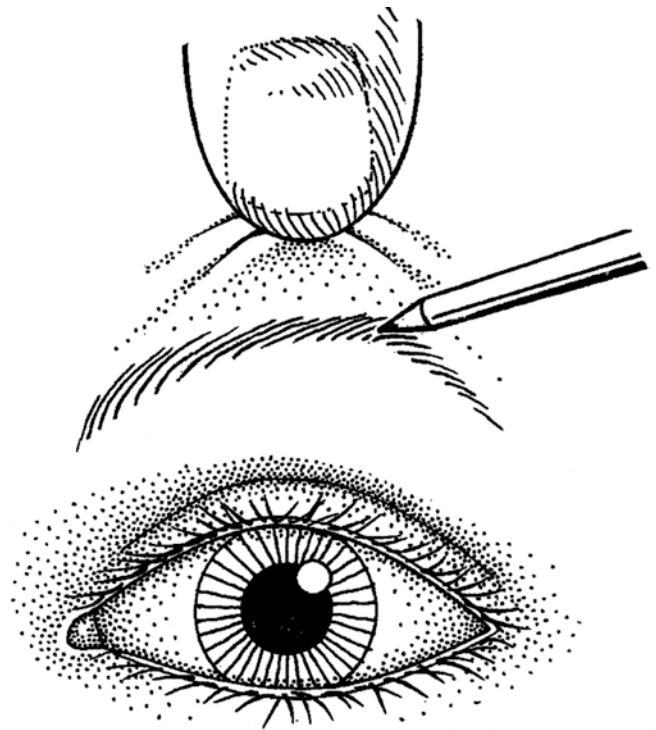


Fig. 11.1 Direct eyebrow lift (Step 1)

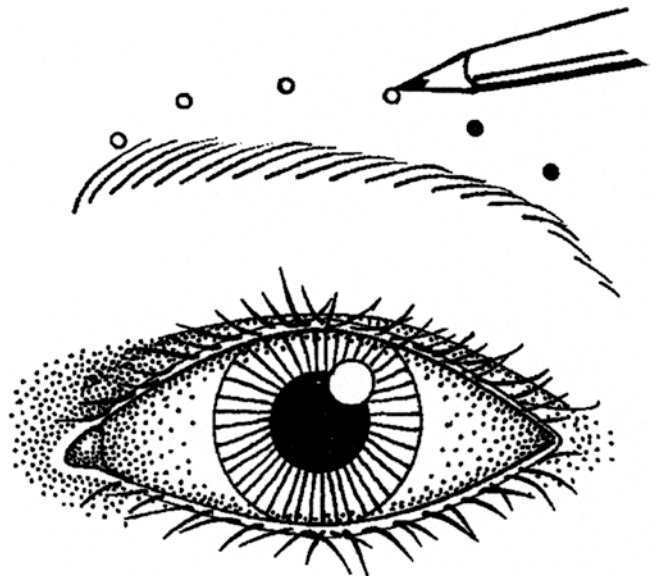
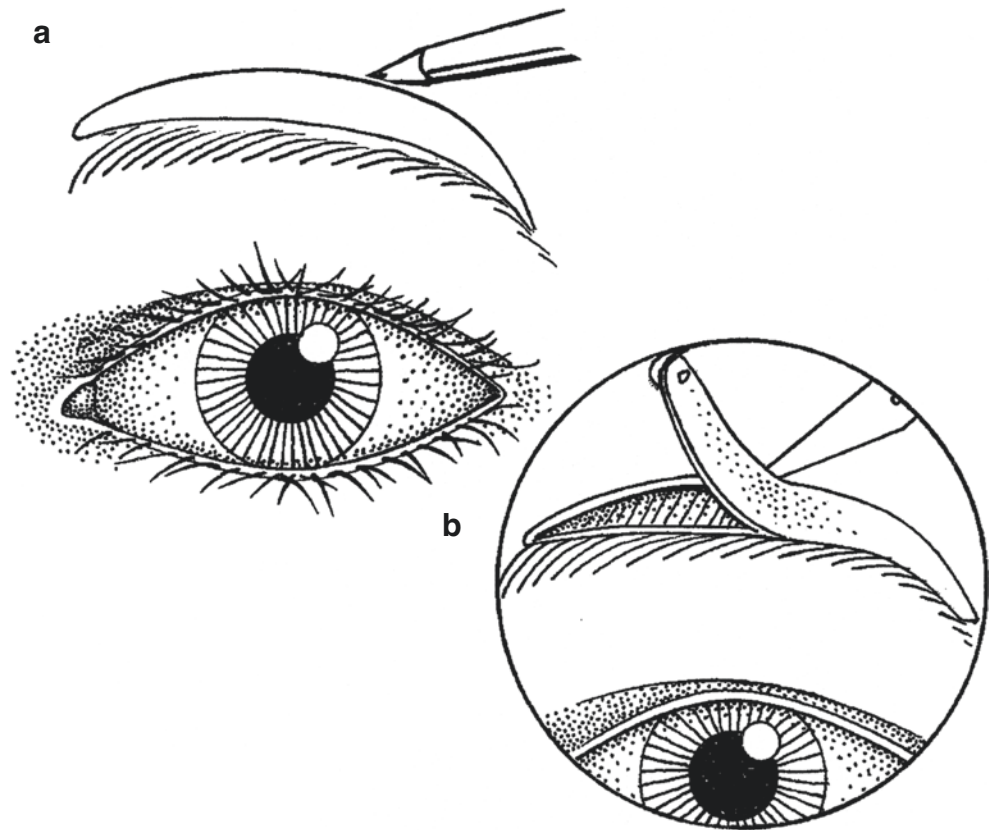


Fig. 11.2 Direct eyebrow lift (Step 1)

#### Step 2

The brow region is infiltrated with 2% lidocaine with 1:100,000 epinephrine and hyaluronidase (Wydase). Fifteen minutes are allowed to pass for adequate vasoconstriction to develop. The incision is carried out using a #15 Bard-Parker blade along the previously demarcated lines. The blade should be held perpendicular to the skin surface (Fig. 11.3b).

**Fig. 11.3** Direct eyebrow lift (Step 1)



It is not necessary to bevel the incision, as some have suggested in the past. The depth of the incision is carried to a plane just superficial to the frontalis muscle in the region of the supraorbital nerve to avoid forehead anesthesia. In patients with extreme lateral brow ptosis, the excised ellipse of tissue can extend more laterally than the lateral brow. However, the depth of the incision in the lateral portion is just through skin to avoid damage to the temporal branch of the seventh nerve. A scissors is used to remove the ellipse of tissue. Hemostasis is achieved with the unipolar cautery (Video 11.1).

### Step 3

The wound is closed with a deep layer of buried, interrupted 4-0 polyglactin (Vicryl) suture on a P-3 needle (Fig. 11.4a).

### Step 4

Multiple, interrupted, vertical mattress sutures of 4-0 nylon or polypropylene (Prolene) are then used to approximate the wound edges (Fig. 11.4b). Eversion of the wound edge is important to avoid a depressed scar. Finally, a running 6-0 nylon or Prolene suture on a P-1 needle is used to close and evert the skin edges (Fig. 11.4c). The wound is dressed with antibiotic ointment, and ice compresses are applied four times a day for 2–3 days. The running 6-0 suture is removed in 5–7 days, and the vertical mattress sutures are removed in 10–14 days. If only lateral brow ptosis is evident, a segmen-

tal direct brow lift can be performed (Fig. 11.5). The brow elevation is marked, incised, and closed in a similar manner.

## Paralytic Eyebrow Lift

### Step 1

The patient is examined in the sitting position to determine the preoperative level of the eyebrow. A crescent-shaped area above the brow is demarcated with the marking pen. The paralytic brow should be overcorrected, for the brow falls with time.

### Step 2

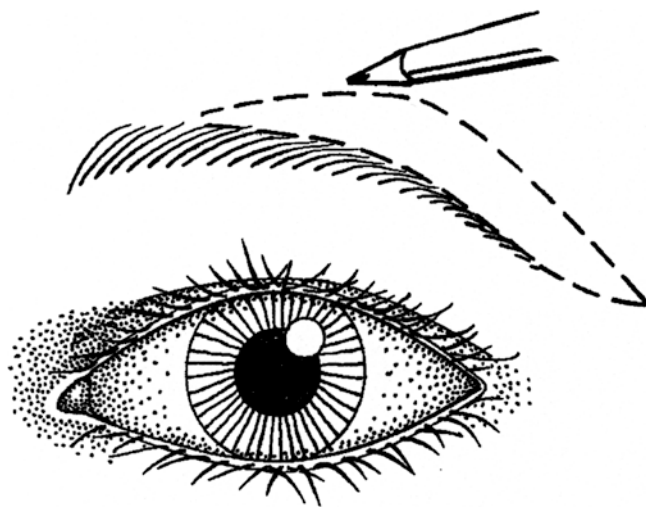
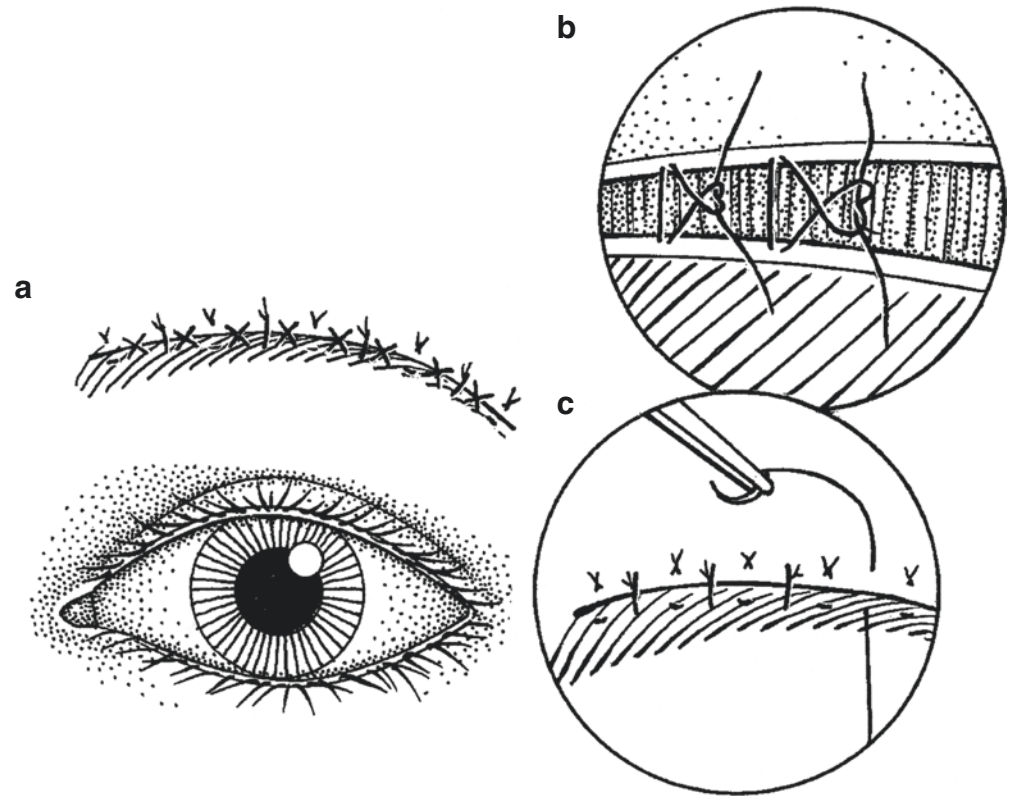
After the brow area is infiltrated with 2% lidocaine with 1:100,000 epinephrine and hyaluronidase, the previously demarcated crescent of skin is excised, as described for the direct brow lift (see Fig. 11.3).

### Step 3

Permanently buried 4-0 Prolene sutures are then placed between the elevated brow tissue and the periosteum of the frontal bone. Then, 5-0 Vicryl sutures are used in a buried subcuticular fashion to approximate the subcutaneous and muscular layers (see Fig. 11.4). The skin is closed in the same fashion as described for the direct brow lift (Video 11.2).



**Fig. 11.4** Direct eyebrow lift: (a) Step 3. (b) Step 4. (c) Step 4



**Fig. 11.5** Direct eyebrow lift (Step 4)

### Gull-Wing Direct Eyebrow Lift

#### Step 1

With the patient in a sitting position, the proposed incision site is marked just above the superior eyebrow hairs. At the medial aspect of the brow, the marking continues in an almost vertical orientation until the procerus fold is reached. A horizontal mark in the fold is then drawn. A mirror image

of the vertical mark is performed on the other side. The superior brow incision line is marked in a manner similar to that for a standard direct eyebrow lift. In the glabellar region, the glabella is digitally elevated, and the marking pen is placed near, but not touching, the previously demarcated procerus fold. When the glabella is released, the point beneath the pen represents a point on the glabellar incision line. This horizontal line should be several millimeters shorter than its inferior counterpart. The superomedial, vertically oriented lines are then drawn. These lines must parallel the inferior lines after the tissues are excised (Fig. 11.6).

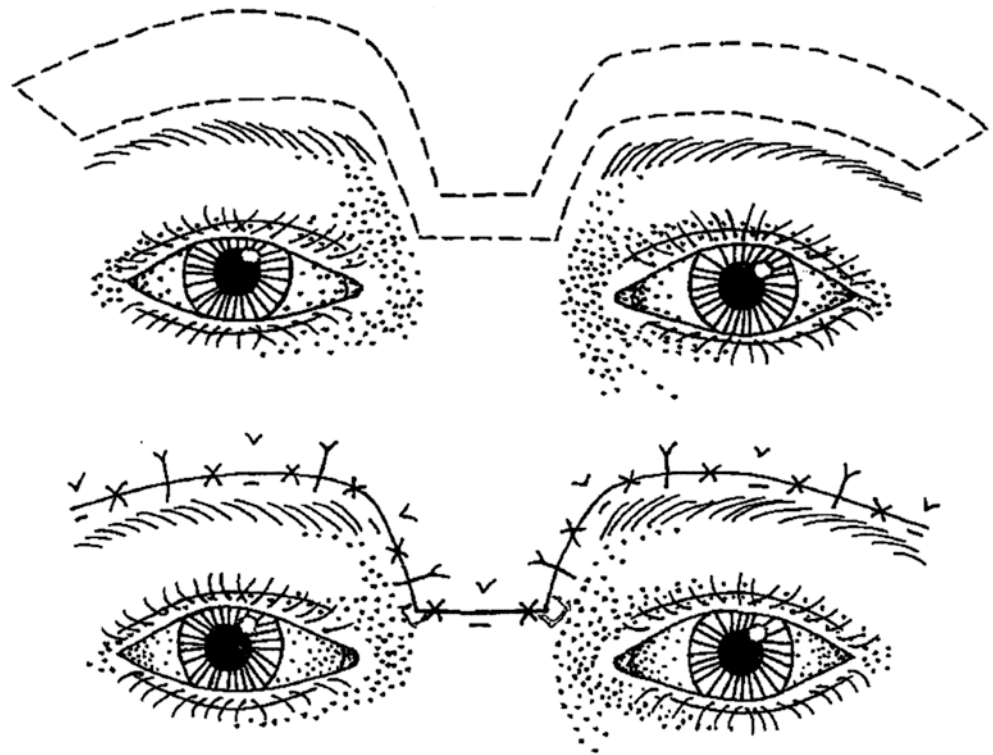
#### Step 2

The brow region is infiltrated with 2% lidocaine with 1:100,000 epinephrine and hyaluronidase. Fifteen minutes are allowed to pass for adequate vasoconstriction to occur. The incision is carried out using a #15 Bard-Parker blade along the previously demarcated lines. The blade should be held perpendicular to the skin surface. The depth of the incision is carried to a plane just superficial to the frontalis muscle in the region of the supraorbital nerve to avoid damage to the nerve (Video 11.3).

#### Step 3

The wound is closed with a deep layer of buried, interrupted 4-0 Vicryl sutures on a P-3 needle (see Fig. 11.4a). In the

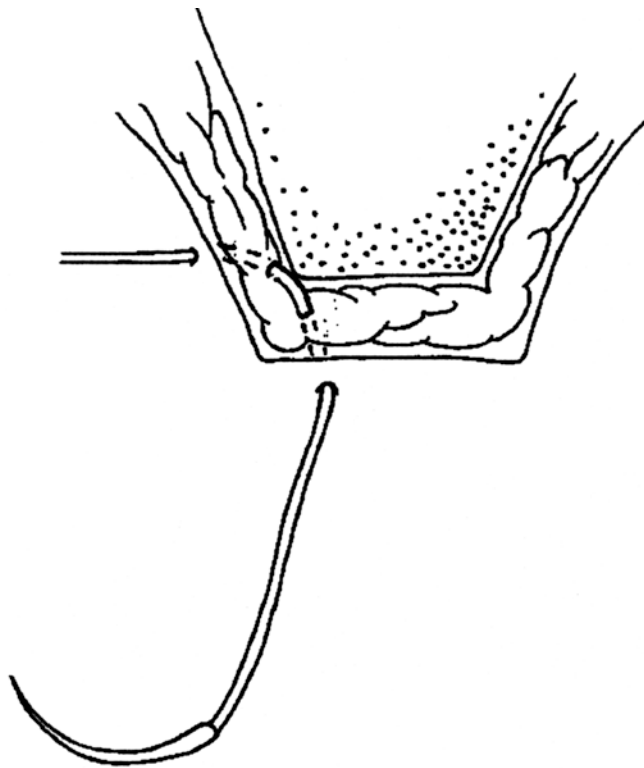
**Fig. 11.6** Gull-wing direct eyebrow lift (Step 1)



glabellar region, the corners are closed with 4-0 Vicryl half-buried horizontal mattress sutures (Fig. 11.7).

#### Step 4

Multiple, interrupted, vertical mattress sutures of 4-0 nylon or Prolene are then used to approximate the wound edges (see Fig. 11.4b). Eversion of the wound edge is important to avoid a depressed scar. Finally, a running 6-0 nylon or Prolene suture on a P-1 needle is used to close and evert the skin edges (see Fig. 11.7). The wound is dressed with antibiotic ointment, and ice compresses are applied four times a day for 2–3 days. The running 6-0 suture is removed in 5–7 days, and the vertical mattress sutures are removed in 10–14 days.



**Fig. 11.7** Gull-wing direct eyebrow lift (Step 3)

### Orbicularis Plication

#### Step 1

With the patient sitting, the incision site is marked in a rhytid 1–1.5 cm above the lateral one-half of the brow. Lidocaine 2% with epinephrine 1:100,000 is injected in the region. After 15 min to allow for adequate vasoconstriction, the incision is made using a #15 Bard-Parker blade. The depth is just posterior under the subcutaneous fat. Blunt dissection is carried out with tenotomy scissors, proceeding inferiorly in

the plane just deep to the eyebrow follicles and extending inferiorly in the plane posterior to the orbicularis as far inferior as 5-mm inferior to the inferior-most eyebrow hairs.

The orbicularis muscle becomes evident, and vertical spreading will avoid injury to the muscle and prevent excessive bleeding.

### Step 2

The superior-most margin of the orbicularis muscle is grasped and pulled superiorly. Often, the vector of pull is superior and medial, which helps in elevation of the lateral-most aspect of the brow. One or two 5-0 PDS mattress sutures are placed, attaching the orbicularis to the periosteum (Video 11.4).

### Step 3

A small amount of skin is removed from the central portion of the wound. The skin is closed in layers with deep buried sutures and a subcuticular suture, making sure not to have tension on the wound edges. Antibiotic ointment is applied four times a day for 3–5 days. If a nonabsorbable suture is used to close the skin, this can be removed in 5–7 days.

## Mid-Forehead Eyebrow Lift

### Step 1

A prominent brow furrow is selected for the superior incision line and is marked with a surgical marker (Fig. 11.8). The incision line also can be broken up by placing the incision in two

separate brow furrows (Fig. 11.9). If a large resection is anticipated in severe brow ptosis, the incision line should be carried across most of the forehead to permit adequate closure. If significant lateral eyebrow ptosis exists, the incision can be carried temporally, following the inferiorly curved eyebrow furrow.

### Step 2

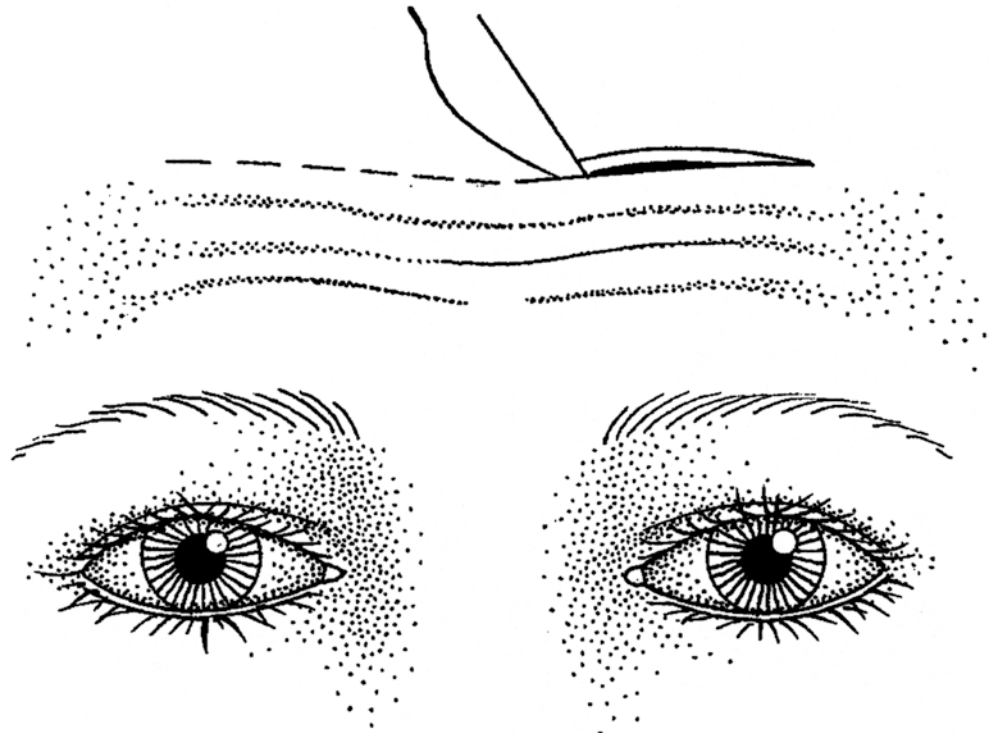
It is often difficult to determine preoperatively the amount of tissue to be resected; however, this is often the distance between two prominent eyebrow furrows.

### Step 3

A bilateral supraorbital nerve block is produced with injection of 2% lidocaine with 1:100,000 epinephrine and hyaluronidase. The incision site, superior brow, and glabellar region are infiltrated with 1% lidocaine with 1:200,000 epinephrine and hyaluronidase. Fifteen minutes are allowed to elapse for adequate vasoconstriction to develop.

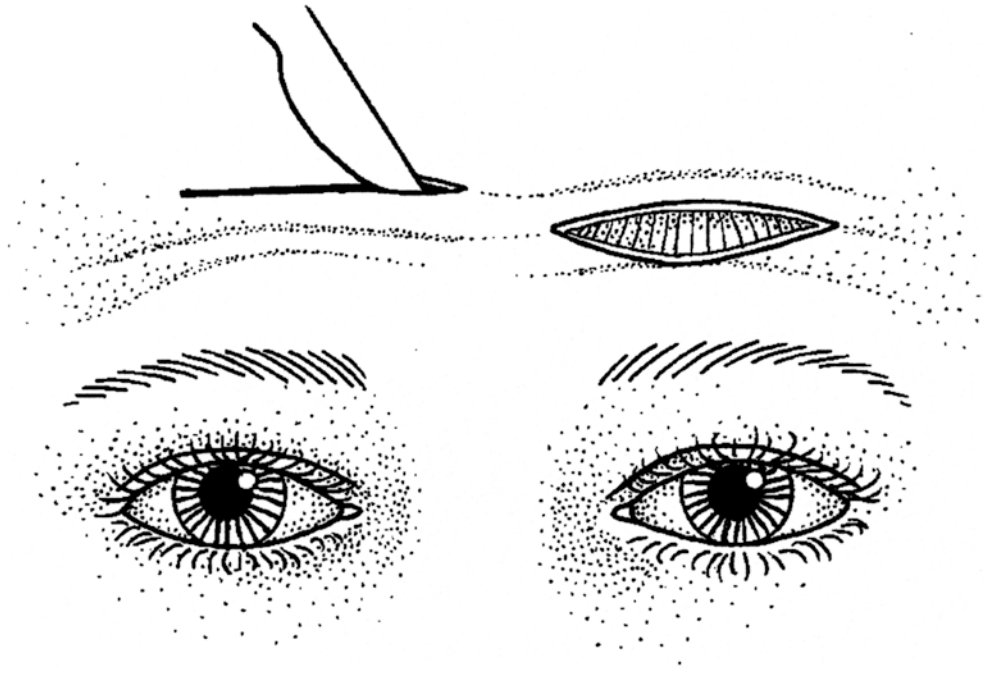
### Step 4

A #15 Bard-Parker blade is used to make a full-thickness incision in the previously demarcated lines. The incision is carried down to the level of the galea. In the temporal region beyond the lateral extent of the frontalis muscle, the depth of the incision includes skin only. Blunt and sharp dissection is performed in the loose aponeurotic layer inferior to the superior orbital rims (Fig. 11.10). Dissection of the corrugator and procerus muscles may be performed as indicated to eliminate glabellar furrows (Video 11.5).

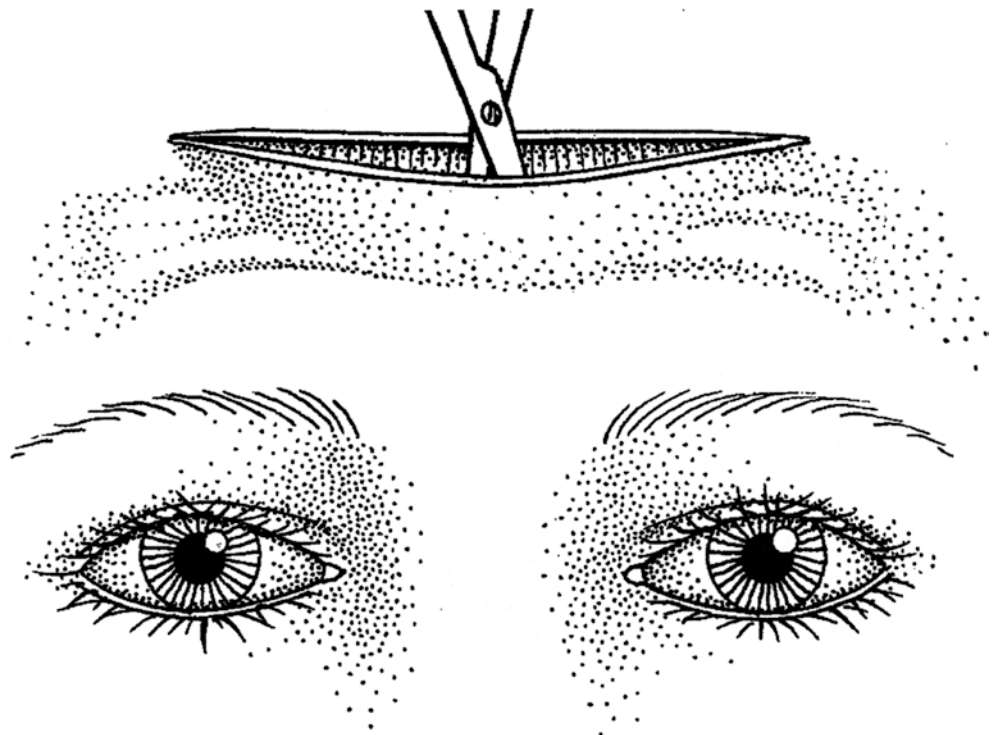


**Fig. 11.8** Mid-forehead eyebrow lift (Step 1)

**Fig. 11.9** Mid-forehead eyebrow lift (Step 1)



**Fig. 11.10** Mid-forehead eyebrow lift (Step 4)



#### Step 5

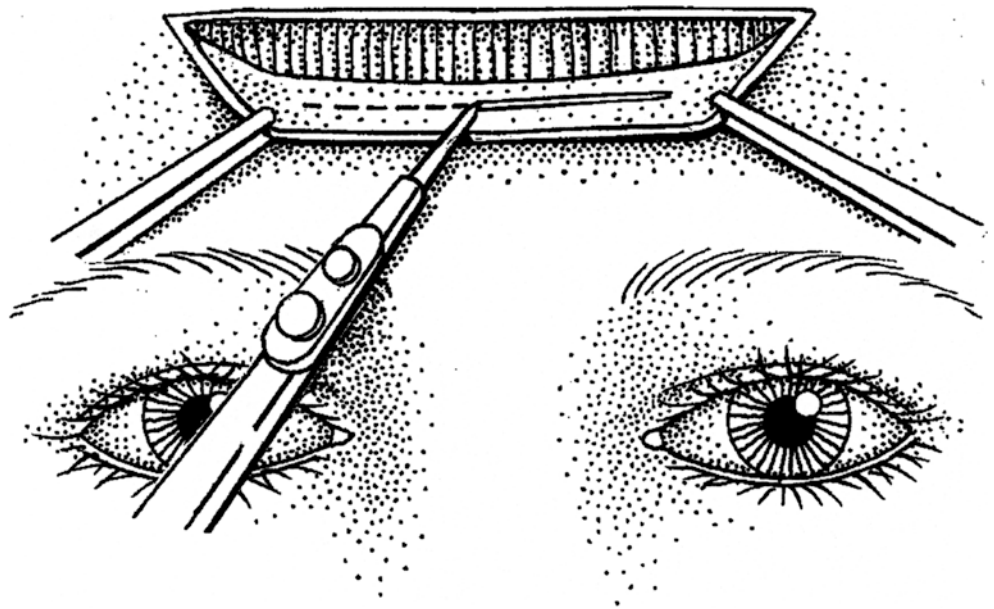
Posterior lamella horizontal relaxing incisions can be performed with cutting cautery through the frontalis muscle (Fig. 11.11). A strip of untouched frontalis muscle is left at the first forehead crease to permit animation of the brow postoperatively.

#### Step 6

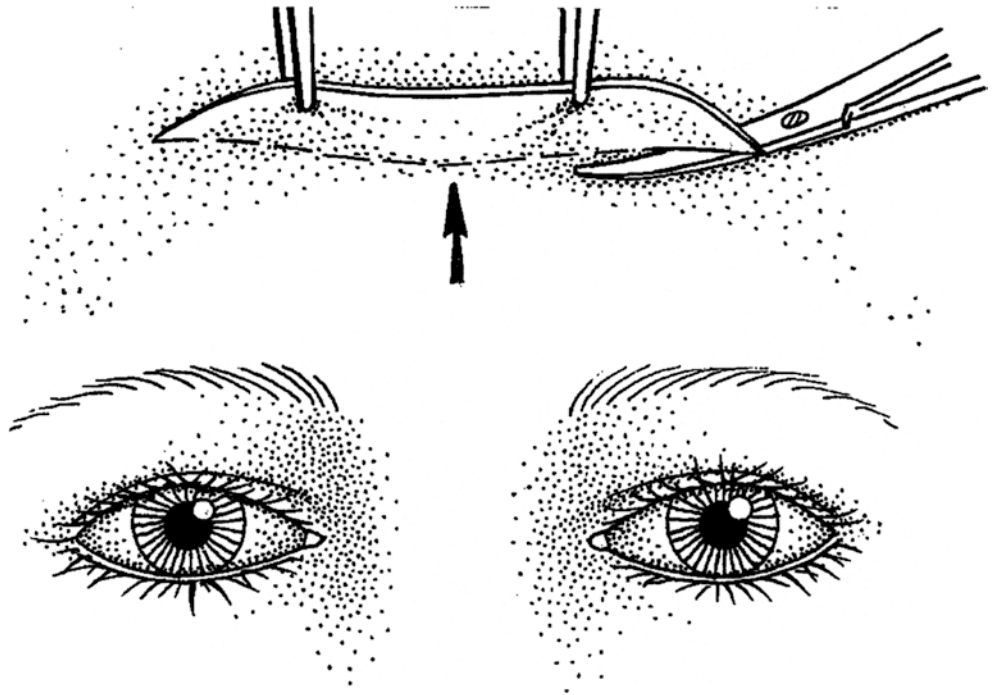
The flap is then elevated to the desired height. The redundant forehead tissue is then excised full thickness, as appropriate, to eliminate eyebrow ptosis (Fig. 11.12). The tissue can be excised in an asymmetric fashion to correct asymmetric brow ptosis or medial or lateral brow ptosis.



**Fig. 11.11** Mid-forehead eyebrow lift (Step 5)



**Fig. 11.12** Mid-forehead eyebrow lift (Step 6)



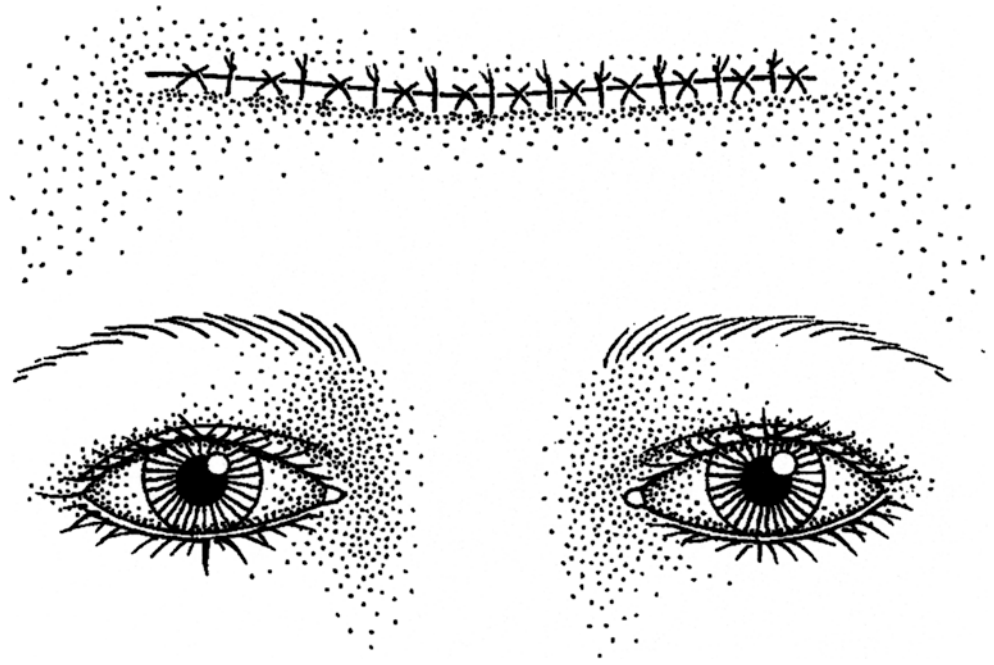
### Step 7

The wound is closed in two layers, as described for the direct brow lift (Fig. 11.13). Antibiotic ointment is applied, and a Telfa dressing is placed over the wound for 48 h. Ice compresses are used four times a day for 4 days to reduce swelling and ecchymosis. Sutures should be removed within 7–10 days.

### Temporal Eyebrow Lift

Patients are asked to wash their hair with antibacterial shampoo the evening before surgery. They are also advised that clothing worn on the day of surgery should not require removal over the head.

**Fig. 11.13** Mid-forehead eyebrow lift (Step 7)



### Step 1

With intravenous sedation, several milliliters of 2% lidocaine with 1:200,000 epinephrine and hyaluronidase are given as a supraorbital nerve block. Ten mL of 0.5% lidocaine with 1:200,000 epinephrine and hyaluronidase is infiltrated along the proposed incision line. Fifteen minutes are allowed to elapse for maximal vasoconstriction to develop.

### Step 2

The hair is parted, and a #15 Bard-Parker blade is used to make a vertical incision approximately 12-cm long above each ear to the level of the deep temporalis fascia (Fig. 11.14).

### Step 3

Blunt dissection with the finger or a large blunt scissors is carried along the plane of the deep temporalis fascia toward the eyebrow. The finger may be wrapped with a single layer of gauze to facilitate the blunt dissection (Fig. 11.15). The temporal branch of the facial nerve is located in the superficial temporalis fascia, which is in the flap. Damage to the nerve is avoided if the dissection is carried deep to the nerve, along the deep temporalis fascia. The temporal flap is undermined to the level of the brow and lateral canthus. Gentle blunt dissection with the finger wrapped in gauze is least traumatic to the facial nerves incorporated in the flap. To prevent damage to the facial nerve, the use of cautery is avoided (Video 11.6).



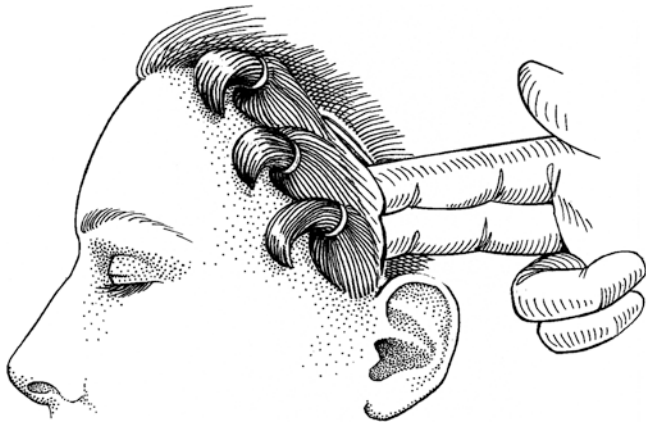
**Fig. 11.14** Temporal eyebrow lift (Step 2)

### Step 4

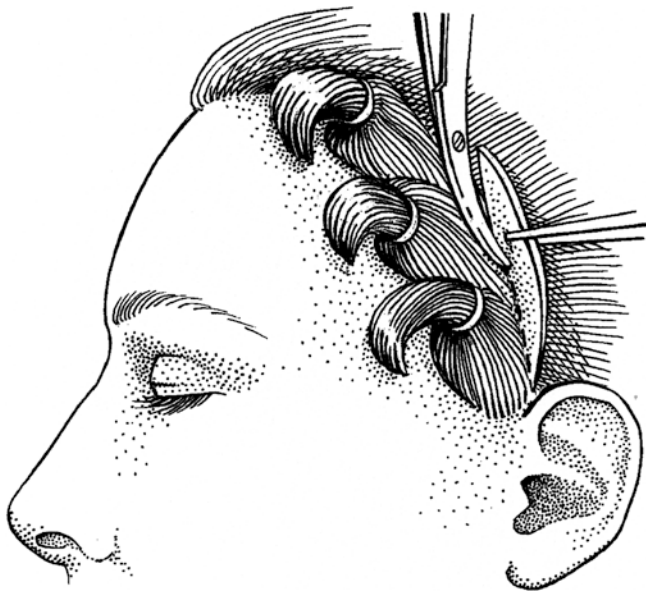
After the flap is developed, it is advanced and rotated slightly. Redundant tissue is then excised (Fig. 11.16).

### Step 5

The wound is closed in a single layer with wide skin staples (Fig. 11.17). No drains are used. Antibiotic ointment is placed on the wound, and fluffs are placed over the flap.



**Fig. 11.15** Temporal eyebrow lift (Step 3)



**Fig. 11.16** Temporal eyebrow lift (Step 4)

Kling and Kerlix are placed as a head wrap. Ice compresses are placed over the eyes and forehead four times a day for 4 days. The staples are removed in 10–14 days.

### Coronal Forehead and Eyebrow Lift

Patients are asked to wash their hair with antibacterial shampoo the evening before surgery. They are also advised that clothing worn the day of surgery should not require removal over the head.

#### Step 1

In the operating room, the hair is parted and braided along the proposed coronal incision site with the help of K-Y Jelly.



**Fig. 11.17** Temporal eyebrow lift (Step 5)

Strips of aluminum foil or dental rubber bands may be used to braid the hair. The incision line extends from the superior point where the ear touches the scalp, from ear to ear. In the midline, the incision is placed 6–7 cm posterior to the hairline. The incision line is marked with a marking pen (Fig. 11.18a).

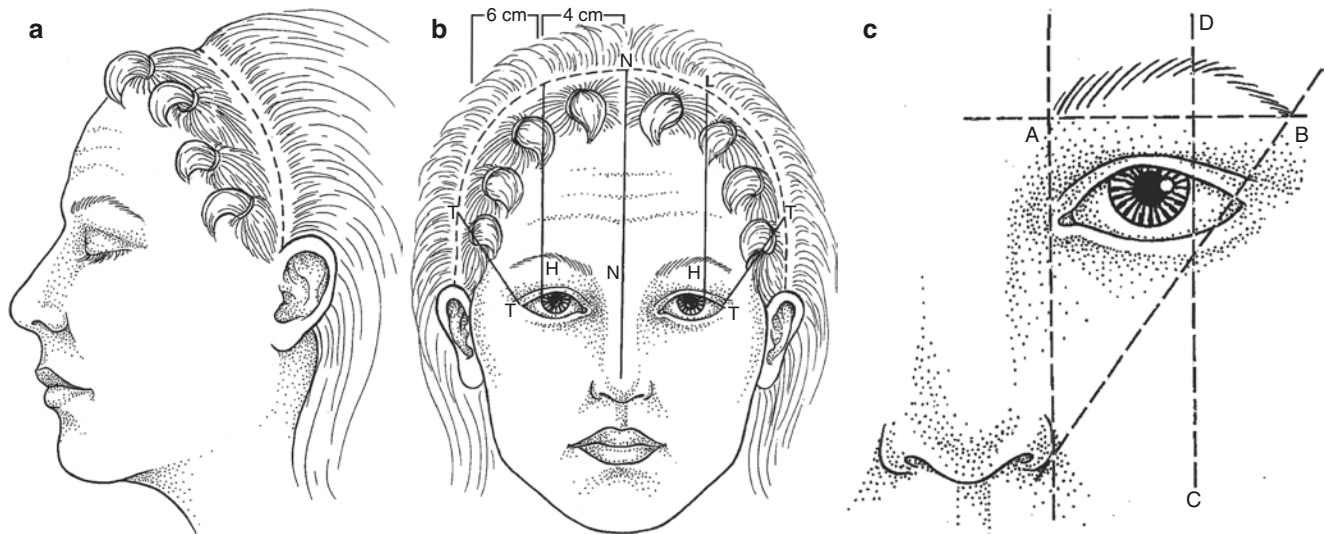
#### Step 2

With a marking pen, a line is marked from the midline (middle of the nose) to the incision line (Fig. 11.18b, line N-N). Another line is drawn from the lateral brow just above the position of the lateral limbus to the incision line (see Fig. 11.18b, line H-L). This is generally 4 cm from the midline (measured along the coronal line). A line is then drawn from the ala of the nose through the lateral canthus and extended until it intersects the incision line (see Fig. 11.18c, line b). This line generally intersects the incision line 10 cm from the midline (measured along the incision line; see Fig. 11.18b, dotted line N-T). The hair may then be clipped just anterior to the incision line for 1–2 cm.

#### Step 3

We prefer performing the procedure under local anesthesia with intravenous sedation. General anesthesia causes vasodilatation and more bleeding. Forty mL of 0.5% lidocaine with 1:200,000 epinephrine and hyaluronidase is given as a “vascular tourniquet” along the incision line and across the brows. This is divided into aliquots of 10 mL along the incision line from the top of the ear to the midline and from the top of the ear to the center of the forehead and is repeated on the opposite side. Four mL of 0.5% bupivacaine hydrochloride (Marcaine) with 1:200,000 epinephrine and hyaluronidase





**Fig. 11.18** Coronal forehead and eyebrow lift: (a) Step 1. (b) Step 2. (c) Step 2

dase is given as a supraorbital block bilaterally. It is also helpful to give several milliliters of the bupivacaine hydrochloride solution above each ear. Excellent hemostasis is generally obtained, and the need for reinjection is rare. Raney clips usually are not necessary.

#### Step 4

A #15 Bard-Parker blade is used to make an incision through the galea to the level of the periosteum. Dissection between the periosteum and loose aponeurotic tissue is performed with the fingers or with scissors. The forehead flap is elevated down to the level of the superior orbital rims (Fig. 11.19). Because the temporal branch of the facial nerve lies within the flap, dissection is carefully performed along the temporalis fascia, and blunt dissection with the finger wrapped in gauze is performed in these areas. Cautery is avoided in the temporal portion of the flap (Video 11.7).

#### Step 5

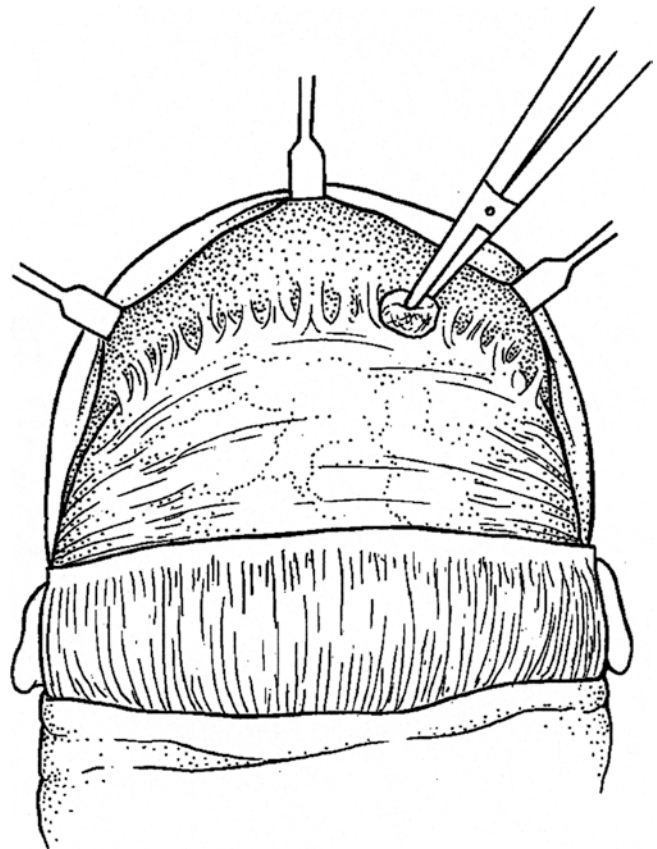
A subperiosteal plane is established with a Freer elevator 1–2 cm superior to the superior orbital rims. This allows maximal elevation of the brows and preservation of the supraorbital neurovascular bundle.

#### Step 6

At this point, superior traction of the scalp lifts the brows but does not smooth the creases and furrows of the glabella or forehead. The procerus-corrugator muscle complex must be cut with scissors or dissected with cutting electrocautery (Fig. 11.20).

#### Step 7

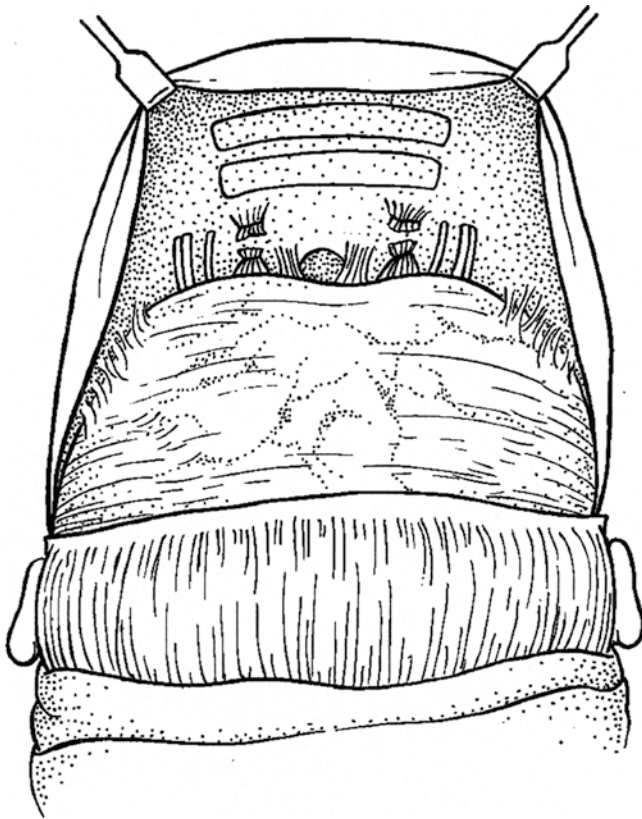
To obliterate forehead furrows, one or more horizontal relaxing incisions are made in the posterior muscle lamella of the



**Fig. 11.19** Coronal forehead and eyebrow lift (Step 4)

forehead flap above the first forehead crease (see Fig. 11.20). This allows the posterior lamella to relax and the anterior skin layer to be stretched. The cautery is carried through frontalis muscle to subcutaneous tissue. However, cautery is





**Fig. 11.20** Coronal forehead and eyebrow lift (Step 6)

avoided in the hair-bearing scalp to avoid follicle loss. Inferiorly, a thin strip of frontalis muscle is preserved at the first forehead crease to allow natural animation of the brows.

### Step 8

Using a D'Assumpcao clamp, the posterior scalp is advanced in the midline and marked with a satellite incision created with a #11 blade. This procedure is repeated along the previously demarcated lines of tension (Fig. 11.21). Redundant scalp is then excised with scissors. A gradual tapering of the incision is performed in the temporal segment, as little lift is gained in this area. Tension on the forehead flap can be adjusted to correct asymmetric brow ptosis and to achieve the desired eyebrow arch.

### Step 9

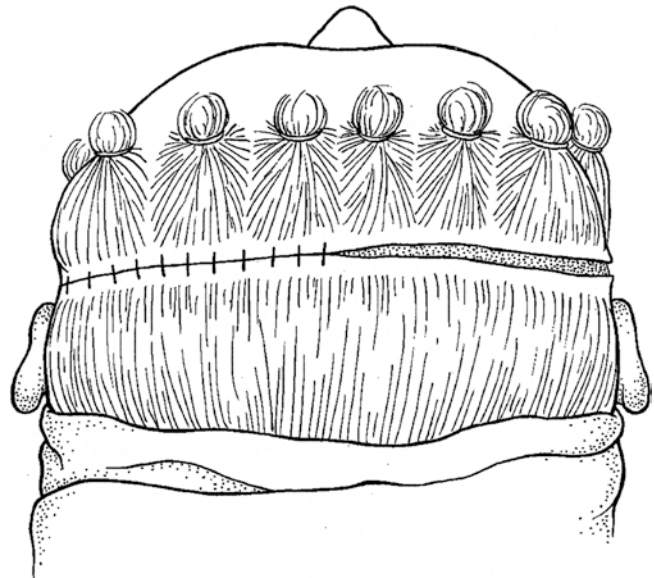
A single closure is performed with wide skin staples (Fig. 11.22). No drains are used.

### Step 10

The hair may be rinsed with 1.5% hydrogen peroxide to remove blood and then rinsed with saline to avoid bleaching



**Fig. 11.21** Coronal forehead and eyebrow lift (Step 8)



**Fig. 11.22** Coronal forehead and eyebrow lift (Step 9)

the hair. The hair is dried with a towel, and antibiotic ointment is applied to the wound.

### Step 11

Fluffs are placed across the flap, and a head wrap is made with Kling and Kerlix gauze roll anchored with short pieces of tape. Ice compresses are applied to the eyes and forehead constantly for the first postoperative day and continued three or four times a day for the following 4 days to minimize edema. The head is kept elevated, and the head wrap is removed in 2–3 days. Patients are then instructed to shampoo the hair gently for several minutes a day to remove crusts. Staples are removed in 10–14 days. Blepharoplasty may be performed after coronal eyebrow lift at the same sitting. However, because of the volume of anesthetic injected and the presence of intraoperative edema, blepharoplasty may be more easily performed as a separate procedure.

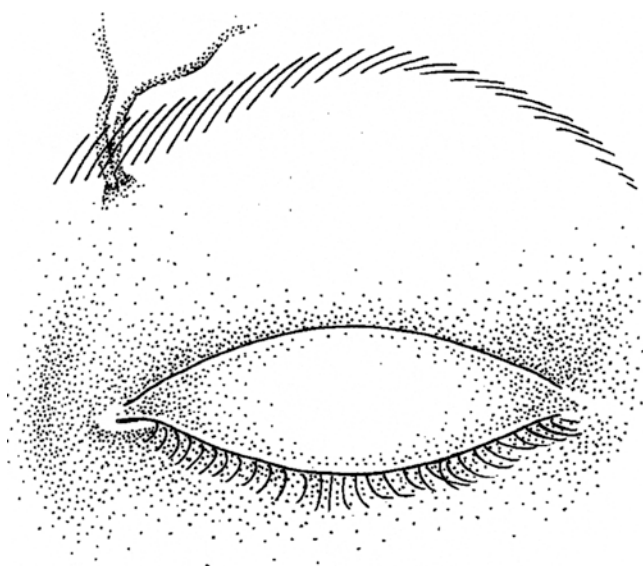
## Internal Eyebrowpexy and Transeyelid Eyebrow Lift

### Step 1

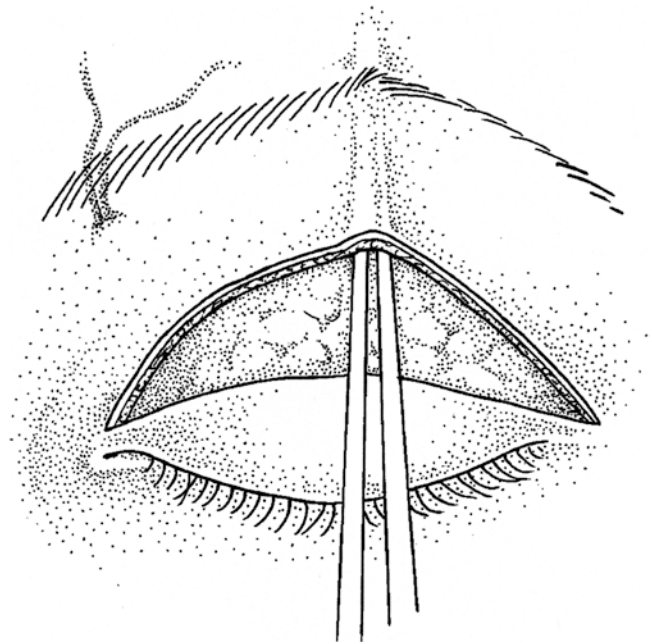
The amount of eyebrow lift desired is determined with the patient in a sitting position. The supraorbital notch is palpated and demarcated to localize the supraorbital nerve and vessels. The upper lid crease is then demarcated as well (Fig. 11.23).

### Step 2

After the eyebrow and upper lid regions are infiltrated with 2% lidocaine with 1:100,000 epinephrine and hyaluronidase,



**Fig. 11.23** Internal eyebrowpexy and transeyelid eyebrow lift (Step 1)



**Fig. 11.24** Internal eyebrowpexy and transeyelid eyebrow lift (Step 3)

a lid crease incision is made. A standard upper blepharoplasty can be performed at this time, if so desired.

### Step 3

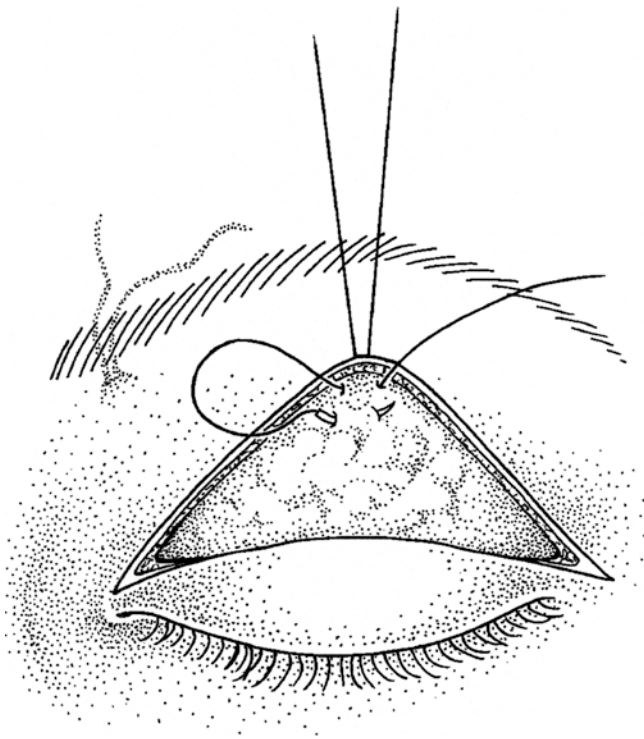
Blunt dissection with scissors is extended superiorly in the submuscular plane toward the eyebrow. The dissection is carried 1.0–1.5 cm above the superior orbital rim. The dissection is limited to the central and lateral aspect of the eyebrow to avoid injury to the medial supraorbital neurovascular complex (Fig. 11.24).

### Step 4

A 4-0 Prolene suture is passed through periosteum approximately 1.0–1.5 cm above the orbital rim. The suture is then passed in the sub-brow muscular tissue at the level of the lower edge of the brow cilia (Fig. 11.25). A needle can be inserted transcutaneously to facilitate identification of this level. Sutures are placed both laterally and centrally. The brow height and contour are adjusted by replacement of sutures until proper position and symmetry are achieved. The upper blepharoplasty incision is closed with a 6-0 nylon or Prolene suture (see Video 11.4).

## Endoscopic Eyebrow Lift

Patients are evaluated during the week before surgery, and the eyebrow depressor muscles are injected with botulinum toxin. Patients are asked to wash their hair with antibacterial shampoo the evening before surgery. They are also advised



**Fig. 11.25** Internal eyebrowpexy and transeyelid eyebrow lift (Step 4)

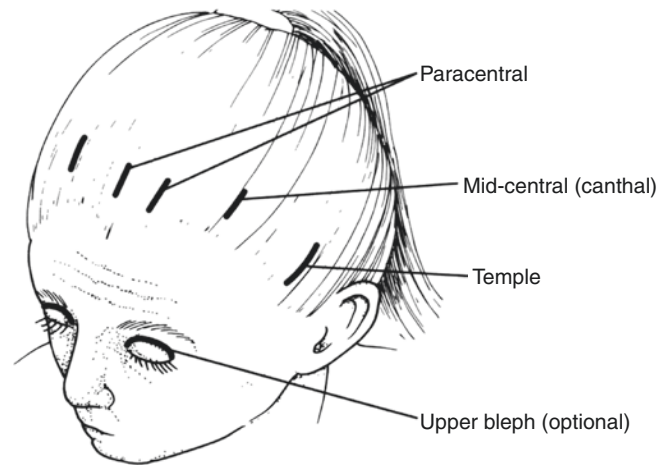
that clothing worn the day of surgery should not require removal over the head.

### Step 1

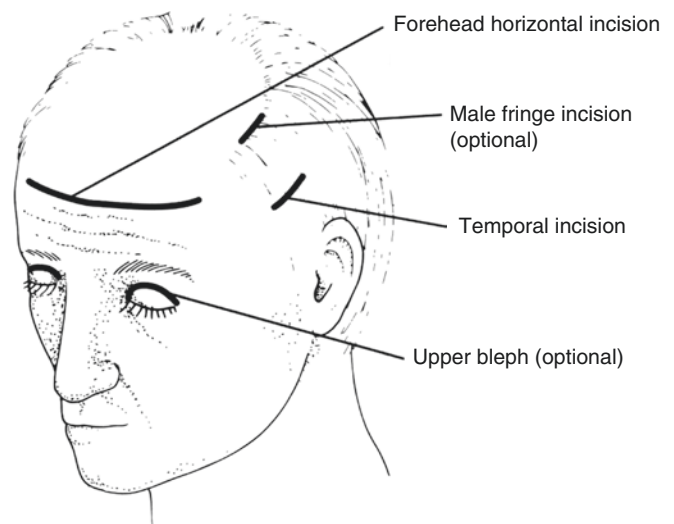
With the patient in the seated position, a permanent skin marker is used to mark important anatomic landmarks including the hairline, the palpable anterior border of the temporalis fossa, the supraorbital notch, the course of the temporal branch of the facial nerve, and the zygomatic arch. Next, the appropriate forehead and eyebrow vector of elevation is determined by manual and voluntary elevation. This vector usually corresponds to a line connecting the lateral oral commissure and the lateral canthal angle. A mark corresponding to this vector measuring 3 cm is made on the skin 2.5 cm inside the hairline over the temporalis muscle. An identical procedure is performed on the opposite side. Additional marks are made 2.5 cm inside the hairline, marked parallel 2.5 cm and 7.0 cm from the right and left of midline (Fig. 11.26). In patients with male pattern baldness, the position of the central incisions can be marked in prominent forehead rhytides and along the temporal fringe of hair (Fig. 11.27).

### Step 2

In the operating room, the procedure begins under local anesthesia with intravenous sedation. Two milliliters of 0.5% bupivacaine hydrochloride with 1:50,000 epinephrine is given as a supraorbital nerve block bilaterally and under each marked



**Fig. 11.26** Endoscopic eyebrow lift (Step 1)



**Fig. 11.27** Endoscopic eyebrow lift (Step 1)

incision site. Three hundred milliliters of Klein's solution (1000 mL normal saline, 1 ampule 1:1000 epinephrine, 50 mL 1% lidocaine, 12 mEq sodium bicarbonate) is given as a "vascular tourniquet" throughout the scalp and forehead. Excellent hemostasis is generally obtained, and the need for reinjection is rare. The hair is parted and braided along the proposed incision sites with the help of K-Y Jelly. Strips of aluminum foil or dental rubber bands may be used to braid the hair.

### Step 3

The skin is incised using the skin marks with a #15 Bard-Parker blade. Temporally, the tissue is incised down to the deep temporalis fascia; the more medial four incisions are made down to the periosteum. Beginning through the temporal incisions, the dissection is carried out between the superficial and deep temporalis fascia, moving toward the midline.



The plane is easily sustained with a combination of sharp dissection with a caudal periosteal elevator and blunt finger dissection. Initially, the endoscope is not necessary, but, as the conjoint tendon is approached, it should be used to visualize this landmark. Before releasing the conjoint tendon, dissection is carried out through the medial incisions. A caudal periosteal elevator is used without the endoscope to elevate the periosteum off of the underlying calvarial bone from the occiput to supraorbital ridges (Video 11.8).

#### Step 4

With endoscopic visualization through the temporal incision, the conjoint tendon is dissected beginning superiorly and moving inferiorly. In the area of the lateral eyebrow, 1–2 cm superior to the superior orbital rim, the deep temporalis fascia splits into the intermediate and deep temporalis fascia separated by Yassergil's fat pad. This is observed diverging as a "swirl" as it bifurcates. In close, lateral proximity to the "swirl" is the sentinel vessel. The vessel is identified and cauterized. The swirl and the vessel are then safely divided on the deep temporalis fascia, and the dissection is carried down following the lateral orbital rim onto the body of the zygoma in the subperiosteal plane.

#### Step 5

With endoscopic visualization, the subperiosteal dissection is carried inferiorly to the orbital rims and onto the nasal radix with a rim periosteal elevator. The assistant provides guidance and protects the globe by palpating inside the

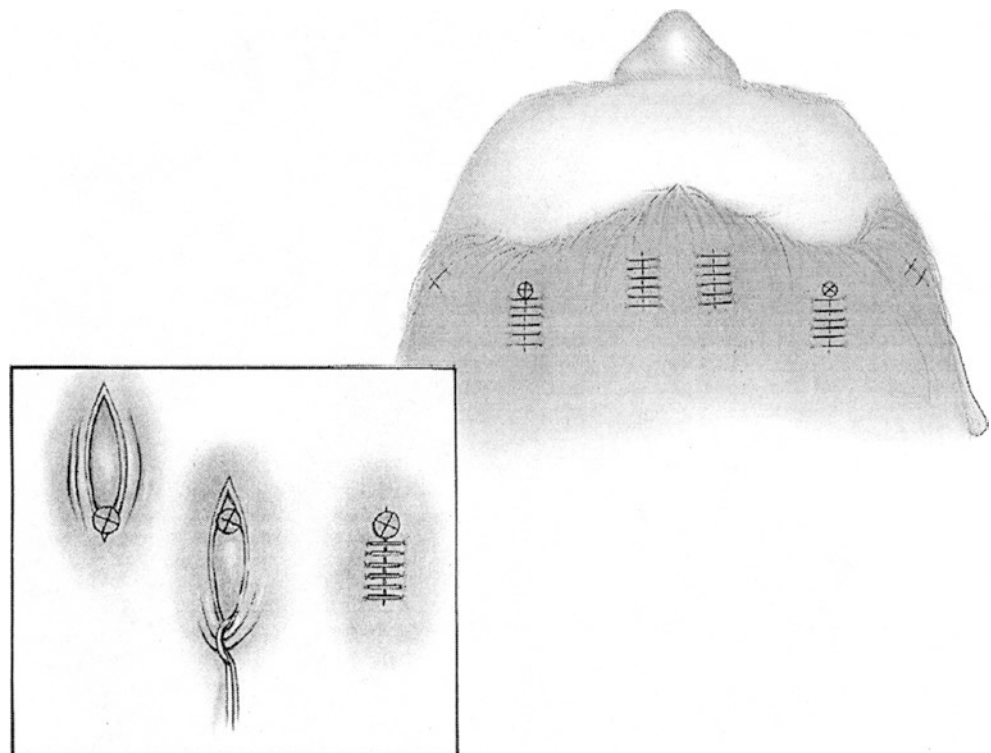
orbital rim in the area of dissection. The arcus marginalis is selectively released. Great care is taken in the medial third of the brow to identify and preserve the supraorbital and supra-trochlear neurovascular bundles. The corrugator, procerus, and depressor supercillii muscles are identified and selectively weakened with blunt and sharp dissection.

#### Step 6

Skin hooks are then placed in the temporal incisions, and appropriate tension is achieved. While maintaining the tension, a 2-0 Vicryl suture is placed through the deep temporalis fascia, through the overlying scalp in the apex of the skin incision, and back through the deep temporalis fascia in a vertical mattress fashion. The suture is tied permanently, and the skin hook is withdrawn while observing for scalp migration. If migration is observed, the suture is replaced.

#### Step 7

Skin hooks are then placed in the remaining incisions, and the brow height and contour are adjusted by variable tension until proper position and symmetry are achieved. A drill with a 2-mm diameter guarded bit is used to make an appropriate number of holes in the frontal bone. Then, 14-mm screws are positioned, and again the brow height and contour are adjusted by variable tension until proper position and symmetry are achieved. At the appropriate tension and position, skin staples are placed posterior to the screws to maintain forehead and eyebrow suspension. The remaining skin incisions are closed with skin staples. No drains are placed (Fig. 11.28).



**Fig. 11.28** Endoscopic eyebrow lift (Step 7). Reprinted with permission from Putterman AM. *Cosmetic Oculoplastic Surgery: Eyelid, Forehead, and Facial Techniques*, 3rd edition. Philadelphia PA: WB Saunders and Co. 1998; pages 265–323



### Step 8

The elastic bands are removed, and the hair may be rinsed with 1.5% hydrogen peroxide to remove blood and then rinsed with saline to avoid bleaching the hair. The hair is dried with a towel, and antibiotic ointment is applied to the wound. Ice compresses are applied to the eyes and forehead constantly for the first postoperative day and continued three or four times a day for the following 4 days to minimize edema. The head is kept elevated, and the head wrap is removed in 2–3 days. Patients are then instructed to shampoo the hair gently for several minutes a day to remove crusts. Staples are removed in 10–14 days and the screws in 21 days. This routine can be varied to adjust the height and contour of the eyebrows.

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### Complications

Complications of brow lifts are few but notable. Proper preoperative evaluation and determination of the patient's specific anatomic abnormalities cannot be overemphasized. The following is a list of the more common complications encountered:

- **Nerve damage:** Damage to the temporal branches of the seventh nerve (motor), supratrochlear, or supraorbital nerves (sensory) can occur if the dissection is in the wrong surgical plane. Hypesthesia of the forehead can also result when the relaxing incisions of the posterior lamella of the coronal or temporal flaps are extended into the path of the supraorbital nerves. Overuse of cautery in the location of the nerves may also cause damage.

- **Scarring:** The eyebrow and forehead are areas that are quite visible. Although the incisions are “hidden” above the eyebrow cilia, in the procerus fold, or in a prominent forehead furrow, a visible scar may result. Improper closure and poor eversion of the wound edges may also result in a depressed scar. The patient must be made aware of this potential complication before surgery. Management of facial scarring is beyond the scope of this chapter; however, the surgeon should be familiar with the use of chemoexfoliative agents and dermabrasion.
- **Hematoma:** If careful hemostasis is not achieved, large hematomas can accumulate under the temporal or coronal flaps and potentially lead to necrosis of the flap. If a scalp hematoma forms and continues to expand, the wound must be opened and the bleeding vessel cauterized.
- **Alopecia:** Hair loss can occur at the coronal or temporal incision sites. If the plane of dissection is too superficial, the hair follicles are damaged. Overuse of cautery in the region of the hair follicles also results in alopecia.
- **Others:** Other potential complications include brow asymmetry, scar depigmentation, incision pruritus, and neuralgias.

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### Suggested Reading

1. Putterman AM. *Cosmetic oculoplastic surgery*. 3rd ed. Chapters 27 and 28. Philadelphia: WB Saunders and Co.; 1998. p. 265–323.
2. Black E, Schlachter DM, Calvano CJ. Forehead/brow ptosis. In: Smith and Nesi's ophthalmic plastic and reconstructive surgery. 3rd ed. New York: Springer Publishing; 2012. p. 467–72.