Avoiding the Incomplete Blepharoplasty: Refinements in Aesthetic Upper Eyelid Surgery Through Adjunctive Procedures

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Reprinted from
PERSPECTIVES IN PLASTIC SURGERY
Vol. 6, No. 1, pp. 39-88, 1992

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Quality Medical Publishing, Inc.
St. Louis, Mo.

Printed in the U.S.A.

Avoiding the Incomplete Blepharoplasty: Refinements in Aesthetic Upper Eyelid Surgery Through Adjunctive Procedures

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Ponder the profound consequences of aging on the upper eyelid. Redundant skin and muscle plunge downward and folds appear, accentuated by ptotic submuscular fat and a displaced brow (Fig. 1, *A*). The bony contour of the superior orbital rim is obscured, and the superior sulcus is effaced. The upper eyelid crease is blunted and lost to view. Relaxation of the fascial barriers favors the herniation of orbital fat and may permit the downward and outward displacement of the lacrimal gland. The redraping of the soft tissues casts a shadow over the pretarsal surface and across the ciliary margin. The palpebral fissure is narrowed, causing diminished receipt of natural lighting.

Consider the more youthful features of a fully restored upper eyelid *in the same patient* (Fig. 1, *B*). The brow arches upward above the superior orbital rim. The upper eyelid crease is crisply delineated at a complimentary higher level. The superior sulcus is now deepened and open. The segment below the crease drapes the globe as a smooth sheet of soft tissue. Light sweeps across this global span, highlighting the eyelashed margin. The sclera is reilluminated and the iris is redefined as light gains access to the palpebral fissure.

Obviously not all patients can enjoy a refined postoperative result such as that depicted in Fig. 1, *B*. Nor is it reasonable for the surgeon to anticipate a premium result with every undertaking. Nevertheless, the *paupière d' excellénce chirurgicale* (lid of surgical excellence) logically follows detailed evaluation and meticulous execution during the initial surgical venture.

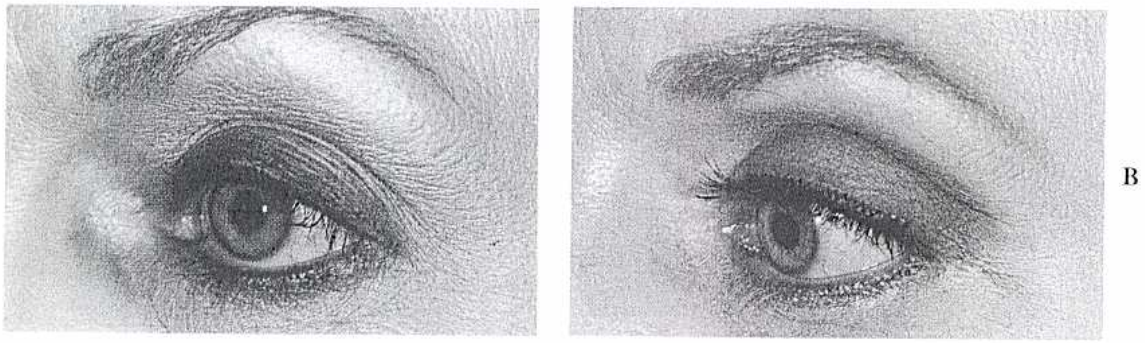


Fig. 1 **A,** The consequences of aging are depicted in the upper eyelid of this 46-year-old woman. **B,** The same upper eyelid is shown 5 weeks after an upper blepharoplasty and several adjunctive procedures. Youthful features have been restored.

HISTORICAL PERSPECTIVE

Three trends characterize the history of blepharoplasty. At the turn of the century, the anatomic problem was perceived to be skin laxity and the appropriate solution was said to be excision of cutaneous excess. In the middle of this century, surgeons came to recognize that muscle and fat were important components of the aging eyelid. Resection of a musculocutaneous composite and trimming of fat were then recommended. In recent decades, a third trend acknowledges that all layers and structures may be critically involved in the aging process. A more complete dissection of the deeper structures is selectively indicated, delamination of all layers is achieved, and reconstruction of the eyelid is undertaken.

These historical perspectives may lead one to still consider upper blepharoplasty a limited skin-muscle-fat resection. Thus attention may be directed preoperatively to eyelid skin texture, excess, and laxity and to fat herniation. Surgical intervention then focuses solely on the excision of skin, muscle, and fat.

Nevertheless, in a prospective study of our first 137 patients, we are convinced that poor results and complications often ascribed to poor patient selection, unfavorable healing, or atypical results may in part be related to incomplete surgical intervention. Some complications cited in the literature similarly are possible errors of recognition at the time of primary surgical blepharoplasty.[1]

In the classic tradition, a skin-muscle (musculocutaneous) strip is removed and fat is excised through limited incisions in the septum. The surgeon may then be vulnerable to the assumption that the preseptal fat is preaponeurotic. Small incisions in the septum do not afford broad exposure of the fat compartments for safe and complete excision. The levator aponeurosis may be damaged through such limited incisions, and control of bleeding vessels may be incomplete. Occult dehiscence of the levator aponeurosis may further go unrecognized.

ANATOMIC MARKERS OF INCOMPLETE UPPER BLEPHAROPLASTY

Lateral brow fullness
Brow laxity and brow malposition
Brow ptosis
Eyelid ptosis (blepharoptosis)
Lacrimal gland prolapse
An indistinct upper lid crease and shallow superior sulcus

Anatomic deformities unrecognized or unaddressed intraoperatively ensure that postoperatively the patient will bear external markers of an incomplete upper blepharoplasty (see box, opposite page; Fig. 2). When anatomic irregularities result following incompletely executed surgery, the surgeon's task is twofold: (1) recognition of the problems not previously treated and (2) their judicious resolution. The operative goal in such patients is to render the incomplete complete.

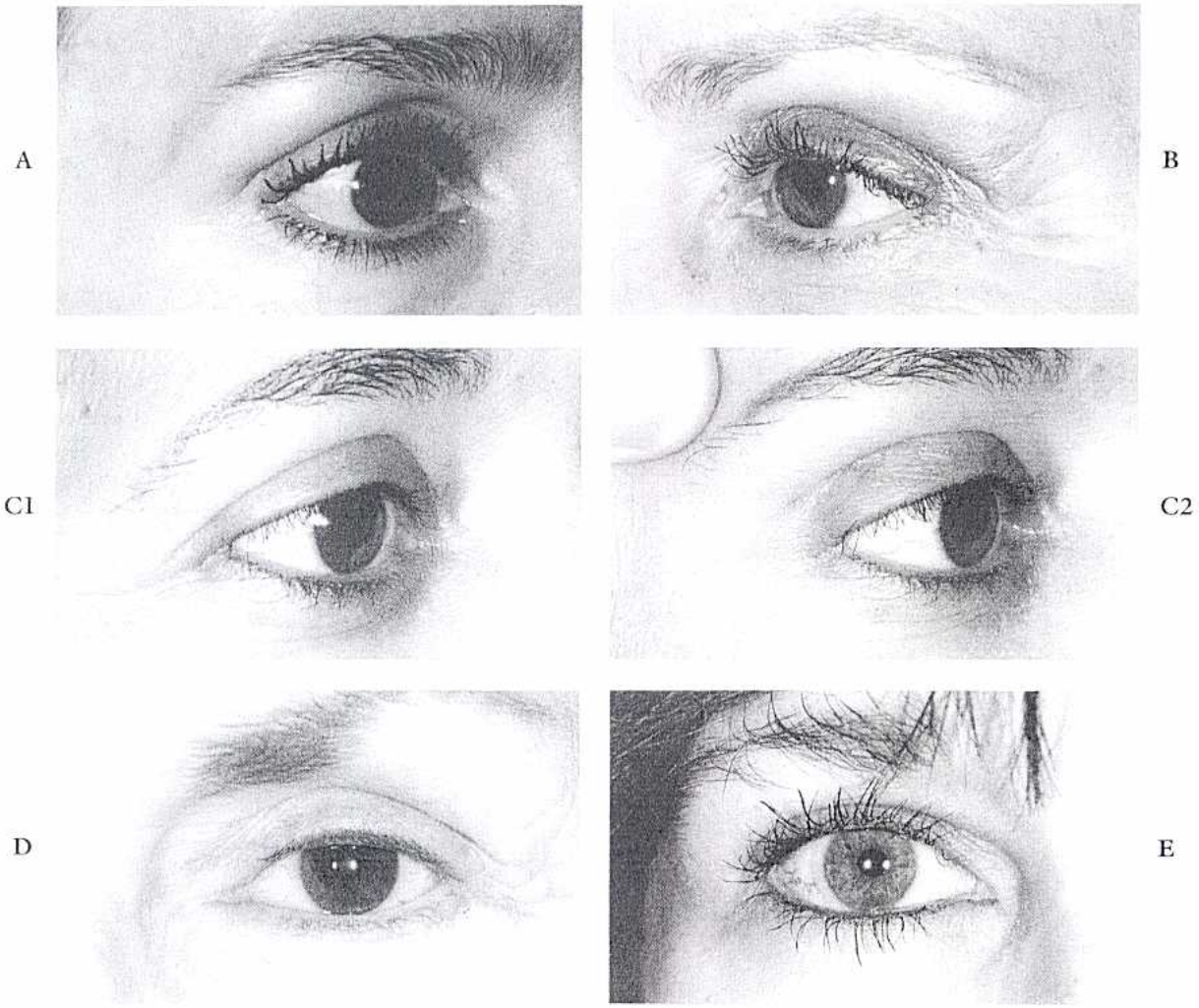


Fig. 2 Following surgery, eyelids may bear anatomic deformities that were unrecognized and not corrected. These deformities are "markers" of incomplete upper blepharoplasty. **A,** Lateral brow fullness. **B,** Subtle brow laxity and malposition with a pseudoexcess of redundant lateral eyelid skin. **C,** Lateral brow ptosis demonstrated by upward traction. **D,** Lacrimal gland prolapse hidden by skin excess and brow ptosis. **E,** An indistinct upper lid crease associated with a shallow superior sulcus.

The third, more recent trend toward a global approach, with broad exposure of the anatomy and repair of a spectrum of abnormalities, is in our experience legitimate. Skin, muscle, preseptal fat, and septum (the components of the anterior lamella) are resected as a composite.[2] The lower incision defines the level of the neocrease. The upper limb of the incision affords access to the brow fat pad, superior orbital rim, lacrimal gland, preaponeurotic fat, and levator aponeurosis.

The broad exposure provided by resection of the anterior lamella affords the opportunity to safely modify or correct coexistent abnormalities that will influence the postoperative result. Often the adjunctive techniques can be performed through the primary blepharoplasty incision.

PREOPERATIVE ASSESSMENT

The evaluative process should reveal an array of problems, leading ultimately to the selection of the appropriate surgical solutions. During the process, the surgical candidate's wishes are carefully considered in light of each anatomic issue.

In order to detect coexisting, often subtle problems, the examiner must proceed in a systematic manner. To do so, we recommend that the upper eyelid be subdivided into four aesthetic subsections by the upper eyelid crease (Fig. 3). The anatomic problems in *each* subunit then can be systematically evaluated.

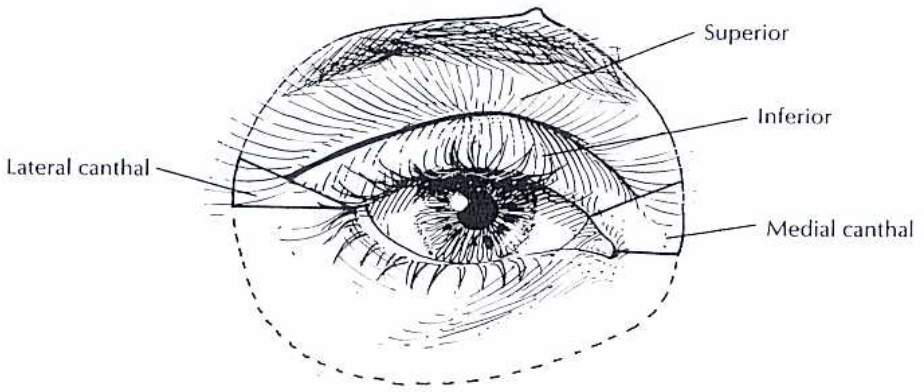


Fig. 3 The upper eyelid aesthetic unit has four subsections. The lateral canthal subunit is defined by the lateral orbital rim and the lateral limit of the upper eyelid crease. The medial canthal subunit begins at the medial termination of the crease and ends as the soft tissue begins to ascend the upward cant of the frontal process of the maxilla. The superior subunit begins at the crease and ascends to include the eyebrow. The inferior subunit descends from the eyelid crease to the ciliary margin. Each subsection is critically evaluated during the preoperative assessment and during the surgical execution.

Begin, for example, at the lateral canthus and proceed medially along the superior orbital rim. First note the position of the lateral brow. Then gently palpate by ballotement the lateral eyelid just beneath the lateral portion of the rim to detect prolapse of the lacrimal gland. Next palpate the contour and projection of the orbital rim and the supraorbital ridge and locate the position of the superior orbital notch. Grasp and roll the lateral brow and subjacent upper lid between the thumb and index finger to assess the thickness of the brow fat pad (Fig. 4). This "pinch" test will help to differentiate the contribution of the submuscular fat (brow fat pad) from that of the osseous rim to brow fullness. Then assess the level, continuity, and symmetry of each superior eyelid crease and note the natural depth of the superior sulcus. Note the distance that the skin folds extend beyond the limits of the lid crease into the medial and lateral canthal units. Estimate the position of the eyelid margin relative to the pupillary reflex. If the reflex-to-margin span is less than the norm of about 2.5 to 3 mm and the presence of ptosis is thus suggested, then check levator function. Evaluation of ocular protective mechanisms completes the assessment (see box).

ESSENTIAL OCULAR PROTECTIVE MECHANISMS

Blink reflex
Bell's phenomenon
Corneal sensation
Tear production

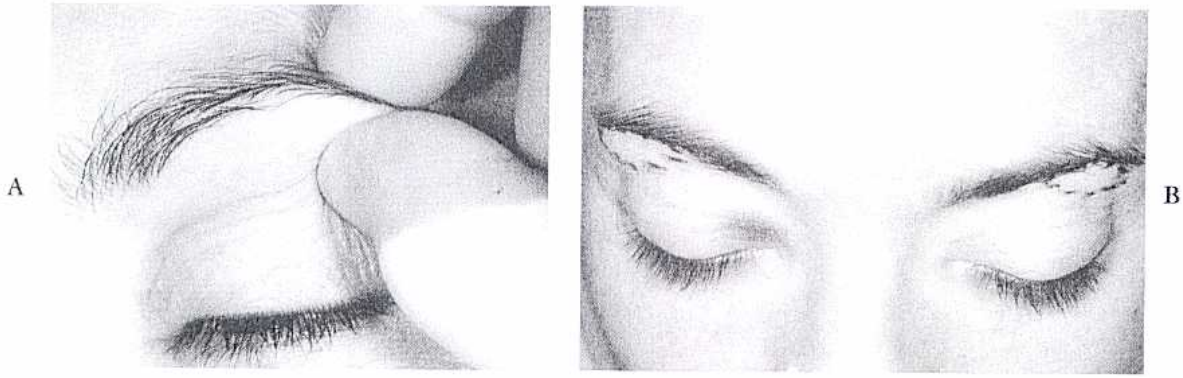


Fig. 4 The pinch test gauges the position of the brow fat pad and its contribution to brow fullness. **A,** The brow fat pad is rolled between the thumb and the index finger. **B,** Note the preoperative markings delineated by the pinch test.

A tentative surgical plan that includes a list of potential adjunctive procedures is then devised and discussed with the patient. A final formulation is reached only after full exposure of the surgical anatomy.

ANTERIOR LAMELLAR RESECTION[2]: BASIC UPPER BLEPHAROPLASTY TECHNIQUE

The key to successful craniofacial surgery is broad exposure, whether confronting anomalies, tumors, trauma, or other deformities.[3-5] In upper blepharoplasty, the principle is equally important. By entering the internal lamella of the eyelid, the surgeon increases the number of available surgical options and the odds of being able to perform a complete lid procedure. The septum, in keeping with this craniofacial principle, is opened across the limit of the musculocutaneous incision within the confines of the orbital rim.[6-8]

The sequence of blepharoplasty and adjunctive procedures is important to achieve a refined result. Rhytidectomy and/or forehead lift should precede the upper blepharoplasty,[7,9] and in selected patients, lower eyelid surgery should precede upper blepharoplasty.[9]

The upper lid is infiltrated with 1% lidocaine with epinephrine. The solution contains hyaluronidase[10] in a 9:1 ratio. Gentle massage is applied, and surgery is deferred for an appropriate amount of time to allow diffusion of the infiltrated drugs and to permit hemostasis. (See Fig. 5 for the general steps of the basic operation.)

The lower limb of the incision is marked with methylene blue. The mark is placed 6 mm above the lid margin medially, 10 to 11 mm above the pupil, and 7 mm above the margin laterally. Clearly, placement of the incision will vary somewhat with the individual patient. A utility forceps is used to delineate the soft tissue excess, and the upper limb of the excision is marked with the dye.

Following the markings, a scalpel is used to incise the skin. The incision is extended through the orbicularis oculi and preseptal fat (Fig. 5, *A*) (via the *upper* limb of the incision) using needle electrocautery. A small nick is created in the septum (Fig. 5, *B*), which then is extended medially and laterally with scissors. The anterior lamella (skin, muscle, preseptal fat, and septum) then is removed as a composite[2] (Fig. 5, *C*). We prefer to apply Kaye serrated mini-scissors (Snowden-Pencer, Inc., Tucker, Ga.) along the lower limb of the blepharoplasty incision.

The composite lamellar resection[2] (of skin, muscle, preseptal fat, and septum) offers access to the deeper structures of the eyelid, including the brow fat pad, lateral superior orbital rim, preaponeurotic fat, lacrimal gland, and levator aponeurosis. The surgeon then may examine, refine, or correct coexistent abnormalities that will influence the postoperative blepharoplasty result.

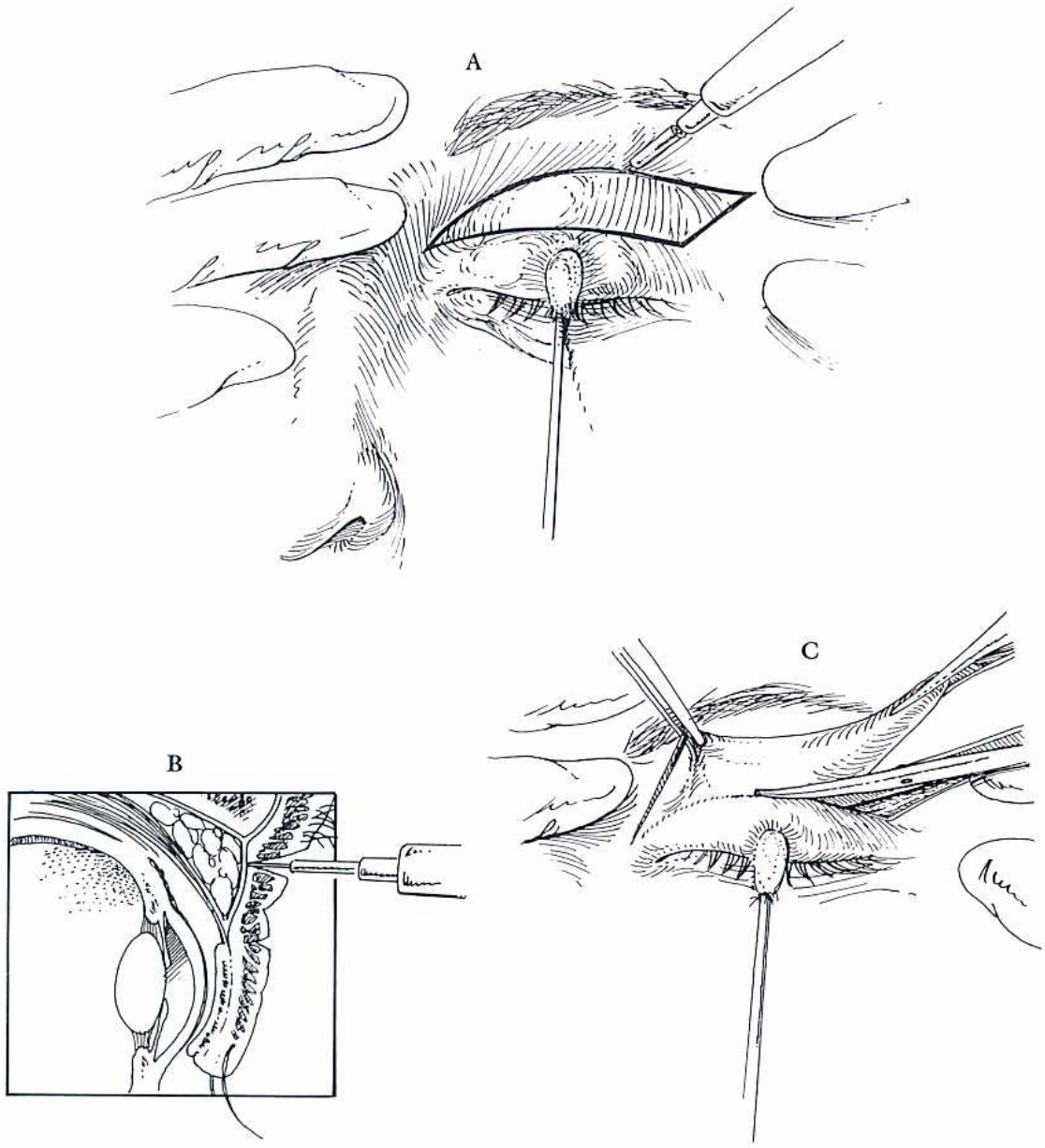


Fig. 5 In the basic upper blepharoplasty technique, depicted in a frontal view (**A**) and cross section (**B**), the anterior lamella of the eyelid is removed as a composite (**C**). The composite contains four components: eyelid skin, orbicularis oculi muscle, postorbicularis (preseptal) fat, and orbital septum. The composite resection affords broad exposure and access to the deeper structures of the eyelid including the brow fat pad, lateral superior orbital rim, preaponeurotic fat, lacrimal gland, and levator aponeurosis.

COEXISTENT DEFORMITIES AND THEIR SURGICAL SOLUTIONS

The consummation of adjunctive procedures in selected patients undergoing upper blepharoplasty in our view enhances the potential of the surgical result. Brow fat pad sculpting, brow contouring, forehead lift, rhytidoplasty, ptosis correction, lacrimal gland suspension, and the lid crease procedure diminish the risk of an incomplete result. The anatomic markers of limited surgical intervention are avoided.

Brow Fullness and Fat Sculpting

Grant[11] estimates that in the normal patient the lateral orbital margin is 20 mm behind the plane of the root of the nose. The superior orbital rim is thus directed posteriorly between the nasofrontal suture and the frontozygomatic suture.[11] The superior orbital rim ascends in a curvilinear arc to reach the supraorbital notch (foramen); flattens out in its central third, just lateral to the notch; and then descends toward the frontozygomatic suture. As the underlying lacrimal fossa is approached, the superior rim flares outward, particularly in men, to thrust the overlying soft tissues, including the hair of the brow, forward. Reduction of a prominent or low lateral superior orbital rim through the blepharoplasty incision is suggested by Lassus[12] in selected cases.

The modest protrusion of the superior orbital rim, prominence of the supraorbital ridge, and bossing of the central forehead have been used to distinguish male from female crania. Forensic pathologists, anthropologists, and craniofacial surgeons have noted that the female superior orbital rim has a smoother, less projecting, continuous curve from medial to lateral.[13-18] If true (Schubert et al.[19] question this tenant), then (1) prominence over the lateral brow in most women is better ascribed to soft tissue thickening than to bony prominence and (2) soft tissue bulk may with age obscure the osseous rim noted in youth.

Fat underlies the musculature to pad the skeleton and to facilitate muscle movement by creating a gliding surface, particularly at the orbital margin.[20] The submuscular fat deposits deep to the frontalis and deep to the orbicularis oculi are in continuity, enclosed within a common fascial sheath. This fascial envelope is derived from a subdivision of the posterior sheath of the galea, beginning approximately 2 cm above the superior orbital rim. After the galea is reflected anteriorly (as in a subgaleal forehead lift after a bicoronal incision), this fascial extension and the underlying fat are apparent on the posterior surface of the flap. Surgeons familiar with the subgaleal forehead lift recognize this fat as the *galeal fat pad*. Anatomists and surgeons witnessing this fat from an eyelid approach have referred to the fat aggregate as *le coussinet adipeux du sourcil* (the fatty cushion of the brow)[21] or the brow fat pad.[21-24]

The dimensions of the brow fat pad, particularly the thickness, vary from patient to patient.[25]

The fascial extension and thus the fat pad are firmly attached to the pericranium over the supraorbital ridge, particularly over the central and medial superior orbital rim. Less dense connections, strong in the young but decidely attenuated in the elderly, are present along the lateral portion of the superior orbital rim. Lemke and Stasior[23] believe the relatively lesser fascial density and attenuation with age and the downward displacement of the brow fat pad in part explain the progressive ptosis of the lateral brow.

The fascial extension of the posterior sheath of the galea changes character below the brow, and the fascia becomes more areolar. The "fluffy" character of this fascia is readily noted with loupes. Within the fibrous septae of the fascia resides the preseptal fat. The preseptal fat, less definable as a distinct entity, is variably present and represents a potential threat to the inexperienced surgeon, who may perceive it to be in the preaponeurotic space.[23, 26, 27]

After the skin, orbicularis, preseptal fat, and lower septum have been excised during routine upper blepharoplasty (see basic technique; Fig. 5, *C*), attention can be directed to the superior aesthetic unit, including the brow (Fig. 6). Surface markings direct the surgeon to the area of greatest fullness and preclude extension medially, where the neurovascular bundles exit from the superior orbital notch.

Additional preseptal fat often will be encountered as the dissection is carried upward deep to the postorbicular fascia (Fig. 6, *B*); it is removed using needle electrocautery. The dissection then is extended to approximately 1 to 1.5 cm above the lateral aspect of the superior orbital rim. The brow fat pad is excised using utility forceps and needle electrocautery (Fig. 6, *C*). The excision is usually elliptic since the resection is tapered medially and laterally.[24] Partial resection is satisfactory in some patients. The pad *and* fascia may be removed en bloc,[24] but we prefer to leave the dense areolar fascia at the deeper surface of the pad intact. This fascial layer overlying the periosteum avoids the postoperative complication of adhesion between the submuscular fascia and the periosteum. The remainder of the blepharoplasty procedure is then completed.

Total or partial resection of the brow fat pad is a valuable adjunctive procedure. Even following bicoronal forehead lifts, we have performed limited resection of the brow fat pad (through the blepharoplasty incision) with positive results. This adjunct (in effect, lateral rim lipectomy) has been extremely well received by patients seeking to restore a more youthful, rested appearance that had been lost because of lateral brow fullness. The rim has a more skeletonized appearance. The superior aesthetic unit (Fig. 3) is flattened (made less convex) since the skin and muscle better appose the superior orbital rim. A broader band of light traverses the brow and the underlying skin surface above the superior orbital rim postoperatively (Figs. 1, *B;* 7; and 8).

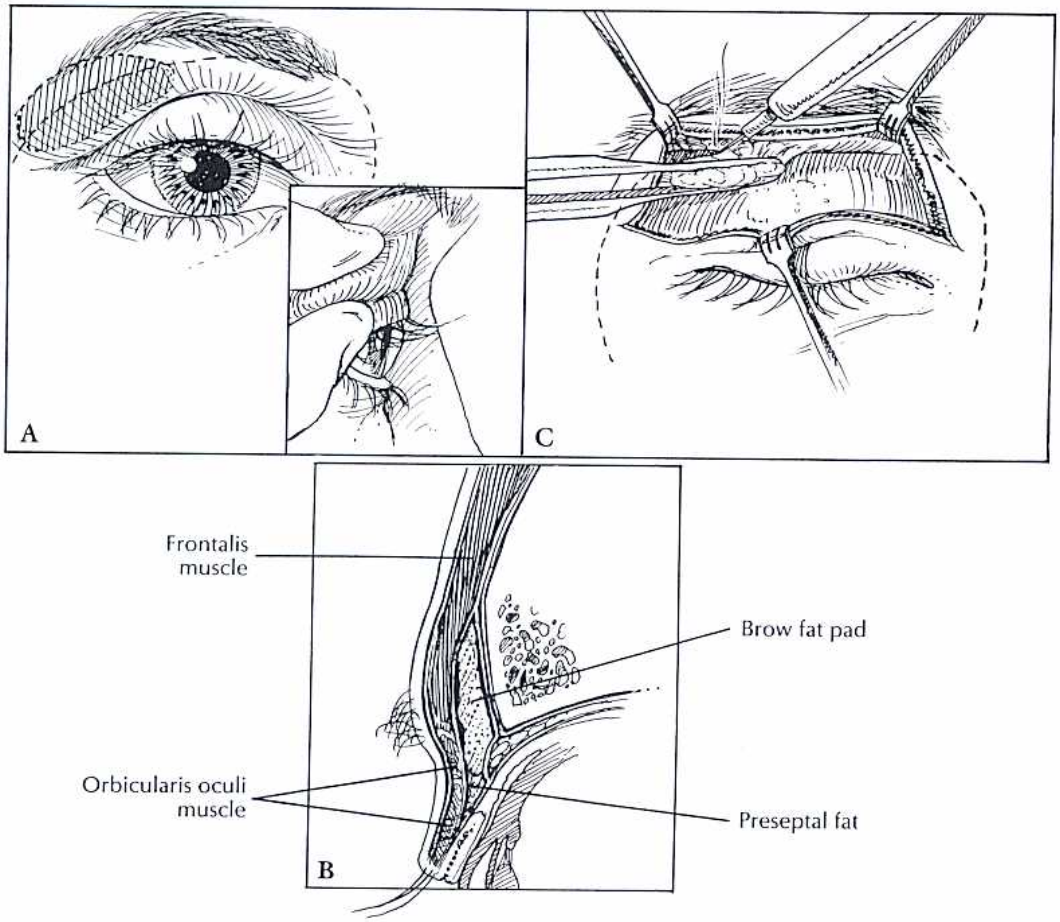


Fig. 6 **A,** Fat deposits deep to the frontalis and orbicularis muscles contribute to brow fullness. With aging, the fat accumulation deep to the frontalis muscle, recognized as the brow fat pad, becomes ptotic. It is detectable by means of the pinch test (inset). **B,** The displaced brow pad may be associated (and in continuity) with preseptal fat. **C,** The brow fat pad is approached through the upper limb of the blepharoplasty incision and sculpted with needle electrocautery.

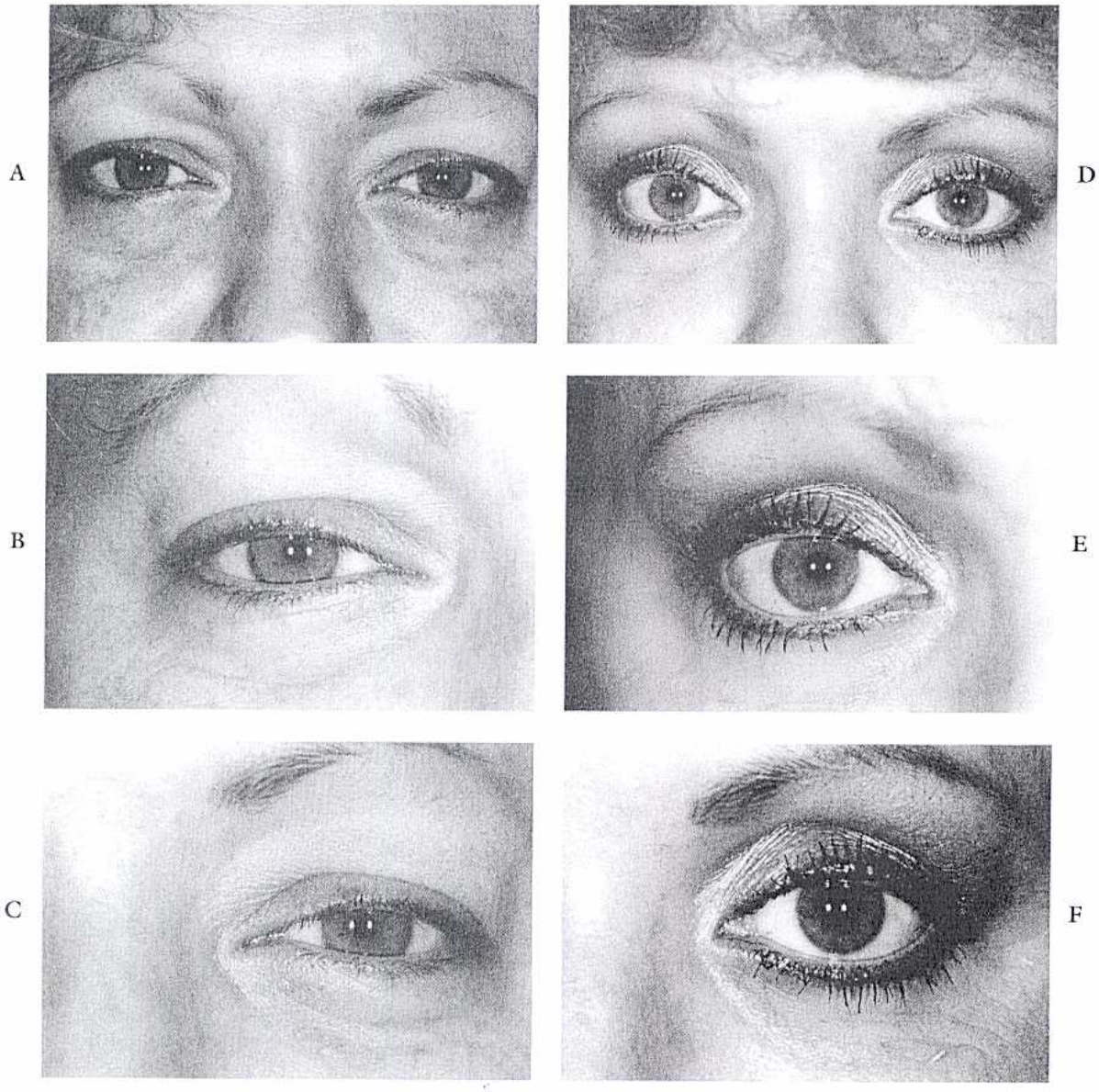


Fig. 7 A, In addition to the basic composite resection and removal of preaponeurotic fat, this 33-year-old patient underwent partial resection of each brow fat pad. She is shown preoperatively (A-C) and 3 months following surgery (D-F).

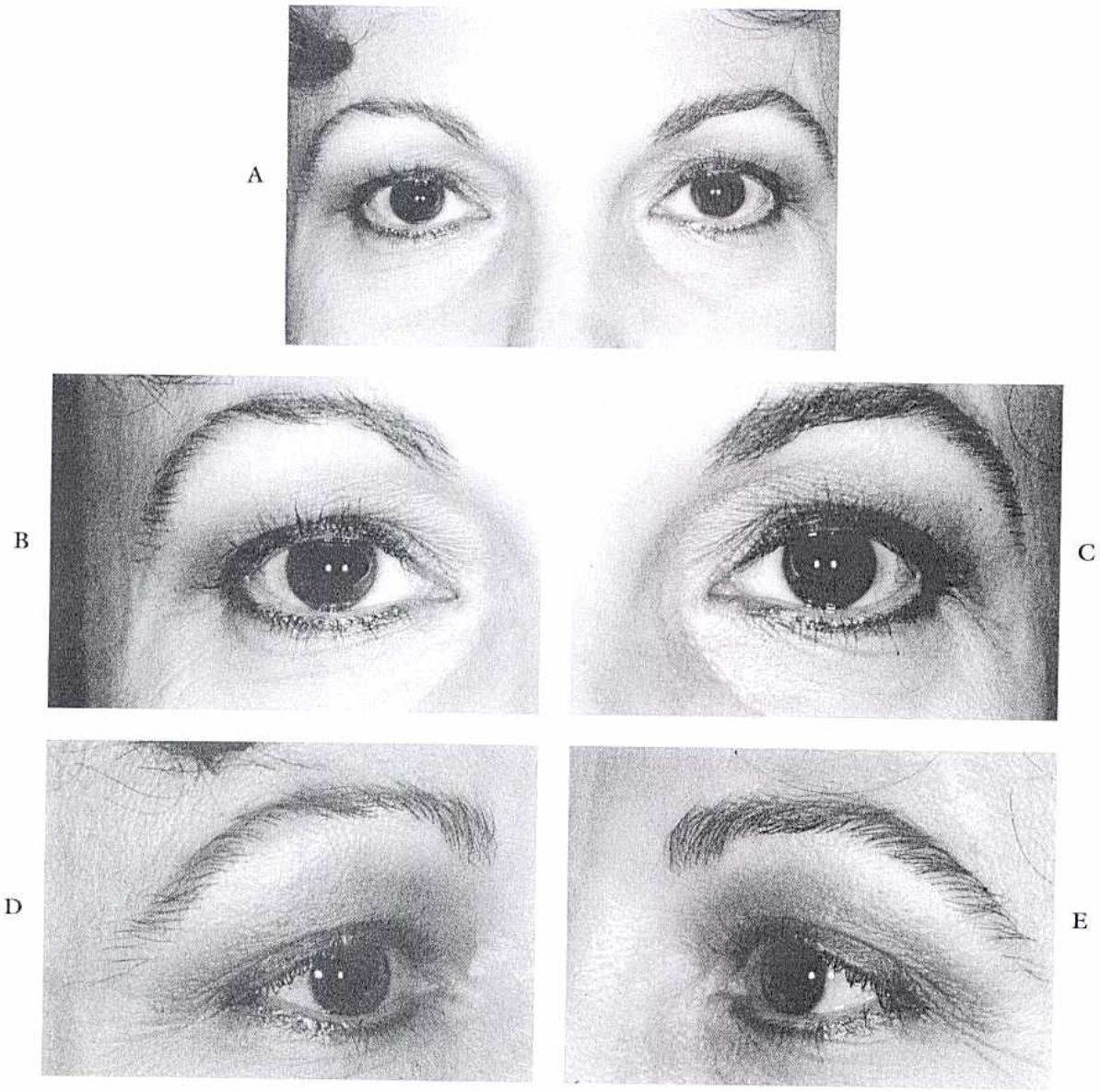


Fig. 8 This patient underwent complete resection of the lateral brow fat pad. **A-E,** Preoperative views.

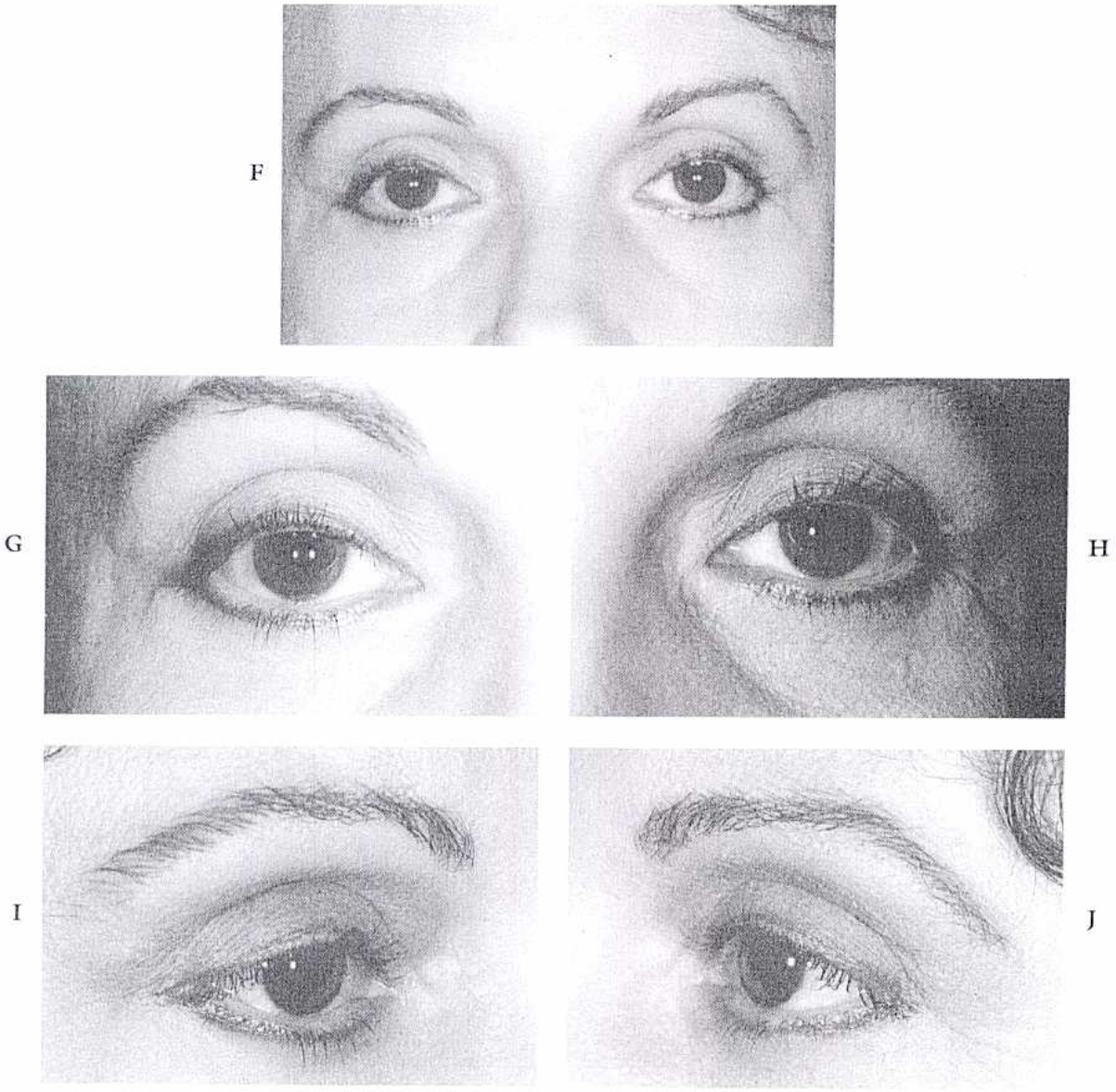


Fig. 8, cont'd F-J, Note in the postoperative views the sculpted superior orbital rim and the highlighted superior aesthetic subunit of the upper eyelid.

Brow Laxity (Early Ptosis) and Lateral Brow Contouring

Strikingly similar to the layered structure of the anterior lamella of the eyelid,[28] the composite of skin, muscle, fascia, and fat overlying the superior orbital rim, supraorbital ridge, and adjacent frontal bone is laminated. The frontalis (anterior belly of the epicranius), corrugator supercilii, and orbicularis oculi are part of the group of so-called subcutaneous muscles of the face.[29] Some of the more medial fibers of the frontalis muscle tightly adhere to the periosteum of the supraorbital ridge, and the nasalmost fibers of the frontalis muscle attach to the nasal bones to form the procerus muscle. Although the remaining frontalis muscle fibers blend with the corrugator and orbicularis, they have no bony attachments. Of equal significance, the lateral frontalis fibers interdigitate with the orbicularis fibers over the zygomatic process of the frontal bone but do not extend to reach the orbital rim laterally.[29] These findings suggest to Lemke and Stasior[23] why frontalis contraction does not prevent lateral eyebrow ptosis and in part why ptosis of the lateral brow precedes that of the medial brow.

The natural lateral brow peaks on, or just lateral to, an imaginary line drawn upward from the lateral limbus.[30] As mild early ptosis evolves, the patient may pluck lower brow hairs to maintain an open superior aesthetic unit. Other patients with early ptosis seek surgical relief by requesting blepharoplasty and brow repositioning. Sokol and Sokol[31] have suggested a periosteal flap, and McCord and Doxanas[24] have championed the use of direct (superior orbital) rim sutures as a means of achieving elevation through the blepharoplasty incision.

Resection or sculpting of the preseptal fat and of the brow fat pad precedes brow recontouring. The procedure is carried out within the (galeal) intrafascial space after resection of the brow fat pad. Two or three horizontal mattress sutures of 4-0 resorbable or permanent (clear nylon) suture (P-3) are used to secure the lateral third of the brow above the lateral superior orbital rim. The suture is first passed through periosteum approximately 8 mm above the rim. The needle is then reversed and passed through the postorbicular fascia at the level of transmusculocutaneous marking sutures that traverse the skin, orbicularis oculi, and postorbicular fascia just below the hairs of the brow (Fig. 9).

The fixation sutures are carefully placed to reestablish a natural contour, with the arch peaking on a point along or slightly lateral to the temporal limbic line (Fig. 10). The levels of the periosteal suture placement are relatively constant in all patients; the level at which the needles purchase the postorbicular fascia is variable. In early experience, in an attempt to achieve higher brow level, the surgeon may tend to place the sutures in the postorbicular fascia at an unrealistically low level. Postoperative dimpling is certain to result

with such placement, and lagophthalmos may occur from tethering of the eyelid.[24]

Patient selection for this adjunctive procedure is extremely critical. There appear to be two optimal candidate groups: (1) the younger patient with inferiorly displaced, near-horizontal brows without other significant upper facial laxity and (2) the younger patient with considerable blepharochalasis and early lateral brow laxity in whom the composite anterior lamellar resection will abbreviate the superior aesthetic unit (and reduce the vertical distance between the eyelid crease and brow) (Fig. 10).

Minimal elevation is achieved with the brow contouring procedure. Cursory examination may suggest that no effect is gained unless the viewer recognizes the changes in the distances between the brow and the corneal light reflex, the brow and the eyelid margin, the brow and the eyelid crease, and the brow and the superior orbital rim (Fig. 10).

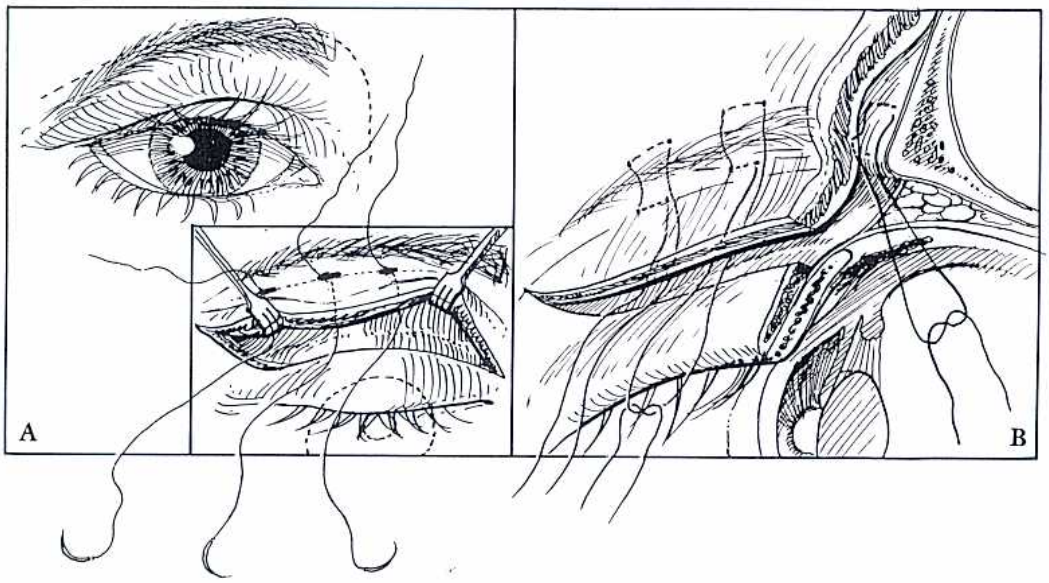


Fig. 9 Early brow laxity is corrected by lateral brow contouring through the blepharoplasty incision. Transmusculocutaneous marking sutures (through skin, orbicularis, and postorbicular fascia) **(A)** guide the placement of the horizontal mattress-contouring sutures **(B)**. The sutures are placed at or lateral to the pupillary line and anchor the postorbicular fascia to the periosteum of the superior orbital rim at a selected level. The middle suture is usually at the highest level, ensuring that the lateral brow peaks near the lateral limbic line.

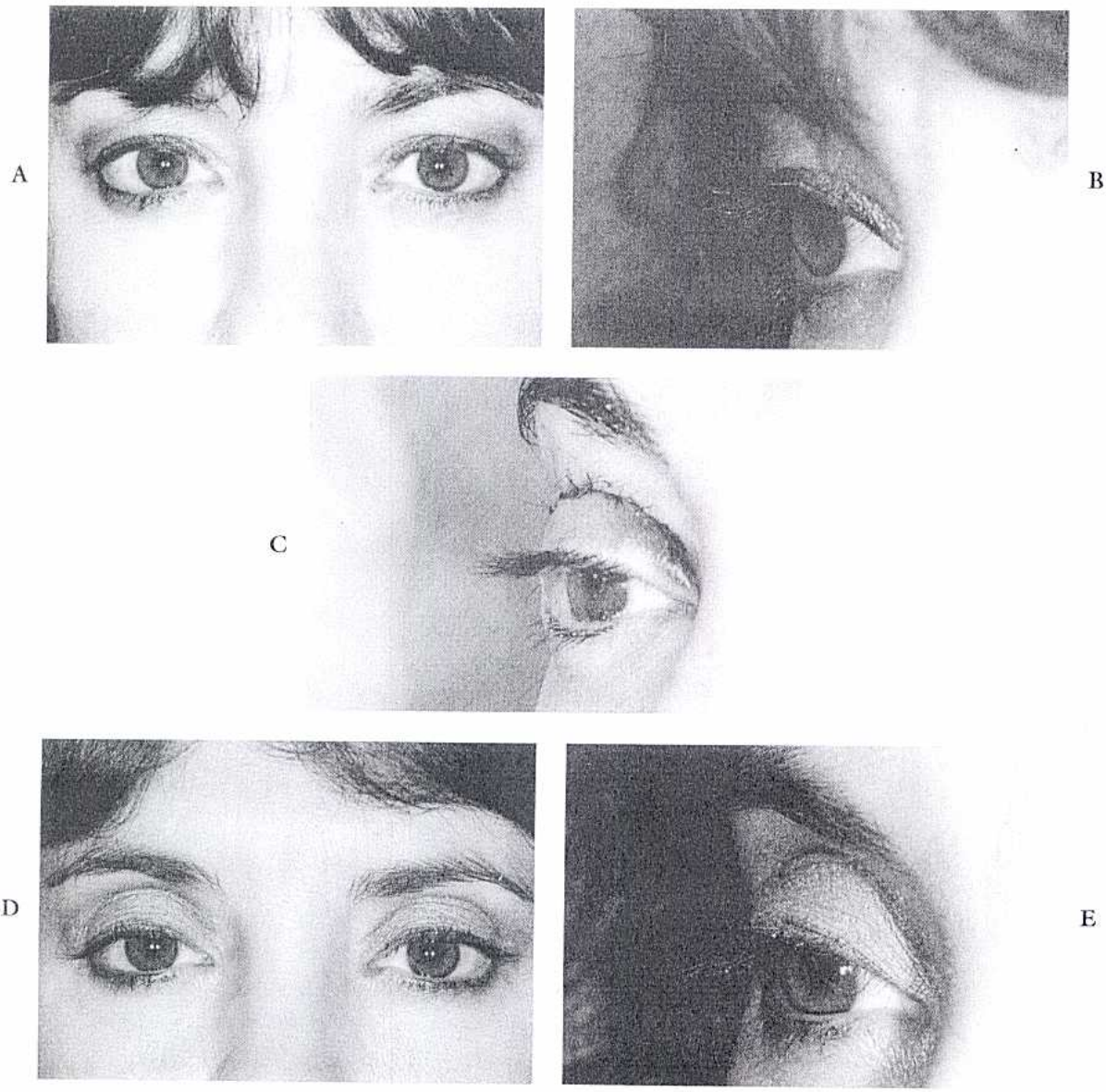


Fig. 10 This 38-year-old woman has blepharochalasis and brow laxity, which are camouflaged in part by the removal of lateral brow underhairs. She underwent basic anterior lamellar resection, removal of preaponeurotic fat, and two adjunctive procedures: sculpting of the brow fat pad and brow contouring. Compare the margin-to-brow distance in the preoperative views (**A** and **B**) and the postoperative views (**C-E**); the difference is most readily compared in **B** and **C**. The "opening" (increase in vertical height) of the superior aesthetic unit may be extremely flattering. Dysesthesias, as experienced by this patient, are common in the immediate postoperative period after brow contouring but resolve over 2 to 3 weeks aided by the application of warm compresses and the use of analgesics.

Brow Ptosis and Forehead Lift

Patients with lateral *and* medial brow ptosis are not signature candidates for lateral brow contouring, although they may benefit from preseptal and limited rim (brow pad) lipectomy. They are better served by a bicoronal forehead lift or, in selected cases, by other techniques (Fig. 11).

External browplasty provides direct brow elevation by removal of a triangular segment of skin and subcutaneous tissue above the brow[32-34] (Fig. 11, *A*). However, it involves a separate and distinct procedure requiring tedious soft tissue closure to minimize scar formation. It has gained limited patient acceptance, and we have for the most part abandoned it.

The lateral forehead minituck may have limited application in the segmental correction of lateral brow ptosis.[35,36] The incision at the temporal hairline is carried to the deep temporal fascia over the lateral surface of the temporalis muscle (Fig. 11, *B*). The subgaleal elevation extends only a short distance from the hairline. In our opinion, the minituck is best suited for the older patient with sufficient laxity to permit the elevation of the lateral brow with limited dissection. Extensive inferior dissection puts the frontal branch of the facial nerve, immediately anterior to the galea, at risk. A subcutaneous approach to the forehead and brow with a modified temple incision has been suggested by Guyuron.[37]

The forehead lift begins at the bregma, on line with each auricle (Fig. 11, *C*). To facilitate rapid closure, a notch is created at the midline.[38,39] The incision thus has a gull-wing configuration. The incision is performed with a scalpel or with blended needle electrocautery and is carried through the skin, subcutaneous tissue, and galea. The incision is directed only slightly forward and inward across the coronal surface,[40] although some surgeons have recommended that it be beveled dramatically, parallel to the hair follicles.[26,41,42] Autoclips are applied to both cut surfaces. A large periosteal (Hargis) elevator serves to elevate the flap within the areolar plane between the pericranium and the galea.

When the hairline is high, the central portion of the bicoronal incision is modified. The incision is placed near the frontal hairline[43] in the central forehead and then is carried laterally before sweeping into the anterior temple.

Just above the level of the supraorbital ridge, the pericranium is incised. The dissection proceeds beneath the pericranium to the superior orbital rim. The supraorbital vessels and nerve are thus protected, the adherence of the brow fat pad fascia to the periosteum (over the lateral superior orbital rim) is preserved, and the frontal branch of the facial nerve, vulnerable just anterior to the galea, escapes harm caused by dissection or injudicious retraction.

The galea at the posterior surface of the frontalis muscle is tightly adherent to the periosteum over the lateral orbital rim, and sharp periosteal dissection along the rim is required. A sharp Molt No. 9 elevator is the instrument of

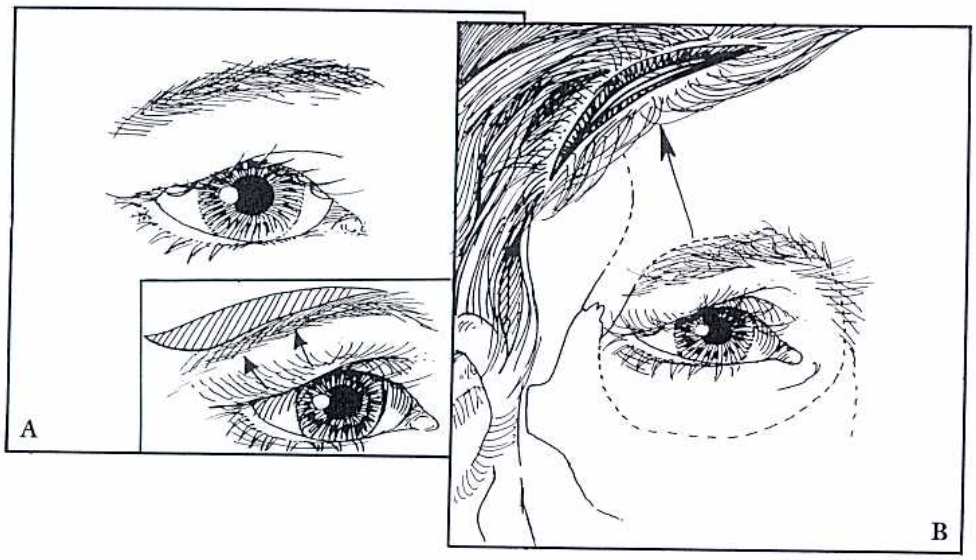
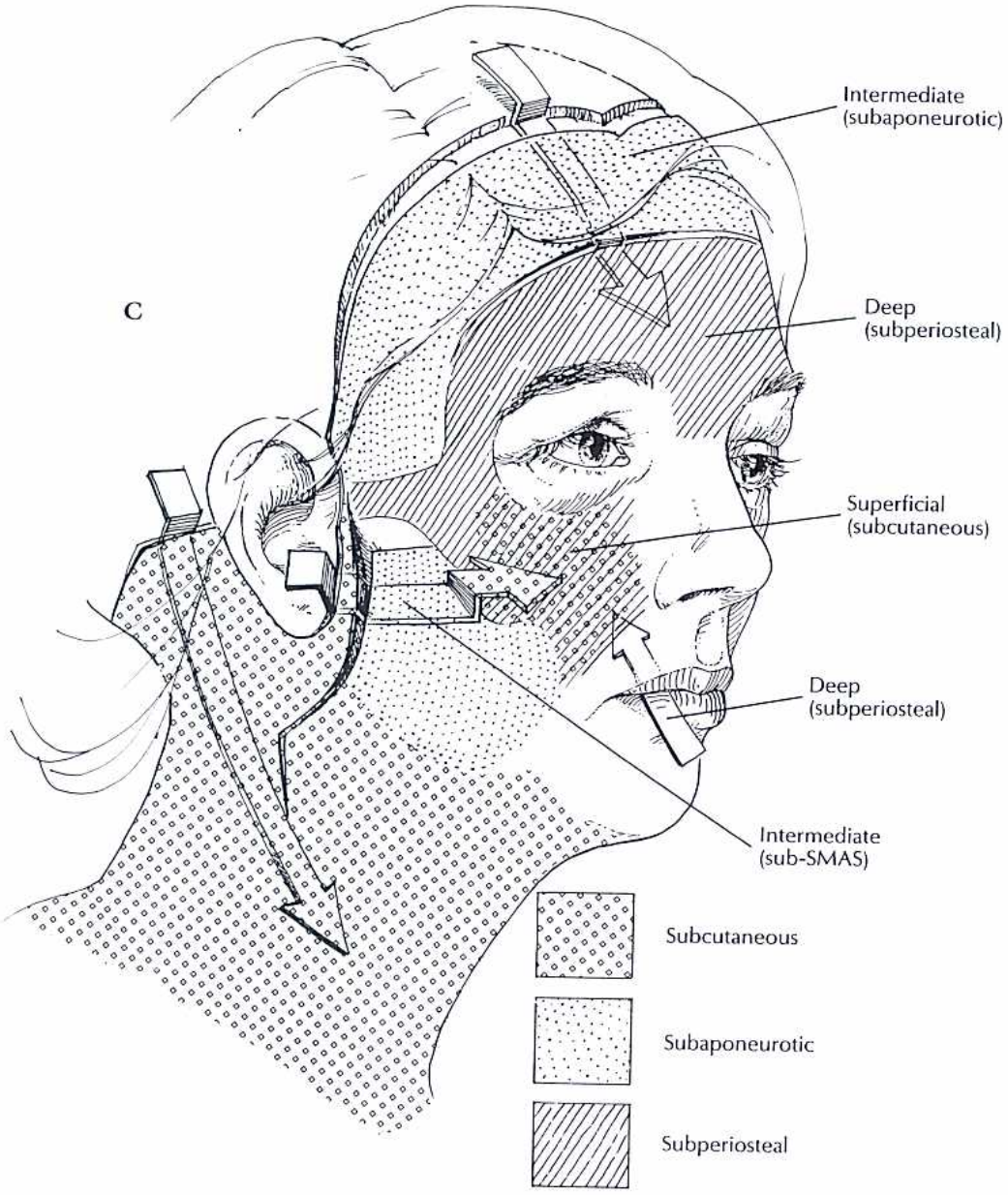


Fig. 11 **A,** The patient with significant brow ptosis is best managed by a combination of blepharoplasty and adjunctive surgery beyond the eyelid. External browplasty (inset) has poor patient acceptance if the scar is not highly refined. **B,** The lateral forehead minituck a few millimeters within the hairline has a better scar prognosis. **C,** The bicoronal forehead lift provides a viable alternative in the patient with advanced ptosis and may be readily combined with rhytidoplasty. The initial plane of dissection is beneath the galea. The plane of dissection is deepened to include the periosteum at the level of the supraorbital ridge. The supraorbital neurovascular bundle, frontal branch of the facial nerve, and adherence of the brow fat pad to the periosteum are thus preserved. The various rhytidoplasty procedures (subperiosteal, SMAS, and subcutaneous) may be combined. The subperiosteal face lift is an extension of the forehead lift and reaches the zygomatic arch and zygoma. The soft tissues overlying the maxilla and the inferior aspect of the zygoma (including the medial origins of the masseter muscle) may be directly reached through a separate incision in the maxillary vestibule. The subperiosteal dissection is supplemented by SMAS imbrication or advancement. Note that if the SMAS dissection is extended beyond the parotid gland into the malar region, a change to a more superficial plane is necessary to avoid injury to the facial nerve filaments that enter the undersurface of the zygomaticus major muscle. Subcutaneous dissection to the level of the clavicle, achieved with a fat suction cannula and elongated scissors, completes the multiplane rhytidoplasty. (**C** after Barton FE Jr. The periorbital dissection in rhytidectomy: How deep? Clin Plast Surg 19(2):455-459, 1992.)


C
Intermediate
(subaponeurotic)
Deep
(subperiosteal)
Superficial
(subcutaneous)
Deep
(subperiosteal)
Intermediate
(sub-SMAS)
Subcutaneous
Subaponeurotic
Subperiosteal

choice. The sharp subperiosteal dissection is next carried along the zygomatic process of the frontal bone to the level of the lateral canthus. The periosteum over the proximal nasal bones, periorbita of the upper medial wall, periorbita of the anterior orbital roof, and periorbita overlying the orbital plate of the zygoma (lateral orbital wall) is then elevated, again using the Molt elevator.

Excision of transverse strips of the posterior sheath of the galea and of the frontalis muscle[44,45] in three separate strips[33,46-48] avoids injury to the supraorbital neurovascular bundles. The horizontal excision is placed 3 cm or more above the superior orbital rim in order to avoid injuring the frontal branches of the facial nerve. This technique allows increased expansion of the skin, muscle, and fascia. The resected areas adhere to the pericranium, resulting theoretically in increased flap stability.

Before the flap is trimmed, five fixation points are established using staples or 2-0 nylon sutures. The excision is flared over the temporal brows. The galea is anchored to the deep temporal fascia just below the superior temporal line. Skin margins are closed using running locking 4-0 nylon (P-3). A drain is seldom necessary.

The bicoronal incision offers good scar prognosis; obviously the scar is hidden. There are further advantages of the forehead lift. For surgeons with craniofacial experience, the dissection is extremely rapid.[42] Adjunctive procedures such as partial resection of the corrugator muscles and elevation of the medial brow are possible in patients with glabellar ptosis or frown lines. In addition, patients carry a more natural elevation of the entire forehead aesthetic unit postoperatively.

Facial Laxity and Rhytidoplasty

Blepharoplasty and bicoronal forehead lift may be effectively combined with rhytidoplasty. The fascial and vascular anatomy of the face are now more precisely defined[49,50] and the parasymphyseal and paramasseteric ligaments, important to soft tissue suspension (and attenuation), have been identified.[49,51] Of critical importance, the safe planes of dissection beneath the superficial fascia (submuscular aponeurotic system [SMAS]) and along the deep (parotidomasseteric) fascia are now more clearly established.[29,49] There are therefore safe, effective additional procedures that may be used at deep (subperiosteal), intermediate (SMAS), and superficial (subcutaneous) planes (Fig. 11, *C*).

The soft tissue upper and midfacial "mask" elevation suggested by Tessier,[52] Psillakis, Rumley, and Camargos,[53] and Ramirez, Maillard, and Musolas[54] provides remarkable advancement. The bicoronal dissection is "extended" to expose the zygomatic arch. This extended dissection follows the deep temporal fascia and its fascial extension (innominate fascia[55]) to the temporal fat pad and the zygomatic arch. Shortly beyond where the temporal fat pad[56] is encountered, the fascial extension is incised parallel to the arch. The dissec-

tion is carried to the inner surface of the arch, along which the periosteum is sharply elevated. The frontal branch of the facial nerve is spared as it traverses the zygomatic arch because the dissection is directed through the temporal fat pad to the inner surface of the zygomatic arch before the periosteum is elevated over the lateral surface of the zygomatic arch.

The subperiosteal dissection is then carried downward and forward over the body of the zygoma and the anterior surface of the maxilla toward the maxillary vestibule.[51] The dissection frees the masseter from its attachment to the lateral surface of the zygoma. Dissection along the frontal process of the maxilla may also be achieved as long as the medial canthal tendon is not avulsed. The midfacial skeleton may be approached and the periosteum elevated through a separate incision in the maxillary vestibule.[49]

Before the frontotemporal scalp is trimmed and the bilayered closure of the incision is performed, the cut edge of the innominate extension of the temporal fascia (attached to the midfacial soft tissues) is advanced superiorly and posteriorly. The extension is sutured to the temporal fascia on the lateral surface of the temporal muscle. Our suture of choice is 4-0 clear nylon (P-3). A drain is usually inserted before closure.

The subperiosteal forehead lift and face lift elevate the upper and central soft tissues overlying the maxilla, zygoma, proximal nasal bones, and forehead. The nasolabial folds, outer upper lip, submalar fat, outer limb of the lateral canthal tendon, and brows are thus favorably repositioned in a superior and somewhat posterior direction because the "mask" of soft tissue is secured at a higher level. Brow fat pad sculpting is avoided in some patients since the ptotic lateral brow fat is mobilized to lie above the superior orbital rim. In other patients, sculpting of the preseptal fat and of the lower aspect of the brow fat pad through the upper blepharoplasty incision still remains a viable adjunct. For this reason in most instances the blepharoplasty procedure should quickly follow, rather than precede, the subperiosteal operation. Swelling is modest and rapidly abates since the laminated soft tissue within the mask is not violated by surgical intervention.

The subperiosteal procedure does not advance the soft tissues of the lower lateral face in a desirable posterior and superior direction nor does the subperiosteal technique provide access to complete a neck lift. Today we tend therefore to use a combination of surgical approaches to supplement the subperiosteal midfacial lift and forehead lifts to include SMAS advancement or imbrication and subcutaneous neck dissection extending to the clavicle (Fig. 11, *C*). One or all of these procedures may be used in the same patient to good effect (Fig. 12).

We are convinced that restoration of tissue in multiple planes during rhytidectomy provokes less tension on the skin and provides a longer lasting result than when rhytidectomy is confined to skin resection. The value of such combined surgical approaches in different planes of dissection is recognized by others.[36,57-61]