# Small Incision Preperiosteal Midface Lift for Correction of Lower Eyelid Retraction

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***Purpose:*** Postblepharoplasty lower eyelid retraction is often due to scarring of the middle lamellae and/or vertical shortening of the anterior lamellae. Traditional reconstructive techniques involve a transconjunctival incision combined with a spacer graft. Other techniques involve a subperiosteal midface dissection or limited preperiosteal dissection. Elevation of the midface reduces the gravitational effect of the cheek on the eyelid and recruits skin for the anterior lamella. This study evaluates a technique for correction of lower eyelid retraction using a preperiosteal midface lift via a lateral canthal incision in a series of patients.

***Methods:*** Twenty-eight patients (56 eyes) with postblepharoplasty lower eyelid retraction were evaluated. Preoperative evaluations for inferior scleral show, corneal staining, and epiphora were documented. The patients underwent bilateral preperiosteal midface lift and canthoplasty via a lateral canthal incision. Follow-up ranged from 12 to 18 months.

***Results:*** Average preoperative inferior scleral show was 1.96 mm (range, 1–3 mm). Seventy-eight percent of patients had epiphora, and 54% had corneal staining. Average postoperative lower eyelid position was +0.07 mm (range, 0 to +1 mm) above the inferior limbus. Average change in lower eyelid position relative to the inferior limbus was 2.04 mm. In all eyes, the final lower eyelid position was either at the inferior limbus or above it. All eyes had resolution of epiphora and corneal staining. Two patients required revision of lateral canthus on one side to improve symmetry.

***Conclusion:*** Mobilizing the midface in the preperiosteal plane through a lateral canthal incision provides excellent elevation and support of the eyelid. The small incision allows easy access to adhesions along the inferior orbital rim and to the preperiosteal plane beneath the entire midface. Preperiosteal midface lift combined with canthoplasty provides significant improvement of postblepharoplasty lower eyelid retraction.

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Postblepharoplasty lower eyelid retraction has many causes. These may include vertical foreshortening of the anterior lamella, scarring of the middle lamella to the inferior orbital rim, and/or horizontal laxity of the lower eyelid. Most patients have some degree of all these factors. These patients often present with inferior scleral show and symptoms of dry eye, epiphora, chronic irritation, and blurred vision. Often, there is lagophthalmos, especially while sleeping. Patients also often complain of the loss of the "almond" shape of their eyes.[1–3]

Reconstruction of the postblepharoplasty lower eyelid must be able to address each of these distinct causes. Many techniques have been described to release middle lamellar scar tissue.[4–6] Lateral canthoplasty for horizontal eyelid tightening has also been well described.[7–9] Postblepharoplasty lower eyelid retraction is often associated with a history of previous subciliary skin-muscle flap surgery in which an excessive amount of skin has been excised. This problem of inadequate anterior lamellar tissue is difficult to solve because skin grafting can produce an undesirable aesthetic result. However, unless additional tissue from the midface can be recruited, the cheek will continue to apply its gravitational forces on the lower eyelid.

The relationship between the lower eyelid and the cheek can be demonstrated when evaluating patients with lower eyelid retraction. When the eyelid is manually elevated to its correct anatomic position, traction can be seen being placed on the cheek. This is especially true in patients with vertical foreshortening of the anterior lamella (Fig. 1). In these patients, the eyelid can only be elevated manually if the cheek is elevated simultaneously. This is an indication that unless the heavy cheek is mobilized and elevated at the time of lower eyelid reconstruction, the procedure may fail over time.

Mobilization, elevation, and fixation of the midface provide necessary support for the surgical elevation of the eyelid. They also facilitate the recruitment of tissue for the anterior lamella of the eyelid. Many techniques describing midface lifting have used transconjunctival or subciliary incisions and subperiosteal dissections.[4,10–12] As more is learned about the anatomic relationship between the midface and the lower eyelid, a preperiosteal dissection becomes more logical.[13,14] This plane of dissection is easily accessible from a lateral canthal incision. The small incision is ideal for accessing and releasing scar tissue between the middle lamella and the inferior orbital rim.

This study describes a technique for correction of lower eyelid retraction using a preperiosteal midface lift via a small lateral canthal incision and evaluates its efficacy in a series of patients.

**Surgical Technique.** The infraorbital foramen may be palpated prior to local injection and marked on the skin with a marking pen. 1% Lidocaine with epinephrine mixed with hyaluronidase is injected in the lateral canthus and lower eyelid. Approximately 10 ml of the same solution is then injected in the entire cheek in the preperiosteal plane to provide hemostasis and hydrodissection between the periosteum and the overlying soft tissue (Fig. 2). A lateral canthotomy incision

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**FIG. 1.** A 70-year-old man with bilateral postblepharoplasty lower eyelid retraction. The right lower eyelid is elevated manually. Note the traction placed on the right cheek, evidenced by the decreased right nasolabial fold compared with the left. This indicates that gravitational forces being placed on the elevated lower eyelid.

**FIG. 3.** Stevens scissors are passed in the preperiosteal plane along the inferior orbital rim in a spreading fashion. Scar tissue between the middle lamellae and the arcus marginalis is released. The dissection stops medial to the infrorbital neurovascular bundle.

(5–10 mm in length) is started with a #15 blade and completed with straight scissors. An inferior cantholysis is then performed by cutting the inferior canthal tendon with scissors. A freer elevator is used to dissect down to the level of the periosteum at the lateral orbital rim, so that the periosteum is visible. With the lateral eyelid placed on superior traction, curved Stevens tonotomy scissors are used to dissect in a spreading fashion along the inferior orbital rim in the preperiosteal plane with the scissor tips firmly on the periosteum of the rim (Fig. 3). No cutting is used. The orbital septum and any scar tissue are released from their attachments to the arcus marginalis. The eyelid should now move freely from the rim.

The scissors are then directed inferiorly and medially. The tip of the scissors is kept firmly on periosteum. Spreading action alone, without cutting, is used to dissect in the preperiosteal plane beneath the suborbicularis oculi fat (SOOF) and the soft tissue of the entire cheek to the level of the nasolabial fold medially and to the level of the gingival sulcus inferiorly (Fig. 4). The scissor tips are kept firmly on the periosteum overlying the facial bones to ensure that the dissection plane is beneath the facial muscles and nerves. Because of the hydrodissection, the soft tissue should dissect away from the periosteum with minimal force. Care is taken in the area of the infraorbital neurovascular bundle, and the dissection should stop lateral to this area and resume inferior to it. The eyelid and cheek should now freely move as a unit. The cheek is redraped in a superolateral vector. A 4-0 monocryl suture is passed through the soft tissue of the lateral midface (Fig. 5). Traction is placed on the suture, and the tissue is observed for good purchase of the soft tissue and minimal dimpling of the skin over the suture. The suture is then passed through the periosteum of the inferolateral orbital rim and tied (Fig. 6). In patients with heavy cheeks, a second suture is placed lateral to the first in the same fashion. A lateral canthoplasty is then performed with a lateral tarsal strip technique to set the eyelid at the desired height and tightness by passing two 5-0 vicryl sutures

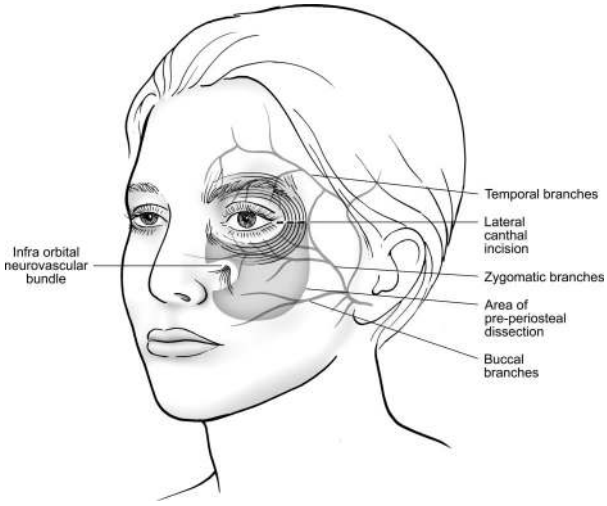


**FIG. 2.** Diagram showing area of preperiosteal dissection in the midface. Note the dissection avoids the area of the infraorbital nerve.

**FIG. 4.** The scissors are directed inferiorly with the tips kept firmly on the periorsteum. Spreading action in the preperiosteal plane facilitates dissection of the entire cheek to the level of the nasolabial fold medially and the gingival sulcus inferiorly.

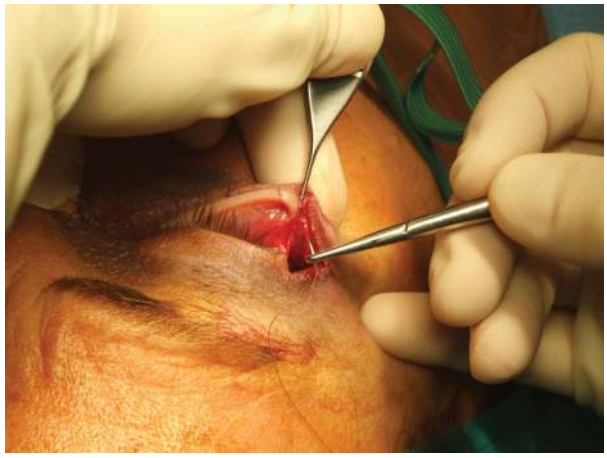

**FIG. 5.** A 4-0 monocryl suture is passed through the tented soft tissue of the lateral midface. The suture is then pulled to ensure good purchase of the soft tissue, without dimpling of the skin.

from the lateral tarsal strip through the periosteum of the lateral orbital rim. The eyelid is shortened, and the lateral canthus is generally set at the midpupillary level, such that the lower eyelid margin is at the level of the inferior limbus. No overcorrection is used.

## METHODS

Twenty-eight patients (56 eyes) with postblepharoplasty lower eyelid retraction were evaluated. All had undergone lower blepharoplasty at least 2 years prior to examination. Preoperative evaluations for inferior scleral show, corneal staining, and epiphora were documented. The patients underwent bilateral preperiosteal midface lift and canthoplasty via a lateral canthal incision. Two patients had some residual excess lower eyelid fat that was excised through a transconjunctival incision prior to beginning the canthal incision. Postoperatively, the patients were evaluated for position of the lower eyelid margin relative to the inferior limbus, corneal staining, epiphora, and any sensory or motor deficits. Follow-up ranged from 12 to 18 months.

**FIG. 6.** The suture is passed through the periosteum of the inferolateral orbital rim and tied. The sutures for the lateral canthoplasty will pass through the periosteum superior to this stitch.

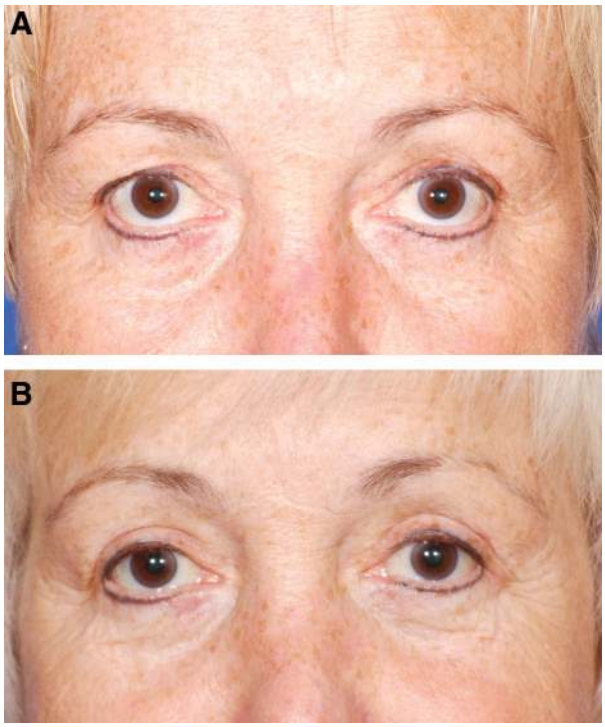


**FIG. 7.** **A,** A 57-year-old female with postblepharoplasty lower eyelid retraction. Patient presented with inferior scleral show, epiphora, and corneal staining. **B,** Same patient 6 months after small incision midface lift and lateral canthoplasty. Lower eyelids now at the level of inferior limbus. Symptoms have resolved.

## RESULTS

Because patient complaints were generally related to issues of exposure and rounding of the lower eyelid, degree of inferior scleral show, i.e., the distance from the inferior limbus to the lower eyelid margin, was chosen as the measurement of the degree of eyelid retraction. A successful endpoint was chosen to be 0 mm of inferior scleral show, with the lower eyelid at the level of the inferior limbus or above.

All analyses were performed using SAS Version 9.1 (SAS, Inc., Cary, NC, U.S.A.). Preoperative scleral show data were approximately normally distributed with a mean of 1.96 mm and standard deviation of 0.7 mm (range, 1–3 mm; 0.5-mm intervals). Average postoperative lower eyelid position was +0.07 mm (range, 0 to +1 mm) above the inferior limbus. The average change in lower eyelid position relative to the inferior limbus was 2.04 mm. In all eyes, the final lower eyelid position was either at the inferior limbus or above it. All eyes had resolution of epiphora and corneal staining (Figs. 7–9). Two patients required revision of lateral canthus on one side to improve symmetry. There was no incidence of facial nerve or infraorbital nerve damage.

Both epiphora and corneal staining were determined as a priori binomial (present/absent) covariates. Preoperatively, 100% of patients (28/28) demonstrated bilateral epiphora, and 76% (22/28) demonstrated corneal staining. Presence of corneal staining was statistically, significantly correlated with greater preoperative scleral show ($p = 0.002$). Epiphora and preoperative scleral show were uncorrelated ($p = 0.99$). Postoperatively, 100% of patients experienced complete resolution of both scleral show and epiphora; corneal staining was also resolved (100% of 22 patients). Ninety-one percent of eyes (51/56) resulted in 0 mm scleral show, while the remaining 9% of eyes resulted in a lower eyelid above the inferior limbus. Postoperatively, absence of epiphora was 100% correlated with the execution of the procedure ($R = 1$, $p = 0$). Further, the prevalence of corneal staining in postoperative patients


**FIG. 8.** **A,** A 61-year-old female with postblepharoplasty lower eyelid retraction with complaints of chronic eye irritation. **B,** Same patient 6 months after small incision midface lift and lateral canthoplasty. Symptoms have resolved.

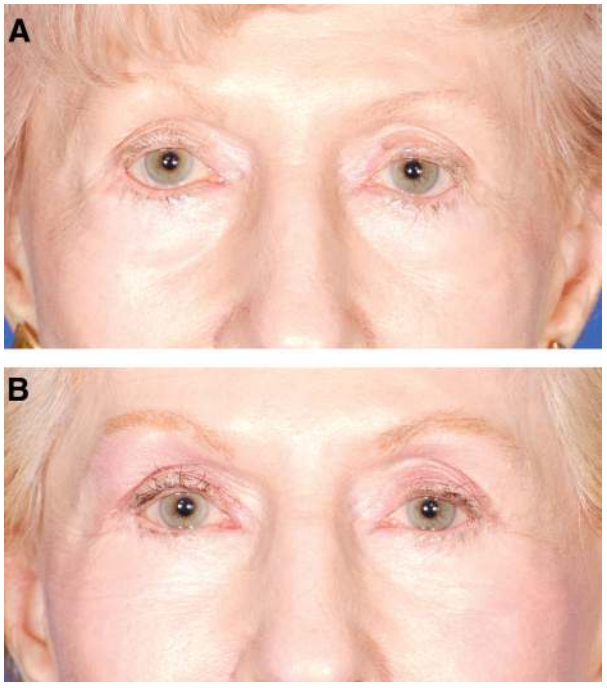


**FIG. 9.** **A,** A 84-year-old female with postblepharoplasty lower eyelid retraction. Note lateral canthal dystopia and erythema of the eyelid margins. Patient complains of chronic eye irritation. **B,** Same patient 6 months after small incision midface lift and lateral canthoplasty. Symptoms have resolved.

was eliminated. No change in eyelid position, epiphora, or corneal staining was noted during the follow-up period.

A 2-way analysis of covariance model was generated to evaluate improvement in scleral show (in millimeters) following the midface lift procedure. While controlling for corneal staining and the statistical relatedness of 2 eyes from a single patient, the analysis of covariance model demonstrated a highly statistically significant improvement of inferior scleral show ($p < 0.001$).

## DISCUSSION

Postblepharoplasty lower eyelid retraction has many causes related to changes in all 3 lamellae. The causes may include a combination of any of the following: 1) vertical foreshortening of the anterior lamella; 2) scarring between the middle lamella, the lower eyelid retractors, and the inferior orbital rim; and 3) horizontal laxity of the lower eyelid.[1–3,15]

Vertical foreshortening of the anterior lamella results from excessive skin excision during skin-muscle flap surgery. This allows the skin of the cheek to have a greater tethering effect on the lower eyelid. Scarring of the middle lamella occurs as a result of violation of the orbital septum when accessing the fat compartments. This leads to scarring between the middle lamella, the lower eyelid retractors, and the inferior orbital rim.[3] Failure to recognize and address preoperative horizontal laxity of the lower eyelid leads to exacerbation by eyelid surgery and postoperative scar tissue formation, allowing the eyelid to retract inferiorly.

Clinically, patients with postblepharoplasty lower eyelid retraction develop rounding of the lower eyelid, lateral canthal dystopia, and inferior scleral show. These patients often present with complaints of dry eye, epiphora, chronic redness and irritation, and blurred vision. There is often also the presence of lagophthalmos, especially while sleeping, contributing to exposure problems. These patients also complain about the rounded appearance of their eyes and the loss of the "almond" shape of their eyes.

The technique described in the current study is designed to release scar tissue between the middle lamella and the inferior orbital rim and to elevate the midface in the preperiosteal plane. Elevation of the midface will reduce the gravitational effect of the cheek on the eyelid and recruit skin for the anterior lamella. A lateral canthoplasty then provides vertical elevation of the eyelid and tightening of the eyelid in the horizontal vector.

Failure of many lower eyelid reconstructive procedures over time is likely related to the constant conflict between the lower eyelid and the cheek. The lower eyelid and midface can be viewed as a unit.[16] Because the cheek is heavier than the eyelid and moves with facial animation, it has a tendency to pull the eyelid down. Therefore, to decrease the ability of the cheek to pull on the eyelid, the SOOF, malar fat pad, and entire cheek must be elevated as a soft tissue unit, as in the technique described here. Fixation of the midface in an elevated position reduces the gravitational forces of the cheek on the eyelid and provides lasting support to the eyelid that is to be surgically elevated and tightened.

Baylis and coworkers[1,2] were first to describe a lateral canthus incision to access postblepharoplasty adhesions of the orbital septum to the orbital rim. This procedure was further modified by Holds et al.[15] In that technique, a scissors is inserted through a lateral canthotomy incision to lyse the lower eyelid retractors and scar tissue, leaving the conjunctiva and skin intact. That technique, however, did not continue the dissection beyond the inferior orbital rim. Shorr and Fallor[17] have described access to the orbital rim and upper midface through a long lateral canthal incision. He later shortened the canthal incision and combined this with a conjunctival incision

and hard palate graft.[5] Patipa[18] has described a subciliary incision with a limited preperiosteal dissection only to the level of the malar fat pad. Kahana and Lucarelli[19] recently described orbitomalar ligament resuspension for ectropion repair by dissecting in the preperiosteal plane beneath the SOOF and orbitomalar ligament.

Several authors[6,11,20] have described techniques to release scar tissue of the middle lamellae through an open posterior transconjunctival incision technique. That incision allows direct access to the middle lamella to directly release scar tissue affecting the lower eyelid retractors and the orbital septum. A spacer graft is then often used in the posterior lamellae to prevent recontraction of the middle lamella. These grafts include hard palate, ear cartilage, alloplastic materials, or dermis fat graft.[21] Posterior lamellar spacer grafts are designed to act as a "splint" for the middle lamella after scar tissue has been incised,[5,11,20] providing a firm vertical scaffold in the posterior lamella. However, posterior spacer grafts do not address issues related to the gravitational forces of the soft tissue of the midface onto the lower eyelid. Nor can they fully address the problem of vertical foreshortening of the anterior lamellae.

The technique described in the current study expands on these techniques by continuing the dissection, in the preperiosteal plane, through the entire midface to the level of the nasolabial fold medially and the gingival sulcus inferiorly. Furthermore, mobilizing the soft tissue of the cheek and eyelid as a unit facilitates the recruitment of tissue for the anterior lamella of the eyelid. Fixating the soft tissue of the midface in an elevated position provides support for the surgical elevation of the eyelid.

Several authors[3,4,12,16,22–25] have described techniques for elevating the midface using a subperiosteal dissection plane. Ben Simon et al.[26] recently advocated a subperiosteal approach to elevating the midface in the retracted lower eyelid using transconjunctival and gingival incisions. Subperiosteal dissection techniques often neglect release of the periosteum medially and laterally and often require inferior periosteal release via a gingival incision. This involves a second "dirty" incision that communicates with the eyelid, creating increased potential for infection. Furthermore, because the ptosis of the midface is due to descent of the soft tissue of the cheek anterior to the periosteum, attempting to elevate the midface by pulling the periosteum superiorly will not fully address the anatomic issue. The weight of the soft tissue of the cheek may continue to transmit gravitational forces to the soft tissue of the lower eyelid.

The advantage of the preperiosteal technique is that the preperiosteal dissection plane directly addresses the glide plane that exists between the facial soft tissues and the periosteum. Elevating the periosteum will not prevent the soft tissues of the midface to continue to descend anterior to the periosteum, either through slippage or ptosis. The weight of the midface will therefore continue to weigh on the lower eyelid and cause it to descend over time. By elevating the soft tissue of the entire midface directly in the preperiosteal plane and fixating it to the periosteum in a higher position, the progression of midfacial ptosis, and its gravitational and dynamic effect on the lower eyelid, can be diminished. A further advantage of the preperiosteal technique is that no dirty incision is required in the mouth.

Techniques to elevate the SOOF and midface have also been described in patients with facial nerve palsy.[27,28] These techniques are designed to address the gravitational effect of the paretic midface on the lower eyelid. These techniques are also subperiosteal and involve a gingival incision. SOOF and midface lifting techniques have also been described for aesthetic corrections, using either a transblepharoplasty approach[10,29,30] or a temple approach.[31,32] These techniques are based on the understanding that as the malar fat pad descends with age and gravity, the eyelid/cheek junction descends.[33] Elevating the midface together with the eyelid facilitates the restoration of the aesthetic eyelid/cheek junction of youth.[34,35]

Anatomic studies have shown that the superficial musculoaponeurotic system (SMAS) of the face continues to the orbit and attaches circumferentially to the arcus marginalis along the orbital rim. The orbitomalar ligament extends from a thickened area of periosteum of the inferior orbital rim and extends through the SMAS and subcutaneous fat to insert on the skin. Elongation of the orbitomalar ligament has been shown to occur with age, resulting in midfacial descent and subsequent descent of the lower eyelid.[13,14]

Given the fact that the SMAS of the face extends to the level of the inferior orbital rim, it makes sense to elevate the midface and lower eyelid as a unit to address lower eyelid descent. Since the SMAS is within the soft tissue of the face, it would follow that a preperiosteal dissection allows for a more anatomic correction. Furthermore, if the orbitomalar ligament begins as a thickening of the periosteum, then dissection in the preperiosteal plane with suturing of the soft tissue of the cheek to the periosteum of the inferolateral orbital rim would be the most anatomical way to elevate the midface and reestablish the anatomic support that had been provided by the orbitomalar ligament.

This study demonstrates the safety of this dissection technique. There were no cases of postoperative loss of sensory or motor nerve function. To ensure the safety of the infraorbital nerve, the dissection must stop lateral to the infraorbital neurovascular bundle. Hydrodissection in the preperiosteal plane with the local anesthetic solution mixed with hyaluronidase aids in creating a safe dissection plane. Spreading action with only mild to moderate force minimizes the chance of nerve trauma. By keeping the tips of the scissors firmly on the periosteum, the branches of the facial nerve are safely anterior to the dissection plane. However, a thorough understanding of facial anatomy is vital prior to attempting this procedure.

This study demonstrates that release of scar tissue at the inferior orbital rim and full preperiosteal dissection beneath the entire midface can be achieved through only a lateral canthal incision. The small incision technique described here provides easy access to the inferior orbital rim without the need to violate the conjunctiva or lower eyelid retractors. By completely releasing scar tissue at the level of the arcus marginalis, there can be no tethering of the middle lamella to the inferior orbital rim. The preperiosteal dissection through the lateral canthal incision provides excellent midface elevation, without the need for a gingival incision. All patients in this study had correction of lower eyelid retraction, with restoration of the position of the lower eyelid at the inferior limbus. All patients had resolution of their symptoms of chronic irritation and epiphora.

The approach to the patient with postblepharoplasty lower eyelid retraction must be tailored to the individual patient. The patient with mild retraction or lateral canthal dystopia may benefit from canthoplasty alone. Those with more significant scarring of the lower eyelid retractors to the orbital septum or prominent globes may require transconjunctival incision with release and recession of the lower eyelid retractors. Patients with severe retraction may also require a posterior spacer graft. Posterior lamella spacer grafts are generally indicated in patients with severe middle lamella scarring, foreshortening of the inferior fornix, shallow orbits, or prominent globes.

For the patient with moderate lower eyelid retraction, mobilization and elevation of the midface in the preperiosteal

plane through a lateral canthal incision provides excellent elevation and support of the eyelid. The small incision allows easy access to adhesions along the inferior orbital rim and to the preperiosteal plane beneath the entire midface. The preperiosteal midface lift combined with canthoplasty provides significant improvement of postblepharoplasty lower eyelid retraction.

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