Transcutaneous Lower Eyelid Blepharoplasty With Fat Excision

A Shift-Resisting Paradigm

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Objective: To prove through our experience that the use of transcutaneous lower eyelid blepharoplasty results in negligible incidence of unacceptable scar and eyelid malposition and that the overall lower eyelid contour is acceptable. A detailed overview of the lower eyelid anatomy and a discussion of the “aging” eyelid are further discussed.

Design: Retrospective, observational study. The study population comprised 50 patients (100 eyes) seen at the McCollough Plastic Surgery Clinic, Gulf Shores, Ala, between 2002 and 2003 (45 women and 5 men), who had undergone transcutaneous lower eyelid blepharoplasty with fat excision. Lower eyelid blepharoplasty was performed by the senior surgeon (E.G.M.), and the surgical technique was identical in all cases. The patients were followed up for a minimum of 6 months and a maximum of 2 years. Patients were selected on the basis of return visits to record the findings, documented by consecutive digital photos. By comparing standard blepharoplasty digital views, the patients were assessed by 3 independent unbiased plastic surgeons. This study was performed in a private practice setting. The main outcome measure was mean score for the presence of unacceptable scarring, the presence of lower eyelid malposition, and the overall appearance of the eyelid after transcutaneous lower eyelid blepharoplasty, as assessed with the Garcia-Mccollough Scale for Lower Eyelid Appearance.

Results: The 50 patients were retrospectively reviewed and analyzed by a group of 3 unbiased plastic surgeons, and there was negligible evidence of lower eyelid contour abnormality, lower eyelid malposition, or easily visible scars.

Conclusions: Transcutaneous lower eyelid blepharoplasty with fat excision is a time-tested method of correcting the undesirable sequelae of the aging eye. This technique not only is a safe and effective manner to rejuvenate the lower eyelid but also results in virtually nonexistent ill effects.

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For more than half a century, transcutaneous lower eyelid blepharoplasty with fat excision has been the paradigm for addressing the undesirable sequelae of the aging eye. This is a time-tested technique that achieves satisfactory cosmetic results, positive changes in eyelid contour, and no significant changes in eyelid position when performed in a conservative fashion. The modern transcutaneous blepharoplasty was first described by Castanares1 in 1951, when an incision was made approximately 1 to 2 mm below the eyelash line, allowing access to the intraorbital fat as well as the orbicularis oculi muscle through a skin flap technique. Early complications of this procedure included ectropion of the lower eyelid as well as lateral rounding of the lower eyelid. This procedure gradually evolved into the use of a skin muscle flap to allow access to the infraorbital fat.

The latest evolution of the transcutaneous lower eyelid blepharoplasty by McCollough and English2 is a skin flap or skin muscle flap technique in which the incision is placed inferiorly to the tarsal margin, thus allowing a “cuff” of pretarsal orbicularis oculi muscle to remain undisturbed. When an appropriate preoperative diagnosis of lower eyelid laxity has been made by either the snap or distraction test, the incidence of iatrogenic ectropion and eyelid malposition is virtually nonexistent. With conservative infraorbital fat removal and appropriate muscle resection (in the skin-muscle approach only), the incidence of causing or worsening lower eyelid contour deformities such as the “tear trough” or “hollow eye” deformity can be kept at a minimum.

In recent years, much emphasis has been placed on intraorbital fat repositioning and infraorbital as well as extrabulbar fat (suborbicularis oculi fat) mobilization to address the preoperative tear trough deformity and to avoid it as a complication of blepharoplasty. The proposed advantages of these techniques are that they improve the skeletonization of the infraorbital rim that is associated with aging and that they im-
prove the double convexity deformity that is associated with the aging face. The indications for intraorbital or extraorbital (suborbicularis oculi fat) fat mobilization or repositioning are clear, and these operations are effective in their desired results. However, not every patient evaluated for lower eyelid dermatochalasis and fat pseudoherniation has a skeletonized infraorbital rim or a tear trough deformity. Others have described a “paradigm shift” in how surgeons should address the lower eyelid. In our experience, in the presence of accurate preoperative analysis and examinations, the incidence of the aforementioned complications of transcutaneous blepharoplasty (creation of the tear trough deformity) are virtually nonexistent and the technique described herein should continue to be embraced. In addition, we propose that the cosmetic results attained with “traditional” lower eyelid blepharoplasty with fat excision, when indicated, are acceptable and consistent. Skin flap or skin muscle flap blepharoplasty with conservative fat excision is still a reliable and effective operation to address most of the cosmetic patient complaints with regard to the lower eyelid.

Transconjunctival lower eyelid blepharoplasty is reserved for younger patients with isolated palpebral bags and without the senile skin changes. When indicated, skin resurfacing can be performed in conjunction with transconjunctival fat excision. Relative indications for transcutaneous and transconjunctival approaches include the following:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Indication</th>
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<tr>
<td>Transcutaneous</td>
<td>Senile eyelid with excess “crepiness” to the skin</td>
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<tr>
<td>Skin flap technique</td>
<td>Young eyelid with robust orbicularis muscle</td>
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<tr>
<td>Skin-muscle flap technique</td>
<td>Palpebral bags with minimal excess skin</td>
</tr>
<tr>
<td>Transconjunctival</td>
<td>Young eyelid with isolated palpebral bags and normal appearance to skin and muscle</td>
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**ANATOMICAL PERSPECTIVE**

The eyes are the most vital component of facial cosmetic emphasis and balance. They play a pivotal role in facial aesthetics. Because of this, aging in this part of the face is easily and emphatically noticed by patients. Upper as well as lower eyelid rejuvenation procedures aim to eliminate the “sags and bulges” that often accompany normal aging.

As the eye ages, there are several functional and anatomical changes that will occur to the eyelid, giving the patient a tired or stern appearance. The successful performance of this procedure is contingent on the understanding of these anatomical changes.

The eyelid is principally divided into 3 lamella, with the anterior lamella being composed of skin and the orbicularis oculi muscle. The orbicularis oculi muscle is further divided into a pre- and midface begin to age and descend because of gravitational effects and loss of tissue elasticity, the orbit will assume a deeper and wider appearance. The youthful eyelid has a gentle convex curve that begins at the inferior orbital rim and blends in smoothly into the cheek tissues and the lateral nasal wall in a subtle transition.

In the aging eyelid, as gravity begins to exert its effects on the orbit, the septum weakens and intraorbital fat presses forward, creating the first convexity. The arcus marginalis, which is firmly adherent to the anterior edge of the inferior orbital rim, creates a transient depression. The aging, descending cheek fat and suborbicularis oculi fat create the second convexity. This complex is aptly named the “double convexity” eyelid contour. The area of tissue paucity between the convexities form a distinct defect that medially is known as the tear trough deformity and laterally as the hollow eye deformity.

The tear trough deformity was defined by Loeb and was thought to be formed by 3 factors. The first component of this deformity is formed by the fixed orbital septum and by the arcus marginalis. The second factor is from the “triangular gap” formed by the junction of the orbicularis oculi muscle and the lateral nasal musculature. The third component of this deformity is formed by the absence of fat and soft tissue in this area,
giving the impression of a hollow sunken medial lower eyelid. With aging, this deformity becomes more visible owing to ptosis of neighboring cheek tissue. Freeman\textsuperscript{12} conducted both intraoperative and cadaveric studies on patients with and without the tear trough deformity and found that the lack of fat at the level of the arcus marginalis below the orbicularis oculi muscle is the major contributing factor in the nasojugal deformity.

TRANSCUTANEOUS APPROACHES

There are 2 principal variations of this technique that include the skin flap technique and the skin-muscle flap technique. Originally described in 1951, the skin flap was defined by Castanares\textsuperscript{1} as a subcutaneous plane of dissection between the thin skin of the lower eyelid and the underlying orbicularis oculi muscle. The senile lower eyelid skin, being lax in nature, allows the skin flap technique to be most effective. In accordance with the senior author's (E.G.M.) 30-year practice of doing so, Smullen and Mangat\textsuperscript{13} recommend the skin flap for cases in which a significant amount of skin laxity of the lower eyelid exists, compounded by an atonic orbicularis oculi muscle.

The McIndoe-Beare flap, or more notably, the skin-muscle flap, was originally described by Beare\textsuperscript{14} in 1967. This technique uses the dissection plane between the orbicularis oculi muscle and the orbital septum. The senior author reserves skin-muscle flap blepharoplasty for younger patients with more robust orbicularis oculi muscles and patients without infraorbital festoons.

SKIN FLAP

The majority of lower eyelid blepharoplasty performed by the senior author is done using the transcutaneous technique described herein. The proposed incision line

![Figure 1. A, Incision at 4 mm below lash line within the first horizontal rhytid; B, incising of orbicularis oculi muscle; C, injection of lateral fat pocket with 1% lidocaine prior to excision; D, conservative fat excision (note the herniated fat from medial pocket); E, redraping of excess skin; F, excision of excess skin from lower eyelid (lateral view); G, excision of redundant eyelid skin; and H, “crimping” of incision after closure with 6-0 plain gut suture.]
is marked approximately 4 mm inferiorly to the lash line of the lower eyelid at the first major horizontal rhytid of the lower eyelid. Almost all patients undergo “twilight” anesthesia with midazolam and propofol and infiltration of local anesthetics.

The incision is made approximately 4 mm below the lower eyelid margin with a No. 15 Bard-Parker blade (Becton Dickinson, Franklin Lakes, NJ) from medial to lateral but only through the skin layer (Figure 1A). Constant downward traction is applied to the cheek skin by the assistant to facilitate developing the flap. The flap is developed and retracted inferiorly. Hemostasis is achieved with bipolar cauteration.

Once the skin flap is retracted, the fibers of the orbicularis muscle are separated parallel to and approximately 6 to 8 mm cephalad to the inferior orbital rim to expose protruding orbital fat (Figure 1B). The lateral fat compartment is addressed first. When the fat pad is properly exposed, 1% lidocaine is injected into the stalk of the fat pad. Bipolar cauteration is used at the base of the stalk, and the fat that is even with or anterior to the infraorbital rim and above the cauterized region is excised (Figure 1C and D). Any additional remnants of fat are cauterized before they are left to retract into the orbit.

The same procedure is performed on the middle and nasal fat pads, taking care not to injure the inferior oblique muscle. Attention to meticulous hemostasis is prudent prior to reapproximation of the horizontally divided orbicularis oculi muscle. If the edges of the muscle tend to roll inward, 2 or 3 interrupted 6-0 fast-absorbing cat gut sutures are used.

Skin closure is begun with the superior advancement and redraping of the skin flap over the incision line (Figure 1E). For best results, magnification is recommended. The flap is incised and excess skin is removed (Figure 1F and G). For skin closure, 6-0 plain gut sutures are used to loosely approximate the skin edges. The final component of closure consists of gentle “crimping” of the closure line to evert the edges with Castroviejo forceps (Figure 1H).

SKIN-MUSCLE FLAP

The skin-muscle flap procedure is generally reserved for younger patients who have some but not an abundance of excess skin or “crepiness.” Anesthesia is administered and applied in exactly the same manner as in the skin flap technique. As in the skin flap transcutaneous lower eyelid blepharoplasty, an incision is made 4 mm below the lower eyelid margin with a No. 15 Bard-Parker blade only through the skin. A lateral subcutaneous pocket is developed by using a fine, curved iris scissors to divide the lateral part of the orbicularis muscle and gain access to the submuscular compartment. A blunt-tipped scissors is used to develop a submuscular pocket, and the muscle is incised horizontally, leaving the pre-tarsal orbicularis undisturbed. The skin muscle flap is retracted inferiorly, exposing the 3 fat pads. Careful attention is now placed to achieving hemostasis with bipolar cauteration. Once the fat has been conservatively removed, the flap is draped upward and a full-thickness section of overlapping skin and muscle are excised.

Meticulous attention is applied to the closure using interrupted 6-0 plain gut sutures as described in the previous section.

Postoperative management of the 2 approaches follows the same protocol. Gauze sponges soaked in ice water are immediately applied over the surgical areas and replaced every 15 minutes. Activity is kept to an absolute minimum. The head is kept elevated at all times. Almost all patients spend the first postoperative night on the premises and are closely monitored by a trained caregiver.

Postoperative wound care consists of gentle application of hydrogen peroxide with a cotton swab and Tears Renewed ointment (Akorn Inc, Buffalo Grove, Ill) to the incision lines. This is repeated 4 to 5 times per day during waking hours to keep the sutures moist and aid in suture disintegration. Any remaining sutures are removed at 1 week under magnification and with the aid of a Wood lamp, which allows residual suture to glow in the dark.

METHODS

A total of 50 patients (100 eyes) were evaluated. Three independent graders evaluated patients using the Garcia-McCollough Scale for Lower Eyelid Appearance.

Garcia-McCollough Scale for Lower Eyelid Appearance

Overall appearance
1 = Worsened eyelid contour
2 = No improvement in eyelid contour
3 = Minimal improvement in eyelid contour
4 = Moderate improvement in eyelid contour
5 = Significant improvement in eyelid contour

Visibility of scar
1 = Elevated, hypertrophic scar
2 = Flat but widened scar
3 = Flat but thin scar
4 = Barely perceptible scar
5 = Imperceptible scar

Eyelid position
1 = Frank ectropion
2 = Canthal rounding with significant scleral show
3 = Mild eyelid retraction with scleral show
4 = Unchanged scleral show
5 = Improved scleral show

Men comprised 10% (5/50) of our population and showed lower scores on average in all 3 categories of the Garcia-McCollough Scale for Lower Eyelid Appearance compared with women. Age groups were also evaluated (Table).

RESULTS

The mean ± SD scores for contour, scar appearance, and eyelid position were 3.90±0.56, 4.43±0.55, and 4.03±0.49. All scores ranged from 3 to 5 in all categories. The women comprised 90% (45/50) of our population and on average, when compared with their male counterparts, showed a 0.20-point improvement in overall lower eyelid contour, scar appearance, and postoperative eyelid position. The mean ± SD scores for contour, scar appearance, and eyelid position were 4.26±0.67, 4.64±0.45, and 4.23±0.34 (Table). All scores ranged from 3 to 5 in all categories. The sample size of the men is too small to adequately explain this difference in overall lower eyelid contour, scar appearance, and postoperative eyelid position.
In the evaluation by age group, overall eyelid contour was appreciably better in the younger population. The scar visibility had the best score in the age group 71 years or older, but this too was not significant owing to the small sample size. Eyelid position showed similar values, with the lowest scores in the 61- to 70-year age group, which also was attributed to small sample size and therefore was not significant.

Of the 50 patients in this series, 40 (80%) underwent a primary procedure and showed improved scores in terms of overall eyelid contour and eyelid position. Because of previous scarring and decreased flexibility of tissues, secondary procedures appeared to have a slightly higher incidence of altered eyelid position.

Having concomitant procedures performed at the same time was also compared. Patients who had forehead-lifts performed at the same time showed lower (worse) scores in all categories. This is most likely owing to the changes in lower eyelid position supporting the orbicularis oculi muscle that occur with forehead-lifts. Of the 50 patients who underwent upper eyelid surgery and temple and cheek rhytidectomy at the same time, 14 (28%) demonstrated lower scores in the eyelid contour and eyelid position categories. The patients who underwent either upper eyelid surgery or temple and cheek rhytidectomy along with lower eyelid surgery did not show an appreciable difference in their scores.

**COMMENT**

Transcutaneous lower eyelid blepharoplasty with fat excision has been used by the senior author for more than 30 years with excellent results. As the manner in which this procedure is performed has evolved within the profession, there also has been much discussion as to the best way in which to approach undesirable conditions caused by aging of the lower eyelid. To better understand the current controversies pertaining to lower eyelid blepharoplasty, a thorough discussion of overall appearance, eyelid position, and postoperative scarring is warranted.

The desired postoperative appearance of blepharoplasty should result in near elimination of the double convexity deformity (Figure 2 and Figure 3).9, 10, 12, 15 The results should also be natural with indiscernible scars to the casual observer's eyes. In recent years, much discussion has revolved around the removal of medial and middle lower eyelid fat and the exacerbation or initiation of what has been described by some reporters as either a tear trough deformity or hollow eye deformity.

It has been postulated by some that less than 10% of individuals have a true excess of intraorbital fat necessitating fat removal during blepharoplasty.8 Eder16 recommended that the only two true indications for fat removal during lower eyelid blepharoplasty is in the “rare” instance of excess fat or in Graves disease. Subsequent to Eder’s opinion, other authors have advocated alternative procedures to avoid removal of intraorbital fat. A variety of alternatives including fat grafting, fat pad sliding, suturing of orbital fat to the inferior orbital rim, and repositioning suborbicularis oculi fat to fill in the defect created by overzealous resection of orbital fat have been advocated.3, 8, 9, 12, 15, 17

While repositioning orbital fat adds the theoretical advantage of reestablishing orbital volume and “preventing” the continued skeletonization of the orbit, it is the senior author’s experience that in most cases there should

<table>
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<th>Scar Appearance</th>
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</tr>
<tr>
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<tr>
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<td>4.19</td>
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<td>4.25</td>
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<td>Upper eyelid and temple cheek surgery</td>
<td>4.10</td>
<td>4.77</td>
<td>4.17</td>
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*Data are given as mean score using the Garcia-McCollough Scale for Lower Eyelid Appearance (see “Methods” section for a description of scores).
not be a need to reposition fat in the lower eyelid. Hamra discussed the correction of the “operated” look by releasing the arcus marginalis and advancing the intraorbital fat inferiorly over the inferior orbital rim. He also stated that unless the orbicularis muscle is not elevated off of the malar eminence, as is routinely done in the composite rhytidectomy, the aging orbicularis cannot be prevented from forming the malar crescent (the lateral descent of the orbicularis oculi) at its inferior border. In the experience of the senior author, these maneuvers have also not been necessary.

Many of the aforementioned approaches to repositioning orbital fat have been designed to avoid what has been described as the tear trough and hollow eye deformity. Many of these sequelae have clearly come about, in our opinion, from improper preoperative assessment of the lower eyelid because no patients in the present study needed volume augmentation.

Conservative removal of orbital fat leads to the recreation of a youthful, singly convex lower eyelid complex. Judicious removal of intraorbital fat, along with conservative removal of skin and/or muscle, has provided excellent, long-term results.

A second misconception that must be addressed is the notion that transcutaneous lower eyelid blepharoplasty per se causes a change in lower eyelid position. Lower eyelid malposition is a disfiguring and sometimes debilitating complication that should be avoided if possible. Exacerbating factors include denuding the lower eyelid sling of its pretarsal orbicularis fibers, excess skin removal, muscular and septal scarring, tarsal injury, trauma to the lower eyelid retractors, infection, hematoma for-
ization, and trauma to the eyelid in the immediate postoperative period. 18

While it has been postulated that transcutaneous approaches render the eyelid more susceptible to retraction than the transconjunctival approach, this has not held true in our experience. In 1989, Baylis et al 19 showed that following transcutaneous lower eyelid blepharoplasty, the incidence of lower eyelid scleral show is 15% to 20%. Netscher et al 20 showed that there was no appreciable difference in the incidence of lower eyelid malposition between transconjunctival and transcutaneous approaches.

We have observed that the incidence of lower eyelid malposition is appreciably low, providing that several factors are respected. First, the preoperative assessment of the strength of the suspensory system of the lower eyelid with the snap or distraction test is valuable in predicting the potential for postoperative eyelid malposition. Second, anatraumatic and clean dissection at the level of the orbital septum may prevent scarring of the orbicularis muscle to the periorbitum of the infraorbital rim. The third factor in reducing the potential for eyelid malposition is the method of redraping the lower eyelid flap. Any undue tension on the skin (or skin-muscle) flap can cause inferior displacement of the eyelid margin, scleral show, ectropion, or rounding of the lateral canthus.

Lateral canthal rounding will in and of itself give the appearance of the “plastic eyelid.” McCollough and English 2 postulated that disruption of the tarsofascial sling, or “hammock,” from surgery can lead to the unopposed inferomedial pull of the eyelid, leading to canthal shortening and subsequent rounding. By placing the incision at or below the level of the inferior tarsal border, disruption of the tarsofascial sling is prevented. In the review of patients included in the present study, there were no incidences of lateral canthal rounding. There were also no patients in which adjunctive procedures such as tarsal strip, eyelid shortening, or orbicularis suspension were deemed necessary. In fact, several patients had improvement in the postoperative appearance to their eyelid.

The final issue is in regard to the placement of the transcutaneous incision and the acceptability of the scar. Several points apply to this matter. First, by placing the incision at approximately 4 mm below the eyelash line or at the level of the first horizontal rhytid of the lower eyelid, the tarsofascial sling remains undisturbed. By leaving more of the superior skin-muscle-tarsal complex intact, many of the suspensory components of the lower eyelid are preserved, and there is less chance for contraction and eyelid malposition. 2 The placement of the incision at the level described herein has given predictable and acceptable results. By respecting meticulous operative techniques in skin closure, the incision line becomes imperceptible to the naked eye.

In conclusion, transcutaneous lower eyelid blepharoplasty with conservative intraorbital fat excision has proven to be a predictable and aesthetically acceptable procedure for the rejuvenation of the lower eyelid. The postoperative relationship of the lower eyelid to the globe and the appearance of the scar have shown to be acceptable. While there may well be a place for repositioning of the intraorbital or surrounding fat to contour the lower eyelid, we do not recommend that fat repositioning become part of routine management for the aging lower eyelid.

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REFERENCES


