SINGLE INCISION REJUVENATION OF THE PERIORBITAL AESTHETIC UNIT

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A PARADIGM SHIFT

In the last decade, we have made a paradigm shift in eyelid, eyebrow, and mid-face surgery. In adults, this area is best treated as one aesthetic unit to provide the best aesthetic and functional results and avoid complications. Surgical dissatisfaction for both patients and surgeons is often caused by surgery limited to only one of these areas, and in many cases, this may make the surrounding areas looks worse. As we age, all facial tissues sag or move downward toward the midline. Therefore, the goal of surgery should be to move all of these areas up and out.

Raising the upper eyelid by upper blepharoplasty or ptosis repair almost always lowers the eyebrow unless it is raised during the same setting. This can be accomplished by internal eyebrow elevation via the same incision. The lateral canthus is the keystone to eyelid and mid-facial surgery. A saggy, lax lateral canthus gives a sad, droopy appearance, while a tight, elevated canthus gives a happy, alert, and youthful appearance. Raising and tightening the lateral canthus is best accomplished through the temporal extent of the upper blepharoplasty incision. The mid-face can also be elevated via the same incision. Lower lid wrinkles and excess skin is improved with midface elevation. Thus the eyebrow, upper eyelid, lateral canthus, lower eyelid, and mid-face can be elevated and improved via the upper eyelid and a lateral eyelid crease incision.

In addition, the corrugator and depressor superciliaris muscles can be removed from the same upper eyelid blepharoplasty incision, which improves medial eyebrow position and improves glabellar furrows. It may also help to reduce headaches in this area, similar to the use of neurotoxin, albeit via a different mechanism. If lower eyelid fat prolapse and/or a predominant tear trough is present, a transconjunctival lower eyelid blepharoplasty with fat removal and repositioning can also be performed. A hidden transconjunctival lower eyelid incision is the only additional incision required. A TCA peel of the lower eyelid can also be added in cases of excess wrinkles or skin.

One aesthetic unit surgery can be performed as an in-office surgery or in an outpatient surgical center. It requires only the upper eyelid blepharoplasty incision, and thus saves morbidity, time, and money. It is performed through the same incision used for functional upper blepharoplasty or ptosis repair. Therefore, many patients who would not otherwise present for aesthetic surgery are happy to include additional aesthetic procedures in this area, thanks to the surgeon’s ability to perform them through the same incision in the same setting.

—Richard L. Anderson, MD

Periorbital rejuvenation is a topic of particular interest to aesthetic surgeons, as aging changes often occur first around the eyelids, and periorbital surgery can improve both function and cosmesis. Ahead, the authors describe an approach to the periorbital aesthetic unit to treat the eyebrow, upper eyelid, lateral canthus, lower eyelid, and midface through a single upper eyelid blepharoplasty incision. We recommend combining internal
eyebrow elevation, upper eyelid blepharoplasty, upper eyelid ptosis repair, lateral canthal resuspension, sub-orbicularis oculi fat (SOOF)/midface lift with lower eyelid elevation and wrinkle improvement, all through an upper eyelid crease incision. This approach can also remove the corrugator and depressor superciliaris muscles through the same incision to eliminate glabellar furrows and raise the medial brow, both of which often have the added benefit of headache relief. Using this one aesthetic unit technique, we are able to achieve excellent functional and cosmetic results. With this approach, we are able to minimize surgical expense, complications, and the number of incisions. Therefore, the patient acceptance rate is much higher than with other eyebrow or midface procedures that require multiple incisions. In the event that the patient has excess lower eyelid fat prolapse, tear trough deformity, and excess lower eyelid skin and wrinkles, transconjunctival fat removal and repositioning and trichloro-acetic acid peel can easily be performed in the same setting. The one aesthetic unit approach to peri-orbital rejuvenation can also be performed in an outpatient minor procedure room, which can further decrease expenses and risks associated with anesthesia.

ADDRESSING FUNCTIONAL AND AESTHETIC CONCERNS

Eyelid surgery is one of the most gratifying areas in aesthetic surgery for both patients and physicians secondary to its ability to address both functional and cosmetic concerns. Many of our patients present with functional problems as their chief complaint, as upper eyelid dermatochalasis and ptosis both cause loss of the superior visual field. Additionally, in the elderly patient population, lower eyelid laxity, retraction, or ectropion is common and may contribute to functional concerns such as tearing and dry eye. When patients have cosmetic concerns, they may opt for additional elective surgery. In our experience, patients are more likely to opt for elective surgery that addresses their cosmetic concerns if we can perform all procedures, both functional and cosmetic, through the same incision in one surgical setting with reduced morbidity and expense.

Surgery of the periorbital aesthetic unit is perhaps one of the most challenging areas in aesthetic surgery, as improving the cosmesis and height of the upper and lower eyelids may compromise coverage and protection of the cornea. When the periorbital area is not treated as one aesthetic unit, unfavorable results often follow. For example, upper eyelid blepharoplasty often improves cosmesis through the removal of redundant upper eyelid skin, but it can also worsen pre-existing dry eye by increasing the vertical palpebral fissure. Tightening the lower eyelid to improve laxity and retraction can help to avoid this problem. In addition, performing only upper blepharoplasty surgery in the presence of a ptotic eyebrow will actually worsen the patient’s eyebrow ptosis by pulling the eyebrow downward and decreasing the ability of the frontalis muscle to raise the eyebrow and eyelids. Similarly, raising the upper eyelid or eyebrow can make lower eyelid retraction and lateral canthal droop more apparent. Raising the lower eyelid, lateral canthus, or midface without raising the upper eyelid can make ptosis of the upper eyelid and eyebrow more apparent. When the patient is concerned about their upper eyelids having a sad, droopy, angry-looking appearance, this may be more associated with eyebrow furrowing caused by the corrugator and depressor supraciliaris muscles. Recognizing these related conditions and considering facial asymmetry when formulating a surgical plan can help to avoid complications and postoperative patient dissatisfaction. Nearly all patients have some degree of facial asymmetry, and this can and should be addressed and improved during surgery.

In our practice, we conceptualize two separate aesthetic units to treat the entire face and neck area, the upper unit and the lower unit. We consider the upper unit, which we refer to as the peri-orbital unit, to be made up of the eyebrow, upper eyelid, lateral canthus, lower eyelid, upper cheek, and mid-face area. The lateral canthus is the keystone and critical anchoring point of this unit and is pivotal in creating a natural, happy, and youthful appearance in one aesthetic unit peri-orbital surgery. We consider the lower unit to be comprised of the lower cheek, lips, chin, jowls, and neck. The focus of this paper is to discuss our one aesthetic unit approach to treating the peri-orbital area.

PATIENT SELECTION

Proper patient selection and analysis of each patient’s individual functional and cosmetic concerns is critical to forming a surgical approach within the peri-orbital aesthetic unit. Many of our patients present with functional concerns, such as dermatochalasis, true ptosis, or lower eyelid retraction. This is a starting point for discussion about all of their other concerns, some of which may be cosmetic and not covered by insurance but certainly improve the outcome of the functional surgery as well as the cosmesis.

The first, and perhaps most important, question is whether the patient has dry eye or uses artificial tears. If a patient says that he or she has dry eye, it is important to assess the tear film and cornea at a slit lamp exam with fluorescein staining to evaluate the severity of their dry eye. While this does not preclude the performance of surgery that may widen the palpebral fissure, we are more careful about recommending ptosis or blepharoplasty surgery unless we also plan to perform surgery that will raise and tighten the lateral canthus and lower eyelids. In these cases, we may also consider performing bilateral punctal occlusion with electrocautery or dissolvable collagen plugs at the time of surgery so that the patient will retain more of their tears.
If a patient presents with tearing, then the surgeon must evaluate the lacrimal system. Often, patients have tearing because of reflex lacrimation from the lacrimal gland in response to a dry eye. Some patients may also have a true obstruction of the tear drainage system. This distinction can be made by a dye test and nasolacrimal system irrigation in the office. Many older patients with lax lower eyelids also suffer from pump failure and lateral pooling of tears. Tightening the lower eyelids and elevating the lateral canthus at surgery can improve such tearing.

In all patients, the surgeon should evaluate for eyebrow ptosis. Normal eyebrow height is at least 1-2mm above the superior orbital rim in women, and at or just above the orbital rim in men. The presence of eyebrow ptosis should alert the surgeon that performing upper blepharoplasty alone will further drop eyebrow height, and in doing so, worsen the angry appearance that was the patient’s initial presenting complaint. At the same time, the surgeon should evaluate the corrugator and depressor superciliaris muscles, which also contribute to eyebrow ptosis and a scowl-like appearance.

When considering whether a patient has ptosis of the eyebrow warranting surgical correction, it is imperative to remember that any tissue removed as part of a standard blepharoplasty correction will further drag down the brow. Performing blepharoplasty alone has been shown to decrease preoperative brow height by 2mm. As the brow descends inferiorly with time, the frontalis muscle must work harder to elevate this displaced tissue. Elevating a droopy eyelid leads to less stimulation of the frontalis muscle and potentially some inferior traction from the incision below the brow, both of which may lead to more brow ptosis. As the distance between the eyebrow and the eyelashes decreases, the face assumes a more sad and angry appearance. This is likely the main reason patients are dissatisfied and may aesthetically look worse despite successful prior functional treatment of dermatochalasis and/or ptosis. Unfortunately, eyebrow ptosis must be severe with the eyebrow blocking the visual axis to get insurance approval.

We have previously reported our findings of obtaining a 1.74mm +/- 0.05mm temporal brow lift using our internal brow-pecty technique through an upper eyelid crease incision. This works in concert with raising the medial brow by performing removal of the corrugator and depressor superciliaris muscles. While endoscopic, pre-trichial, and direct brow lifts also create temporal lift, those techniques usually require deeper sedation or general anesthesia. These approaches create additional scars, are not suitable for certain hairlines, increase surgical costs for the patient, and have increased morbidity and complications secondary to the need for additional incisions.

We counsel all patients who present for evaluation of dermatochalasis or upper eyelid ptosis about the potential for worsening of any pre-existing eyebrow ptosis if we do not address the eyebrows as well. Internal eyebrow elevation and sculpting with corrugator and depressor superciliaris muscle removal raises the medial brow as much as other more aggressive forehead techniques. This approach also relieves furrowing between the eyebrows, effectively creating a “permanent neurotoxin” effect. If the medial aspect of the eyebrow is elevated greater than the central and lateral aspects, a patient may be left with a quizzical type expression. Additionally, male patients may be left with a more feminine appearance if the temporal aspect is over-elevated, as typical male eyebrows are usually flatter horizontally, while female eyebrows tend to arch more laterally.

If patients demonstrate aggressive medial brow furrowing or depression on exam, or complain of migraine or tension-type central headaches, we encourage removal of the corrugator and depressor superciliaris muscles. In a previous paper, we demonstrated that more than 90 percent of patients had a decrease in the severity of their headaches, while almost 60 percent achieved complete resolution of their pain following surgical removal of the corrugators and depressor superciliaris muscles. When discussing this surgery, patients must always be informed of the high likelihood for postoperative numbness and hypoesthesia in the forehead and between the brows, which may last for months. Neurotoxin use in this area is an alternative that is also discussed.

It is important that each patient’s eyebrow be manually elevated in clinic to help determine his or her ideal eyebrow position, contour, and facial asymmetry prior to surgery. We discuss facial asymmetry with every patient, as many patients are unaware of asymmetry pre-operatively but often notice even mild asymmetries post-operatively. Old photographs are especially helpful. Benefits, limitations, and results of various brow procedures should be discussed with aesthetic patients. Eyebrow height asymmetry can be made worse from standard surgery if not recognized preoperatively and improved at the time of surgery.

After evaluating the eyebrows, we evaluate the upper eyelids including the length of the anterior lamella. We prefer to leave greater than 22mm of anterior lamellar skin behind after upper eyelid blepharoplasty surgery to reduce the risk of lagophthalmos and dry eye.

In evaluating the lower eyelids, one should look for signs of lower eyelid retraction, entropion, and ectropion, including inferior sclera show, inferior conjunctival injection, corneal staining with fluorescein, or pooling of fluorescein in the tear film. If conservative medical therapy for dry eyes or tearing has been unsuccessful, a discussion of surgical options should be provided because upper eyelid surgery can significantly worsen corneal exposure and dry eye. In patients with dry eye, tissue excision must be more conservative, and punctal occlusion in the upper eyelids can be helpful in preventing further worsening of dry eye. Tightening and rais-
ing the lower eyelids should also be considered.

For many years the lateral tarsal strip (LTS) was the mainstay of our treatment for lower eyelid laxity and involutional ectropion. This is still an excellent technique in severe functional cases as well as cosmetic cases with marked laxity. However, in our aesthetic patients and those who would benefit from midface elevation, we prefer lateral canthal resuspension and midface lift. Midface lift can be conveniently performed in a sequential manner through the lateral aspect of a blepharoplasty incision. Lateral canthal resuspension is also effective for mild to moderate ectropion without midface elevation.

Lateral canthal resuspension with or without midface lift demonstrated significantly greater lengthening of the horizontal palpebral aperture (1.61mm +/- 0.22mm and 1.56mm +/- 0.14mm, respectively) than LTS (0.04mm +/- 0.12mm). With aging, as the lateral canthal ligament stretches, the horizontal length of the lower eyelid diminishes and patients may develop a small or 'round' eye appearance. Further shortening of the eyelid with full-thickness excisions often also leaves aesthetic patients unhappy.

Lateral canthal tightening and suspension is the keystone in peri-orbital cosmetic surgery and paramount in treating the brow, upper eyelid, lateral canthus, and midface as one aesthetic unit. Midface and SOOF (sub-orbicularis oculi fat pad) lift is obtained by fixing a lateral orbicularis pedicle flap to periosteum in the interior, superolateral aspect of the orbital rim. This improves rhytids in the lower lids, moves the descended SOOF and cheek fat pads superiorly, and can also improve tear trough deformity when present. Limited supra-periosteal dissection is required to elevate the midface. Also key to the procedure is upper eyelid skin and orbicularis muscle removal, as well as internal eyebrow sculpting with release of the anterior leaf of the posterior galea and orbital ligament to move the entire lateral periorbital tissues both superiorly and laterally as one aesthetic unit.

Based on our long-term results, we routinely encourage patients with mild to moderate lower eyelid laxity to consider a mid-face/SOOF lift in addition to lateral canthal resuspension. This elevation improves both function and cosmesis and can be performed through the lateral portion of the upper eyelid crease incision. For patients with severe laxity, ectropion, entropion, or those with lamellar deficiencies, we still perform the typical or enhanced lateral tarsal strip procedure. In patients with lower eyelid fat prolapse and tear trough deformities who desire lower eyelid blepharoplasty, we perform a transconjunctival approach with fat repositioning, often with a lower eyelid TCA peel, but that is not the focus of this paper.

**SURGICAL TECHNIQUE**

Our technique begins with an upper eyelid blepharoplasty with skin and muscle removal to correct any dermatochalasis. A #15 blade is used to make the skin incision. Next, a flap of skin and underlying orbicularis oculi muscle is removed using Stevens scissors and Paufique forceps. This creates an “open sky” view of all the structures of the upper eyelid. If a levator aponeurosis dehiscence is visualized at this time, it is repaired with one or two interrupted 5-0 polyglactin sutures. The upper eyelid fat pads can be debulked with Stevens scissors and bipolar cautery if necessary. The skin and muscle removal not only provides for lateral eyelid crease formation, but it is also important in order to elevate the eyebrow, lateral canthal area, and midface. The removal of the temporal orbicularis is similar to permanent neurotoxin under the temporal brow, and provides direct access for brow sculpting and release. It also provides a natural space in which to raise the lateral canthus and midface.

To perform an internal eyebrow lift, the orbital retaining ligament is grasped with Paufique forceps at the lateral edge of the upper blepharoplasty incision. The orbital retaining ligament is then excised en-bloc, and the anterior leaf of the posterior galea, from the lateral edge of the blepharoplasty incision extending three-quarters of the distance across the eyebrow, is released. This allows the eyebrow to be lifted internally by removing tissues tethering it in a lower position. The inferior portion of the eyebrow fat pad is sculpted taking care not to over-skeletonize the eyebrow. Next, the eyebrow fat pads are resuspended to the posterior leaf of the posterior galea with 4-0 polyglactin suture, also attempting to correct any asymmetry that was present preoperatively. Suturing to the posterior galea, rather than the periosteum, is important, as it allows the eyebrow to elevate with contracture of the frontalis muscle.

To achieve even greater medial brow lift, corrugator and depressor superciliari s muscle resection can also be performed. Blunt dissection toward the superomedial edge of the blepharoplasty incision with Stevens scissors is performed to separate the corrugators and depressor superciliaris muscle from the overlying orbicularis oculi muscle. Orbicularis is bluntly dissected and retracted superiorly to expose the furrow muscles. Nerves can be seen running vertically in the fascia overlying the corrugator muscles. The lateral edge of the corrugator muscle is then grasped with Adson-Brown forceps and is removed en bloc with Stevens scissors along with the depressor superciliaris muscle. Bipolar cautery is used for hemostasis. It is important to try to remove the muscles en-bloc instead of piecemeal, which ensures complete removal of the muscle and subsequently reduces intraoperative bleeding and postoperative bruising in this well-vascularized area of the face. The muscles at the root of the nose are bluntly undermined, further raising the medial brow. Supraorbital anesthesia and hyposthesia are expected for months after removal. However, furrowing and headaches—if present—are often greatly improved.

Next, the lateral extent of the upper blepharoplasty inci-
sion is used to perform both lateral canthal resuspension and mid-face/SOOF elevation. Blunt dissection with Stevens scissors is used to separate the orbicularis oculi muscle from the underlying periosteum in the lateral canthal region, mid-face, and cheek area. Blunt dissection allows direct access to the lateral canthal tendon. A 4-0 polyglactin suture is then used to suture the inferior crus of the lateral canthal tendon superiorly to the internal lateral orbital rim periosteum adjacent to Whitnall's tubercle. This serves to elevate the lateral canthus. The previously created myocutaneous flap is then advanced and sutured to the lateral orbital rim periosteum adjacent to the lower edge of the blepharoplasty incision, also using 4-0 polyglactin suture on a P-2 needle. This, in turn, results in elevation of the mid-face and cheek while also improving lateral and lower eyelid rhytids.

All edges of the upper blepharoplasty incision are then inspected and bipolar cautery is utilized as needed for hemostasis. The skin is then closed using a combination of 4-0 polyglactin suture on a P-2 needle and 5-0 plain gut suture on a P-2 needle. The subcutaneous tissue is closed using 6-0 polyglactin suture on a P-2 needle. The skin is closed using 6-0 plain gut suture on a P-2 needle. The patient is then monitored closely for any complications and discharged with appropriate postoperative instructions.

Figure 1: A) 82-year-old male patient shown at post operative month 1, following one aesthetic unit surgery in the periorbital area and corrugators removal. This patient still has some residual, mild edema of the bilateral upper eyelids. B) 58-year-old male patient shown at post operative month 2 following one aesthetic unit surgery in the periorbital area and corrugators removal. He still has more upper eyelid swelling on the right than the left. C) 65-year-old female patient shown at post operative month 4, following one aesthetic unit surgery in the periorbital area and transconjunctival lower eyelid blepharoplasty with fat removal and repositioning. D) 66-year-old female patient shown at post operative month 3, following one aesthetic unit surgery in the periorbital area and transconjunctival lower eyelid blepharoplasty with fat removal and repositioning. E) 79-year-old male patient shown at post operative month 4.5, following one aesthetic unit surgery in the periorbital area and transconjunctival lower eyelid blepharoplasty with fat removal and repositioning.
of single, interrupted and running 6-0 plain gut sutures to allow for egress of any postoperative residual bleeding through the skin as opposed to back into the orbit.

Postoperatively, we suggest ice compresses for the first 72 hours and then transitioning to warm compresses to reduce bruising. We also encourage gentle pressure over the eyelids and brow every two hours for the first two days to encourage egress of any blood. Steroid/antibiotic ointment is then applied to incisions daily for two weeks. We also place all patients undergoing eyelid surgery on topical, preservative-free artificial tears and artificial tear ointment at bedtime, as they may have temporary lagophthalmos while their upper eyelid crease incision heals.

DISCUSSION

The upper eyelid crease incision has become the gateway to performing the majority of surgeries in our practice. Treatment of eyebrow ptosis, glabellar furrows, eyelid ptosis, upper eyelid dermatchalasis, lower eyelid laxity, and midface laxity are now all performed through this one aesthetic unit incision. Being able to treat the entire peri-orbital aesthetic unit in one setting has greatly enhanced both functional and cosmetic results for our patients. The anatomy and technique to perform surgery in the peri-orbital aesthetic unit is best understood by the facial cosmetic surgeon. The senior author, RLA, has experienced gratifying results in over 2,000 procedures utilizing this one aesthetic unit technique. Figure 1 represents results we have obtained with one aesthetic unit surgery, and except where indicated, transconjunctival lower lid blepharoplasty was not performed.

We believe the lateral canthal angle is the keystone and anchor point in the peri-orbital aesthetic unit and thus proper surgical placement of the lateral canthus is paramount to successful surgery. The combined surgical approach described in this paper provides an effective method of restoring a natural, rejuvenated appearance to the lateral canthal angle. As we age, the canthal angle tends to sag and become more rounded, and the eyelid’s horizontal length decreases, thus giving the face a sad and droopy appearance. Lateral canthal re-suspension allows us to effectively lengthen and raise the lateral canthal angle while simultaneously increasing its sharpness, without disrupting the natural supporting tissues. The lower eyelid and midface are a continuum with the lateral canthus, and thus elevating and tightening the canthus simultaneously also improves lower eyelid rhytids and the appearance of the midface.

Elevating the entire peri-orbital aesthetic unit in the same setting is beneficial for a number of reasons outside the obvious cosmetic benefit. If only the upper eyelid and brow are elevated, pre-existing lower eyelid laxity often appears more prominent. If only the lower eyelid and midface are elevated, the upper eyelid and eyebrow appear lower, and there tends to be a bunching of tissues at the lateral canthal angle if any brow or upper eyelid heaviness are present. If the lower eyelid is elevated without a simultaneous midface lift, a lack of support allows for preexisting midface descent to decrease the longevity of the eyelid correction. Elevating the brow and upper eyelid helps take weight off the canthal angle, and a mid-face lift helps provide additional reinforcement from below.

The one aesthetic unit approach has numerous advantages. Use of a single incision increases our efficiency in the operating room and leads to decreased surgery, along with its associated risks and costs. Rehabilitation of the entire peri-orbital aesthetic unit in one session also requires only one recovery period and a single cosmetic incision site with less swelling, pain, morbidity, complications, and cost than other procedures in our experience.

As cosmetic periorbital surgery has evolved, the line between functional and cosmetic surgery has become more blurred, with insurance covering less and patients expecting more. Most patients are no longer satisfied by the simple correction of a functional deficit. We believe they are justified in this belief, as correction of functional problems may further aggravate cosmetic problems. The modern patient is also more aware that overly aggressive cosmetic surgery leads to an unnatural appearance. Based on our examination and discussion with the patient, we recommend surgery that recreates the most natural and youthful appearance possible for the patient. Treating the entire peri-orbital aesthetic unit provides a powerful yet natural outcome. In our experience, the patient acceptance rate for one aesthetic unit surgery performed through a single incision is much higher than for surgery performed through multiple incisions. We believe that our “one aesthetic unit” approach to the peri-orbital area has not only been beneficial for our patients but has greatly improved and expanded our cosmetic surgery practice.

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