

Reducing the Incidence of Dry Eye Symptoms After Blepharoplasty

Dry eye syndrome (DES) after blepharoplasty has many causes, but most relate to reduced eyelid function. The author provides guidelines for reducing the incidence of DES, explains causes, patient selection, procedures that may exacerbate symptoms, techniques to decrease risks, and provides “pearls” for reducing lid malposition and DES after blepharoplasty. (*Aesthetic Surg J* 2004;24:464-468.)

The occurrence of symptomatic dry eye syndrome (DES) after a well-executed blepharoplasty can be extremely disconcerting. A highly satisfactory aesthetic result will not be appreciated by a patient experiencing symptoms of foreign body sensation, overt ocular pain, epiphora, photophobia, or reduced vision that has been aggravated or precipitated by the eyelid surgery. Symptoms may range from mild and inconsequential to severely debilitating. Despite advanced surgical approaches, the incidence of these symptoms is as frequent, and, perhaps, more frequent than in the past. The fact that many more patients request aesthetic blepharoplasty after already having one or more procedures leaves them vulnerable to greater risk of DES (even when all procedures are performed with a high level of expertise).

Determining Who Is at Risk

Although certain preoperative tests have commonly been performed, such as the Schirmer's test, it is my opinion that they are of little value in screening or prevention of DES for those at risk.¹ First, these tests are technique dependent; varying results are common in the same patient tested by different examiners. Additionally, what do results from these tests really mean? The standard Schirmer's test measures aqueous tear production as a reflex to ocular stimulation. However, aqueous tear secretion, baseline or reflex, may offer inadequate protection in some instances.

Causes of DES After Blepharoplasty

Reduced ocular lubrication and DES after blepharo-

plasty have a variety of causes mostly relating to reduced eyelid function.

- The most common cause of DES is lagophthalmos (incomplete eyelid closure) with resulting exposure keratitis. Causes of lagophthalmos, which may involve reduced upper, lower, or upper and lower eyelid closure, are numerous (Figure 1). Lagophthalmos may be mild and completely asymptomatic or chronically debilitating. Fortunately, it is frequently transient, occurring immediately after surgery but improving or reversing as eyelid edema subsides.
- A common but frequently misdiagnosed cause of reduced eyelid function relates to poor canthal fixation. Stable and secure lateral canthal fixation is essential for normal eyelid closure (Figure 2).
- Overzealous excision of soft tissue (mostly skin and muscle), or denervation (orbicularis oculi muscle dysfunction caused by muscle manipulation) can result in poor eyelid function that is typically transient. Prolonged denervation, however, can result in poor lid position, mostly lower, which may be permanent. Over-excision of skin and muscle with the induction of severe exposure symptoms is less frequently seen after primary surgery and in younger people. On the other hand, increased symptoms are more prevalent in secondary surgery, especially in older people; premenopausal females; and also in patients with thyroid ophthalmopathy, treated or undiagnosed, in whom symptoms may be severe.
- Eyelid dysfunction may also relate to the onset and persistence of chemosis, a poorly understood phenomenon, and may in turn exacerbate poor lid position and increase exposure (Figure 3). In a vicious cycle, chronic ocular irritation from exposure com-



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Figure 1. This 50-year-old woman was referred to me after having undergone upper and lower blepharoplasty that resulted in lagophthalmos and exposure symptoms related to cicatricial effects of the upper and lower eyelids.



Figure 2. Reduced eyelid function and worsening of lagophthalmos and exposure symptoms may also relate to poor canthal fixation. This patient underwent lower blepharoplasty without canthopexy/canthoplasty. Note the medial displacement of the lateral canthus and lower eyelid and note that attempted eyelid closure results in medial ectropion. Canthopexy/canthoplasty might have facilitated improved eyelid function and closure.

monly facilitates the chronicity of the chemosis.

Patients Predisposed to DES

The first step in reducing the incidence of DES is to carefully screen patients for aesthetic blepharoplasty.

The determination of risk does not necessarily disqualify the patient from blepharoplasty but indicates that surgical procedures must be modified to reduce or eliminate worsening of symptoms. The following are patients with a poor risk profile.

- Patients who have symptoms of DES before undergoing blepharoplasty have a poor risk profile (Figure 4). These patients report that they use supplemental “tears” (eye drops/topical lubricants) at least every

hour or two and still have DES. However, many patients report that they have dry eyes but almost never use eye drops. If patients are relatively asymptomatic they are probably at much lower risk, assuming surgery is performed well. Preoperative tear function tests, such as the Schirmer’s, are far less accurate predictors of who is at risk than an accurate patient history of current symptoms and use of topical lubricants.

- Patients who have had prior blepharoplasty resulting in denervation, lid retraction, or lagophthalmos have a poor risk profile (Figure 4). Assess these patients for compromised eyelid function. Frequently, these patients become significantly symptomatic in the short term (after surgery) and sometimes may have chronic symptoms if lid function is further compromised.
- Patients who require tight canthoplasty/canthopexy due to excessive lower eyelid laxity and denervation necessitating procedures such as extensive orbicularis oculi dissection for malar elevation may also have a poor profile. These involuntional changes are commonly associated with reduced tear function and increased risk of chemosis. Canthopexy/canthoplasty will likely improve long-term eyelid function because lid closure is a function of canthal support, and lack of good canthal fixation is frequently a cause of exposure symptoms. However, a firm canthal tightening procedure can frequently lead to a slight increase in exposure symptoms immediately after surgery despite the elevation of the lower eyelid. This is because the normal dynamic and fluid activity of the eyelid is temporarily replaced with a stiffer lateral support resulting in transient reduction of the dynamic, fluid eyelid (function) with normal blinking. Symptoms will almost always subside because the eyelid loosens and the long-term lid function is actually enhanced by canthopexy/canthoplasty.
- Patients with a history of thyroid disease have a higher incidence of postoperative prolonged edema and chemosis and ultimately a worsening of lid posture (unless primary spacer grafts are used²) and exposure symptoms. However, because these patients are accustomed to exposure, they may actually tolerate exposure better than others.
- Allergic patients who regularly use antihistamines are at mild to moderate risk but can be highly sensitive to manipulation of the periorbita.
- Patients who have undergone refractive surgery

(LASIK³ and related corneal procedures) and other intraocular procedures consistently have more DES in the early postoperative period. Although procedures such as LASIK do not directly affect tear production, increased DES is likely associated with alteration of corneal topography resulting in an aberrant dispersion of the tear film across the ocular surface. Warn patients that these symptoms are likely to occur and are caused by previous surgical alteration of the cornea interfering with dispersion of tears and also may cause transient visual blurring.

Procedures That May Exacerbate DES

The following procedures may increase DES.

- Extensive skin-muscle flap (SMF) due to temporary denervation; therefore skin flap will reduce this due to transient denervation that can lead to long-term lid malposition.
- Extensive subperiosteal and orbicularis oculi muscle dissection for malar/cheek elevation with possible alteration of the lower eyelid position.
- Previous upper blepharoplasty (one or more) with lagophthalmos.
- Canthopexy/canthoplasty may exacerbate DES in many patients, but these symptoms are short term.
- Previous corneal/refractive surgery procedures (LASIK).
- Combined orbicularis repositioning with high extended SMAS due to denervation. These symptoms are short term but may also increase the incidence of chemosis.
- Brow lifts, especially when combined with overzealous upper blepharoplasty, with resulting lagophthalmos and/or frontal branch (facial nerve) injury.
- Transpalpebral resection of the corrugator muscles, especially in secondary upper blepharoplasty.

Procedures Less Likely Associated With DES

Although the following procedures have been considered to exacerbate DES, they usually do not if performed appropriately. Meticulous execution of these procedures, appropriate preoperative counseling, and frequent administration of topical emollients will often remedy symptoms.

- Transconjunctival lower eyelid approach to fat maintenance.
- Transconjunctival upper eyelid posterior approach ptosis repair (Müller's muscle conjunctival resection). The conjunctival incision has been associated



Figure 3. This 74-year-old woman was referred to me for evaluation and treatment of chronic chemosis after undergoing upper and lower blepharoplasty one month prior. Her persistent lower eyelid malposition relates to long standing chemosis and possibly to denervation resulting from the skin-muscle flap approach. These problems might have been avoided if the patient had also undergone an effective canthopexy and suture tarsorrhaphy



Figure 4. This 70-year-old woman requested a secondary blepharoplasty. She reported chronic ocular irritation, constant foreign body sensation, and use of artificial tear supplements hourly to maintain some reasonable level of comfort. She would be at great risk for worsening of her ocular symptoms after blepharoplasty.

with possible DES due to potential and theoretic destruction of accessory lacrimal glands of the conjunctiva. This has never been proven to be clinically significant in my experience.

- Lower eyelid subciliary incision (especially with skin flap), if performed with appropriate canthal fixation, will be less likely to cause lower eyelid retraction. In fact, lower eyelid CO₂ laser skin resurfacing without canthopexy may actually be riskier.

- Lateral canthopexy/canthoplasty (long-term symptoms).

Reducing the Risk of DES

The following pointers may help to reduce the risk of DES when performing blepharoplasty.

- Perform brow lift with an upper blepharoplasty in the appropriate fashion and only when aesthetically necessary.
- Perform conservative upper eyelid blepharoplasty (volume enhancing) with skin excision only (minimal or no orbicularis muscle excision).⁴
- Perform (conservative) transconjunctival fat contouring with release of lower eyelid retractors from a posterior approach.^{5,6}
- Perform lower eyelid subciliary incision with skin flap; preserve pretarsal orbicularis;
- When orbicularis oculi muscle trim is necessary, a tight canthopexy with lateral orbicularis oculi muscle support/suspension is also necessary.
- Perform lateral canthal suspension in all patients who have had any sort of skin treatment (incision, excision, laser resurfacing).^{5,6}
- Use temporary traction (“Frost”) suture⁷ for the first day (Figure 5).
- Use temporary suture tarsorrhaphy⁷ in any patient who is more prone to exposure, chemosis, etc. (Figure 6).

Discussion

Measures to reduce the risk of DES begin during the preoperative evaluation and extend through the perioperative period. The risk of lower eyelid retraction begins immediately after surgery. Even when a lower eyelid blepharoplasty is performed impeccably, certain circumstances, which may appear innocuous or even helpful at first, can cause lower eyelid malposition.

One of the many advantages of a transconjunctival incision is that release of the lower eyelid retractors with an approach for fat contouring promotes a cephalad position of the lower eyelid margin just after surgery. For several years, I closed the conjunctival incision with a single interrupted plain gut suture until I finally realized that this provided no advantage. Further, an open wound provides a potential space that can promote better lid position because the lower eyelid retractors are recessed. Another advantage of not suturing is reducing the incidence of compartmentalization syndrome (retrobulbar



Figure 5. This 45-year-old woman is seen here one day after undergoing upper and lower blepharoplasty with orbicularis oculi muscle and lateral retinacular suspension. The traction suture used during surgery was then used as a “Frost” type suture to elevate the lower eyelid for the first 24 hours and was then removed.



Figure 6. This 40-year-old woman underwent secondary upper and lower blepharoplasty. Temporary suture tarsorrhaphies were placed bilaterally. These remained until suture removal at one week.

hemorrhage) if there is postoperative bleeding. In fact, in rare instances, mild degrees of lower eyelid retraction can be treated by this incisional approach without the need for posterior lower eyelid spacer grafts. Although it has been suggested that a transconjunctival incision can be therapeutic in improving DES,⁸ I believe this would be rare and, at best, when the transconjunctival incision is well executed, DES is not induced or worsened.

Ice packs, when applied incorrectly for reducing ecchymosis and edema, can promote lower lid malposition if the lower eyelid is distracted caudally. The advantage of the transconjunctival incision on lower eyelid

position may therefore be neutralized or antagonized by improper application of ice. Eyelid traction, Frost sutures and tarsorrhaphies can aid against lid malposition in the immediate postoperative period. The eyelid retraction can enhance corneal/conjunctival exposure, which, when combined with a small degree of denervation (with skin muscle flap or orbicularis oculi suspension), can contribute to the appearance of conjunctival chemosis. Chemosis, in turn, mechanically causes a worsening of the lower eyelid position (retraction) along with further disjunction of the globe to the lower eyelid. The result is wholly unaesthetic and combines short-term symptomatology with long-term lid malposition and eventual poor aesthetic outcome with potential DES. All of this can be prevented or significantly reduced with appropriate surgical/medical maneuvers.

Surgical and Management “Pearls” to Reduce Lid Malposition and DES After Lower Eyelid Blepharoplasty

Selecting from the following procedures and maneuvers, based on individual patient needs, has prevented the onset of significant DES after lower eyelid blepharoplasty in most of my patients. The short-term nuisance for both surgeon and patient is far outweighed by the long-term positive effects.

- Leave the conjunctival wound open after careful inspection prior to the lateral retinacular canthal suspension.
- Securely resuspend the lateral orbicularis oculi muscle to the lateral orbital rim, which both restores function and promotes a better lower eyelid position.
- Perform conservative lower eyelid skin excision (without muscle) with redraping.
- Routinely place a “Frost-type” (lower eyelid traction) suture during dissection of the lower eyelid skin flap and maintain it after surgery, taping it in an elevated position to the forehead (Figure 5). This suture is kept in for the first night and thereby allows the patient to liberally apply ice packs without the risk of inducing lower eyelid malposition. The traction on the transconjunctival incision also promotes the cephalad positioning of the lower eyelid margin. It also eliminates corneal exposure, risk of applying direct pressure to the corneal surface, and initial (almost always present) lagophthalmos.
- Give patients lubricants (tears and ointments) and instruct them to use them consistently, and consider

the use of punctal plugs in those whose symptoms persist despite frequent use.

- During the first week, give patients topical antibiotic/corticosteroid-containing drops and ointments.
- Patients are first pulsed with intraoperative dexamethasone sodium phosphate, usually 4 mg intravenous for the initial pulse and 4 mg intramuscular for maintenance for the first couple of days. By day 4, if edema or chemosis appears, persists, or worsens, I usually administer a tapering dose of prednisone for 4 days: 40 mg, day 1; 30 mg, day 2; 20 mg, day 3; and 10 mg, day 4.

The precipitation of DES can frequently induce patient anxiety even if the aesthetic result is satisfactory. These maneuvers have proven beneficial in achieving gratifying results while minimizing symptoms even in the most challenging cases. ■

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