Long-term Results of Lower-Lid Suspension Blepharoplasty

A 30-Year Experience

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Background: Muscle suspension blepharoplasty remains a reliable method to tighten the loose skin and muscle of the lower eyelid.

Objective: To evaluate the 30-year experience of the senior author (N.J.P.) with the skin-muscle suspension technique for lower-lid blepharoplasty.

Patients and Methods: Of 4395 patients who underwent lower-lid blepharoplasty, 3988 had muscle suspension blepharoplasty performed with adequate follow-up.

Results: Results of the 30-year review showed that most patients were very satisfied with the procedure. There were 67 complications (2 hematomas, 1 poor scar, 24 cases of scleral show <1 mm, and 40 cases of chemosis). Chemosis resolved in 2 to 8 weeks, and there were no cases of ectropion, scleral show greater than 1 mm, dry eye, or vision loss. Revision surgery was needed in 41 patients, all of whom were satisfied after the secondary procedure.

Conclusion: Despite the recent drift toward orbital fat preservation for lower-lid blepharoplasty, conventional lower-lid muscle suspension offers the surgeon a reliable method to tighten the loose skin and muscle of the lower eyelid and give the patient a more attractive, youthful appearance.

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not been previously reported. However, long-term experience and results of this technique have not been previously reported.

**METHODS**

This is a retrospective review the 30-year experience of the senior author with lower-lid muscle suspension blepharoplasty performed in his private practice.

Although this technique has been described, some of the important aspects of the procedure will be highlighted. First, lower-lid skin redundancy and fat pseudoherniation are determined, as well as the presence of festooning or swag of the orbicularis muscle and that of scleral show. Lid strength or laxity can be evaluated with the snap test. If its result is abnormal, a lid-shortening procedure is indicated. The obvious patient for the suspension skin-muscle flap is an older person who demonstrates a large amount of fat pseudoherniation, significant redundant skin, and prominent orbicularis muscle swag.

The lower-lid procedure is usually performed in conjunction with an upper blepharoplasty. Optimal anesthesia is achieved with the injection of 1 to 2 mL of an anesthetic agent (2% lidocaine hydrochloride with 1:100000 epinephrine buffered with 8.4% sodium bicarbonate in a ratio of 10 mL of lidocaine hydrochloride to 1 mL of sodium bicarbonate) when completion of the upper eyelid surgery is near.

The incision measuring approximately 6 to 7 mm is made 2.5 mm below the lid margin in the subciliary crease, at the lateral canthal mark corresponding to the transition zone between eyelid and facial skin. Using small straight scissors, the rest of the lower-lid skin incision is completed from lateral to medial up to, but not beyond, the lower-lid puncta.

A skin flap is elevated for approximately 3 mm, exposing the pretarsal portion of the orbicularis muscle. Preserving the pretarsal muscle allows for immediate tension of the lower eyelid postoperatively and helps prevent scleral show or ectropion. Next, dissection of the preseptal fibers off of the orbital septum is performed using a curved Stevens scissors, creating the muscle portion of the skin-muscle flap (Figure 1). Sweeping the muscle down to the orbital rim with a cotton-tipped applicator completes the flap and helps expose the lateral, central, and medial fat compartments. Meticulous hemostasis of any skin and/or muscle bleeding at this point is important to allow for adequate visualization of the fat compartments and prevent any complications.

Removal of fat is done from lateral to medial to avoid persistence of lateral lower-eyelid fat, which is a frequent cause of postoperative dissatisfaction. The orbital septum is opened sharply and only fat that easily flows into the wound is removed. Forcefully tugging fat from deeper in the orbit will only hollow out the eye. Leaving about 1 mm of exposed orbital rim is a good measure of the amount of fat removal necessary to provide for a good aesthetic result without causing a depression along the inferior orbital rim. Once the fat is teased out, it is injected with the anesthetic solution, clamped, and excised. A small cuff of fat is left above the clamp to provide an area to cauterize. I prefer to use a hot-tipped rather than a monopolar or bipolar cautery device.

Once fat removal is deemed complete and hemostasis is achieved, attention is turned toward the skin-muscle flap. The flap is draped superiorly. Since the procedure is performed under local anesthesia, the patient is asked to look upward and open the mouth. The maneuver will place maximum tension on the lower lid and allow the skin-muscle flap to slide downward. The skin-muscle flap that remains above the subciliary incision can be safely removed with a straight Stevens scissors. There should not be any wound gap after excision, and further beveling the excision by removal of muscle should be done to prevent bulging along the incision.

The lid suspension stitch is placed next. The preferred suture is done with a clear 3-0 polypropylene thread (Prolene; Ethicon Inc, Somerville, NJ) with a needle large enough to go through the orbital rim. Once the fat is teased out, it is injected with the anesthetic solution, clamped, and excised. A small cuff of fat is left above the clamp to provide an area to cauterize. I prefer to use a hot-tipped rather than a monopolar or bipolar cautery device. Occasionally, a small strip of skin needs to be excised further.

The incision is then closed with a running 6-0 polypropylene stitch. Surgical glue is used to aid in approximation of the wound edges and to reinforce the sutures. Multiple surgical tapes are also placed to help suspend the lid laterally during the initial healing period.

Of the 4396 lower-lid blepharoplasties performed from 1971 to 2001, 2300 were independent procedures and
2096 were performed in conjunction with a face-lift. The skin-muscle flap with suspension was used in 3988 patients and without suspension in 83 patients. There were also 272 transconjunctival and 41 skin pinch procedures, and 12 patients underwent only a skin-flap procedure.

There were 41 revision procedures in patients who underwent the skin-muscle flap suspension technique, as 17 patients with very thin skin had the suspension stitch removed 6 months postoperatively, 17 patients had additional fat removed, 1 patient had resuspension of 1 lid secondary to suture failure, and 6 patients required unplanned postoperative laser resurfacing for fine rhytids after blepharoplasty.

The following tabulation shows the complications that developed in 67 patients:

<table>
<thead>
<tr>
<th>Complications</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematoma</td>
<td>2</td>
</tr>
<tr>
<td>Inverted scar</td>
<td>1</td>
</tr>
<tr>
<td>&lt;1-mm Scleral show</td>
<td>24</td>
</tr>
<tr>
<td>&gt;1-mm Scleral show</td>
<td>0</td>
</tr>
<tr>
<td>Chemosis</td>
<td>40</td>
</tr>
<tr>
<td>Ectropion</td>
<td>0</td>
</tr>
<tr>
<td>Vision loss</td>
<td>0</td>
</tr>
<tr>
<td>Dry eye</td>
<td>0</td>
</tr>
</tbody>
</table>

The cause of the inverted scar is unexplained. Of the 2 hematomas, which required opening the incision and controlling the bleeding vessel, one was secondary to alcohol consumption and the other was attributed to weight lifting within a day of the surgery. All 40 cases of chemosis resolved within 2 to 8 weeks.

The 41 patients who required revision surgery were subsequently satisfied. Although the surgeon deemed unsatisfactory the 24 cases of scleral show, which were less than 1 mm, they were not considered unsatisfactory by the patients. The only patient who remains unsatisfied had the inverted lower-lid scar.

Preoperative and postoperative examples are shown in Figure 4.

**COMMENT**

Beare, Rees and Dupuis, Rees and Wood Smith, Aston, Spira, and Adamson and their colleagues have all have described their technique and experience using the skin-muscle flap procedure. Some surgeons have noted that they have used it in most of their blepharoplasty cases. However, although it has been used for many years to rejuvenate the lower eyelid, no long-term evaluation of the skin-muscle suspension technique for the lower eyelid has been previously reported.

The transcutaneous approach has been met with some resistance, however. The concern is development of retraction, and thus possible lateral rounding, scleral show, and ectropion. The causative factor appears to be orbicularis muscle violation, which results in denervation of the pretarsal orbicularis muscle. Therefore, the transconjunctival technique without adjunctive procedures such as the pinch technique, carbon dioxide laser treatment, or chemical peel has been favored by some. Patients must be properly selected for the transconjunctival procedure. The younger patient with smooth skin, moderate fat pseudoherniation, and no muscle slavage since there is no need for skin excision, is an obvious candidate for a transconjunctival approach. The transconjunctival approach may also be useful in revision or secondary blepharoplasty. While comparing results of 300 cases where they used the skin-muscle flap approach and 300 cases where they used the transconjunctival technique, Perkins et al noted that in approximately 30% to 40% of the cases they used the transconjunctival blepharoplasty, and that therefore this procedure should have a significant place in the surgical armamentarium of the cosmetic surgeon.

However, lower-eyelid surgery has undergone another transformation during the past 5 years, and newer methods and theories to recreate a youthful appearance have appeared. Recent descriptions of techniques have shied away from removal of skin, muscle, and fat, and focused on orbital fat preservation with lower-eyelid and midface contouring. Hamra in 1995 described a new technique in which the lower-eyelid fat is preserved and advanced beyond the orbital rim. Eder reports that her satisfaction with this new technique has led her to “abandon completely the conventional type of fat resection.” Baker provides an excellent discussion of the theories behind this new approach and notes that this technique may have merit in patients who demonstrate significant bony rim visibility, prominent eyes with hypoplasia of the infraorbital rim, a prominent nasojugal groove, and deep-set eyes with fat protrusion. The premise behind these newer
techniques is that the natural course of aging results in skeletonization and hollowing of the orbit.\textsuperscript{2,4,20} Conventional methods of blepharoplasty, in which varying amounts of skin, muscle, and fat are excised, merely remove manifestations of the gravitational and aging process.\textsuperscript{20}

On the other hand, the skin-muscle suspension technique has been a tried-and-true procedure to rejuvenate the lower eyelid. It has provided excellent immediate results by reducing the amount of lower-eyelid fullness and smoothening out wrinkles. The transcutaneous scar is not an issue\textsuperscript{21} and patients who have undergone the skin-muscle suspension technique have had excellent long-lasting results. The senior author thus reverted to using this technique in most of his patients requiring aesthetic surgery of the lower lid.

Several maneuvers have been used to help prevent some of the dreaded complications of the transcutaneous approach to the lower lid. The skin-muscle flap technique was first performed by trimming off the excess skin and muscle and suturing the skin for closure, but excessive removal of skin leads to an increased risk of vertical contracture. Webster et al\textsuperscript{22} described a technique, which they termed the \textit{flap suspension technique}, that relies on extending the lower-eyelid incision in an upward and lateral direction from the outer canthus to provide a superolateral pull and the stabilization of the lower-eyelid structures. The technique described in this article centers around the muscle suspension stitch. Suspending the lateral portion of the orbicularis muscle in a vertical direction and securing it to the periosteum with a permanent stitch helps prevent scleral show and ectropion. Rounding of the lower eyelid is also avoided, and an attractive S-shaped curvature will occur. Fixing the lower lid also allows for more skin removal to further prevent any postoperative skin redundancy. The vertical pull of the stitch also provides a superior pull on the midface structures, thereby creating a slight midface-lift. The suspension stitch essentially counteracts the gravitational forces of aging with lasting results.

Use of the hot-tipped cautery also appears to be beneficial both during the procedure and afterward. Monopolar cautery can still cause pain deep within the orbit despite the infiltration of local anesthetic, and bipolar cautery has to be applied to multiple areas of the fat stump, which can be time-consuming. The hot-tipped cautery acts only in the area of contact. There is no dissipation of the heat and, therefore, less chance of injury and further necrosis to the deeper fat and other orbital structures.

Because of the surgical trauma to the muscle, several days are required for healing and lid edema can cause a downward pull on the lower eyelid. There are 2 reinforcement techniques to skin closure. The first is the use of glue to help with proper skin approximation, and there is no difficulty with removal as the glue flakes off. The second consists in using multiple surgical tapes to aid in suspending the lid laterally during the initial healing period. They are removed on the fourth postoperative day.

Long-term follow-up of patients undergoing the skin-muscle suspension technique demonstrates that revision work is necessary about 12 to 15 years after the initial surgery—if the patient so desires. Usually, removal of fat and/or

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4.jpg}
\caption{A and B, Preoperative photographs of 2 patients. C and D, Postoperative photographs taken at the 1-year follow-up visit.}
\end{figure}
tightening of the skin with a pulsed carbon dioxide laser are all that is required. Excess skin can also be removed using the skin pinch technique. Reperforming the skin-muscle flap suspension is not always necessary.

**CONCLUSIONS**

Lower-eyelid surgery has undergone a transformation over the past 30 years, and many methods to recreate a youthful appearance have been described. Despite the recent push toward orbital fat preservation and mobilization, the senior author has reverted to using the skin-muscle flap suspension technique for patients undergoing lower-lid blepharoplasty. Although there are patients who can benefit from orbital fat preservation and mobilization, the results obtained for 3988 patients in 30 years attest to the reliability of this procedure to correct the normal aging process of the lower eyelids. Patient satisfaction is evident from the excellent immediate results of removing fat, skin, and muscle and performing a muscle suspension stitch to create an S-shaped curvature of the lower lid, with resolution of lower-eyelid fullness and skin wrinkling. Long-term follow-up also shows prolonged, aesthetically pleasing results.

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**REFERENCES**


