

Chapter 99 – Eye Reanimation in Patients with Facial Paralysis

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One of the most important aspects in caring for patients with facial paralysis is eye care. Inattention to this detail can lead to corneal exposure, ulceration, and permanent scarring with loss of vision. Patients who have a concomitant fifth cranial nerve deficit are at particularly high risk and should be managed in conjunction with a corneal specialist. For patients without a sensory deficit, primary treatment is the use of topical drops and lubricants. A wide variety of products are available, and the otolaryngologist should work closely with an ophthalmologist if uncomfortable with this field to ensure optimal care of the patient.

Topical preparations in the form of drops and ointments are available in a wide range of viscosity, depending on the scope of the exposure problem. Attention should also be paid to the presence or absence of a preservative because some patients are intolerant of these chemicals.^[1]

Other extremely important nonsurgical therapies include the use of clear moisture chambers, taping the eyelids closed at night, manual blinking, and external lid loading. The use of an opaque patch over the eye should be discouraged because it can lead to corneal irritation if the eye opens beneath it.

PATIENT SELECTION

Abnormal eyelid position and disorders of the lacrimal apparatus are the usual ocular symptoms in patients with paralysis of the eyelids. The surgeon must evaluate the entire effect of the facial nerve paralysis on the eye, including brow position, lagophthalmos, lid laxity, lid position, and epiphora. Most patients can be managed without surgery indefinitely, and the decision to operate is therefore generally elective. Careful assessment of the lid preoperatively will lead to more satisfactory outcomes.

The patient's history, including the cause of the paralysis and the patient's likelihood of spontaneous nerve recovery or recovery after neural reanimation procedures, is vitally important in surgical planning. The age of the patient plays a role, and the contralateral eye should be observed for age-related changes in the eyelids and brow.

Detailed physical examination of these patients includes evaluation of visual fields and acuity. The conjunctiva is examined for signs of inflammation with topical fluorescein and ideally with a slit lamp. The level of the brows, eyelid approximation with involuntary blink and voluntary effort, tear production, extraocular muscle function, and pupillary size and response should be noted.

A systematic evaluation of the eyelids before reanimation surgery as suggested by Moe is very useful. Moe's Ectropion Grading Scale ranks the lower eyelid on a I to V scale with predominantly medial and lateral determinations. Likewise, upper eyelid function can be objectively compared with the normal side by using medial and lateral measurements of the distance between the eyelids in the closed position.^[2]

Factors favoring successful medical management of paralyzed eyelids include an expectation of early recovery, residual facial function, preservation of static lid tone, normal tear function, normal Bell's phenomenon, intact corneal sensation, young age, and the ability to have close follow-up appointments.

SURGICAL TECHNIQUE

Interested readers will find much more extensive writings on this subject, including in May and Schaitkin's *The Facial Nerve*,^[1] where 100 pages are devoted to eye reanimation. This chapter will therefore consider only the most common procedures used in eyelid reanimation. Partial tarsorrhaphy is mentioned only to be condemned, except in very rare situations, because of its limitations: restriction of vision, cosmetic disfigurement, and in some cases, failure to provide protection.

BROW-LIFT

Patients with brow ptosis have asymmetry as a cosmetic problem. They will often have visual field deficits superiorly as a result of redundant skin from the upper brow. Symmetry can be improved by injection of a small dose of botulinum toxin (Botox) into the normal side. A brow-lift can provide more definitive resting symmetry but should never be undertaken at the expense of corneal protection. Manual distraction of the brow with the patient sitting upright can indicate the effect of a brow-lift on lid closure. A direct brow-lift allows the surgeon to better control the shape and position of the brow but unfortunately leaves a visible scar.

Skin removal is usually necessary in an older patient. The procedure is easily accomplished under local anesthesia with mild sedation. The ellipse of skin taken should be larger laterally to mimic the shape of the normal brow. Removal of only the skin and subcutaneous tissue protects the supraorbital neurovascular bundle. Once the excision is accomplished, the inferior aspect is sutured with two or three permanent 4-0 clear monofilament sutures. If necessary, a portion of the orbicularis muscle and soft tissue can be included in this suture to improve drooping of the supratarsal fold. In general, a man's brow lies close to the orbital rim and a woman's above the rim, although the normal side should be used for comparison. Beveling the incision to parallel the hair follicles can reduce scar visibility. The incision should be kept central for maximal concealment, and meticulous wound closure is necessary.

An endoscopic brow-lift, which has been introduced more recently, is also an alternative technique.^[3]

Upper Eyelid Procedures

A number of methods can be used to improve upper eyelid closure, but lid loading with gold is the method most commonly performed (Fig. 99-1). Jobe, in 1974, was the first American to place a gold weight and is responsible for popularizing the procedure.^[4] This technique remains appealing because of its high success, simplicity, low complication rate, and cosmetic acceptability.

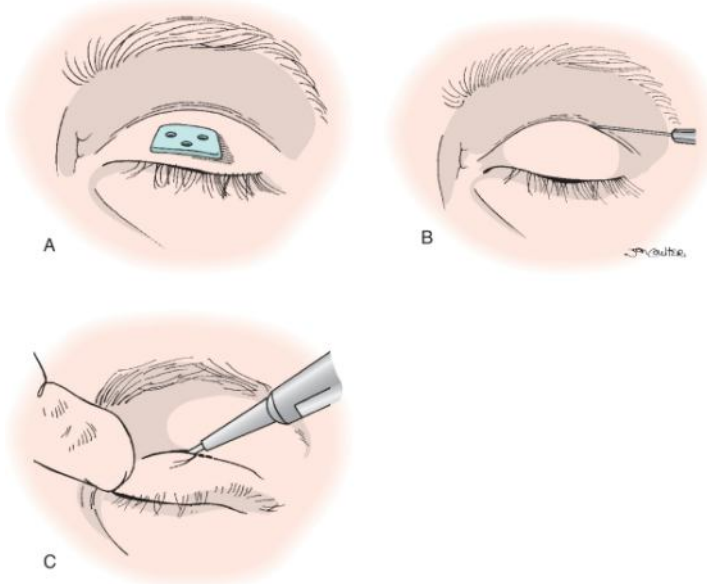


Figure 99-1 Insertion of a gold weight. A, Gold weights are tried as external lid loads preoperatively. B, Minimal local anesthesia is required. C, A corneal protector is always used. The incision is made along the tarsal-supratarsal fold with an ophthalmic knife.

(Reprinted from May M, Levine RE, Patel BCK, Anderson RL: Eye reanimation technique. In May M, Schaitkin BM [eds]: *The Facial Nerve*. New York, Thieme Medical, 2000, p 708.)

Several aspects, emphasized by Jobe, must be adhered to:

1. Preoperative fitting of the prosthesis involves finding a weight that closes the eye, with the lower lid in neutral position, without causing significant ptosis at rest. One millimeter of ptosis is considered acceptable. Ideally, the patient wears the prosthesis for 24 hours to evaluate its function during fatigue and in different head positions. Less expensive sizing prostheses are available for this purpose.
2. The prosthesis works best when it is placed medial to the midpupillary line. Such placement overcomes the wider area of exposure between the eyelids medially.
3. The prosthesis should be placed in a pocket just lateral to the tarsal plate to minimize visibility of the plate through the soft tissues and decrease the risk of exposure.

4. The weight is fixed with three 8-0 monofilament permanent sutures 3 mm above the lash line. This area is easily appreciated surgically inasmuch as a vascular arcade is noticed below this level in the tissue pocket.
5. The soft tissues are closed with 7-0 chromic suture and the skin with absorbable plain gut.
6. Patients with gold sensitivity can have platinum weights or chains inserted.

The procedure can be performed under local anesthesia with or without sedation and combined with other reanimation procedures. The patient's midpupillary line is marked before applying topical anesthesia to the eyelid and placing a corneal protector. Under loop magnification, an incision is made through the skin along the tarsal-supratarsal fold. With gentle forceps traction, Westcott scissors are used to divide the soft tissues overlying the orbicularis muscle and levator aponeurosis and expose and identify the tarsal plate as a dense white structure (Fig. 99-2). The dissection continues above the tarsal plate inferiorly to within 3 mm of the lash line (Fig. 99-3).

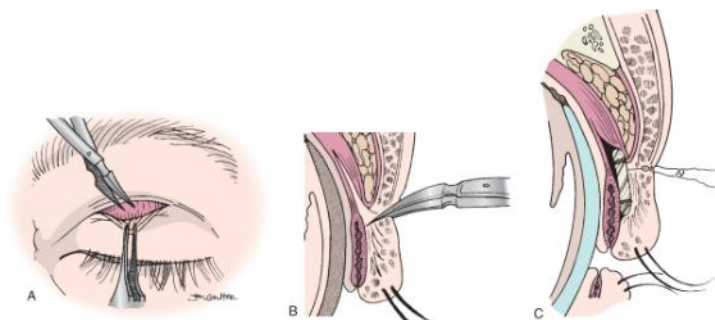


Figure 99-2 Surgical dissection and fixation for the gold weight procedure. **A**, Double-action scissors are used to sharply dissect a pocket to the tarsal plate noted as a white plane. **B**, Further dissection divides the orbicularis muscle and levator aponeurosis. The lowest point of dissection is 3 mm from the lash line, often noted surgically as the position of the vascular arcade. **C**, The gold weight is centered at the medial and central third of the lid to improve coverage medially. Three-point fixation is necessary to avoid extrusion, and the levator and orbicularis are closed with 6-0 absorbable suture. (Reprinted from May M, Levine RE, Patel BCK, Anderson RL: Eye reanimation technique. In May M, Schaitkin BM [eds]: The Facial Nerve. New York, Thieme Medical, 2000, p 710.)

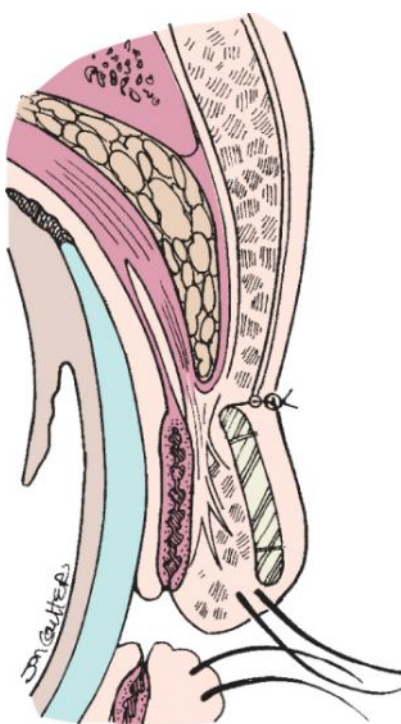


Figure 99-3 Superficial placement of the weight or dissection too close to the lash line will produce cosmetic disfigurement and increase the risk of extrusion. (Reprinted from May M, Levine RE, Patel BCK, Anderson RL: Eye reanimation technique. In May M, Schaitkin BM [eds]: The Facial Nerve. New York, Thieme Medical, 2000, p 710.)

Two sutures are used for fixation inferiorly. Although some authors prefer to suture to the levator aponeurosis,^[1] suturing to the soft tissues overlying the tarsus is also acceptable.^[5] Kao and Moe have described a retrograde implantation technique that has certain advantages but may produce a more apparent surgical scar^[5] ([see Video 99-1](#)).

Lower Eyelid Procedures

Many procedures have been described for lower eyelid reanimation, including the Bick procedure (Fig. 99-4), lateral tarsal strip, medial and lateral canthopexy, cartilage grafting, precaruncular medial canthopexy, and transorbital canthopexy.

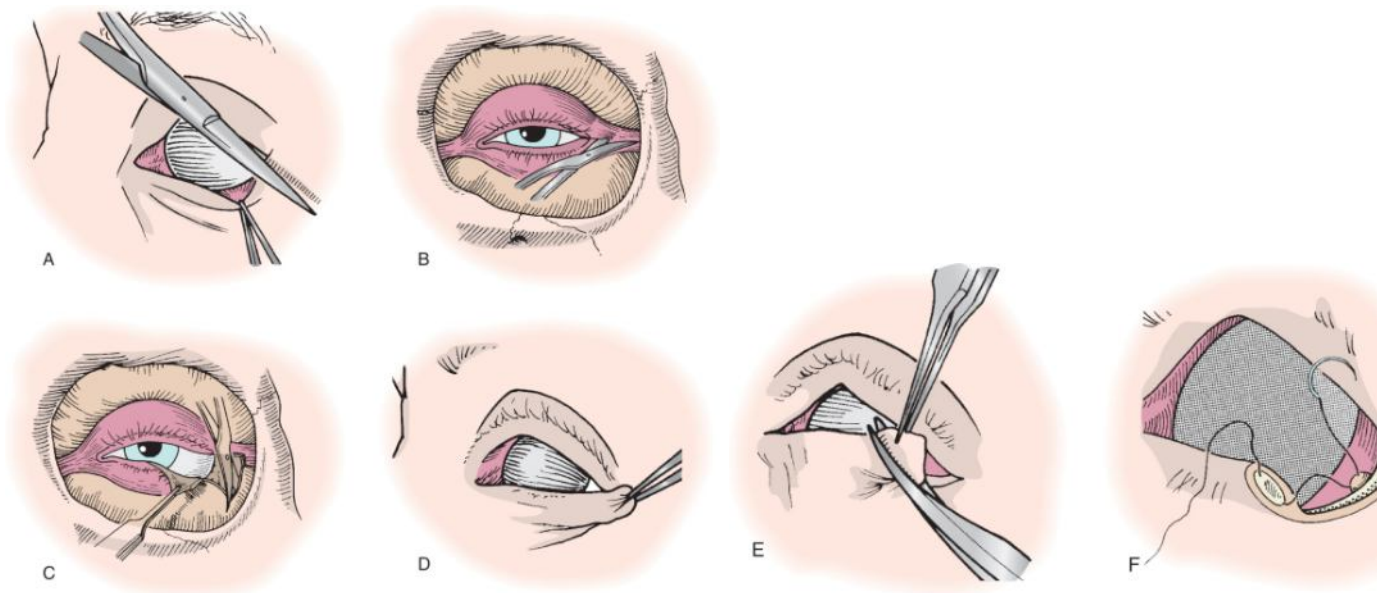


Figure 99-4 Lower lid tightening procedure (modified Bick). **A**, The procedure is performed under local anesthesia with a corneal protector. The lateral canthal incision follows the relaxed skin tension lines. **B**, The anatomy of the lateral canthal tendon is understood during the procedure. **C**, Scissors complete the lateral canthotomy and inferior cantholysis. **D**, The lower eyelid is pulled laterally to achieve shortening without distorting placement of the punctum, which would lead to epiphora. **E**, The excess skin is resected. **F**, Absorbable 4-0 suture is used to reattach the new lateral margin of the tarsus to the orbital rim. (Reprinted from May M, Levine RE, Patel BCK, Anderson RL: Eye reanimation technique. In May M, Schaitkin BM [eds]: *The Facial Nerve*. New York, Thieme Medical, 2000, p 739.)

The surgeon should have intimate knowledge of the anatomy of the eyelids before performing lower eyelid reanimation, including the orbicularis oculi muscle, the medial and lateral canthal tendons and their attachment sites, the tarsal plate, and the lacrimal system.^[6] Preoperative assessment, in addition to upper eyelid and brow recommendations, should include rotation of eyelid position relative to the limbus, position of the punctum, results of a snap test, and medial and lateral distances between the upper and lower eyelids.

The Bick procedure or any of its modifications allow tightening of the lower lid and suspension at a higher position to the lateral orbital rim. Patient who do not require skin excision to achieve this result may best be served with a lateral transorbital canthopexy.^[7] The procedure begins with a 1.5-cm lateral canthotomy and cantholysis to expose the periosteum of the lateral orbital rim. The lid is tightened to achieve the desired snap without significant displacement of the punctum of the lower lid. A full-thickness wedge resection is then designed and executed with fine scissors. This creates a free edge of tarsal tissue that can be resuspended with 5-0 nonabsorbable suture to the lateral orbital periosteum. The soft tissues require minimal absorbable sutures for reapproximation.

PEARLS

- The otolaryngologist must acquire familiarity with this anatomy.
- Preoperative weight selection is important to avoid ptosis or incomplete closure.
- Gold weights must be sutured in place.
- Neglect of the position and function of the lower eyelid will lead to imperfect results.

PITFALLS

- Surgically corrected brow position can make eye closure difficult.
- Patients without eventual neural recovery will undergo atrophy over time, which can make upper lid loads more apparent.
- Patients who are allergic to gold can be transitioned to platinum.
- If the lower eyelid is tightened too much, it will ride underneath the equator of the globe and provide a poor cosmetic and functional result.