

# The Endoscopic Brow Lift

## 13 caveats to success

by Guy G. Massry, MD, and Paul S. Nassif, MD, FACS

Over the past decade, forehead and eyebrow rejuvenation surgery have changed significantly. The eyebrow lift—a procedure once considered traumatic, invasive, fraught with lengthy postoperative rehabilitation, and burdened by complications objectionable to the aesthetic patient (such as hair loss, anesthesia, and scarring)—has become a surgical procedure welcomed by both surgeons and patients. This has occurred as a result of the development of the endoscopic technique of eyebrow lifting. As with all new surgical procedures, a period of trial and error and a steep learning curve are inherent in the development and improvement of the technique. This has been especially true of the endoscopic brow lift, since most cosmetic surgeons (regardless of background and specialty training) were not familiar with this technology when the procedure emerged. In the development of all new technologies, perseverance, hard work, diligent study, and observation will eventually define their significance, worth, and feasibility. This has held true for endoscopic brow lifting. Contemporary surgeons who routinely perform the procedure have found that it is an integral part of their surgical armamentarium, and that it has revolutionized, modernized, and simplified eyebrow lifting surgery.

At our practice we have been performing endoscopic brow lifts since 1996. Over the past 5 years, our surgical volume for the procedure has been significant and steadily increasing. Our surgical techniques are nearly identical, and our combined clinical observations for the procedure have led us to develop a series of key caveats that we feel are important to the success of any surgeon who currently performs the procedure or is interested in learning it.

**1** Educate yourself through knowledge and practice. Today, it is not uncommon for physicians to take an intensive course in a particular surgical technique and then begin performing it on a routine basis. In many instances, there is nothing wrong with this, as most procedures are outgrowths of standard surgical techniques learned during one's training. This, however, is not the case with endoscopic surgery. In using this technology, one must become familiar with new instrumentation, with holding instruments at a distance from the surgical site, with performing surgery in a closed space, with depending on a video monitor to view the field, with reduced tactile sensation during surgery, and with an appreciation of deep anatomic planes rather than anatomy from the skin down.

Under the best circumstances, this can be frustrating, even to the most seasoned surgeons. We believe that the best way to make the transition into endoscopic surgery is through appropriate preparation (knowledge of the current literature and anatomy), by participating in an endoscopic brow lifting course, and by observing and performing a number of procedures with a surgeon who has experience with the technique. Then, and only then, should you attempt to perform the endoscopic brow lift as the primary surgeon.

**2** Precise incisional markings are unnecessary. We routinely use three incisions (one midline and two temporal) as entry points for instrumentation and fixation points during surgery. The anteroposterior midline incision is approximately 2 cm posterior to the hairline and is 1 cm in length. The temporal incisions are 3 cm in

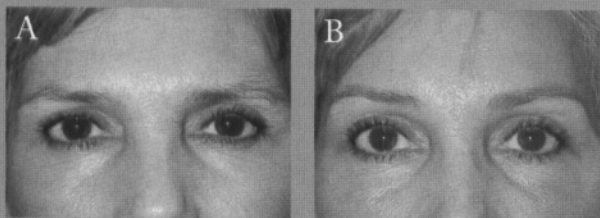
length and are approximately 2 cm posterior to the hairline. The key to obtaining a natural-looking brow is creating a temporal incision parallel to the tail of the brow, with its medial extent at the temporal conjoint fascia. It is not necessary to mark the incisions before surgery, as their locations can vary without affecting the outcome.

**3** Use high-volume, low-concentration local anesthetics. The most important surgical aspect of a successful outcome is creating an environment that allows a clear view during surgery. It is critical to create a bloodless field. We have found that injecting two different concentrations and volumes of local anesthetics can attain this goal. The local anesthesia consists of 15 mL of 1% xylocaine with 1:100,000 epinephrine. This is injected at all incisional sites, along the orbital rim where deep tissue release is to be performed, at the central glabellar musculature, and for supraorbital and supratrochlear nerve blocks.

The rest of the central forehead, parietal scalp, and temporal region are infiltrated with approximately 30 to 40 mL of 0.25% lidocaine with 1:800,000 epinephrine or with a solution consisting of 500 mL of normal saline mixed with 0.5 mL of 1:1,000 epinephrine, 5 mL of sodium bicarbonate, and 25 mL of 2% lidocaine without epinephrine. The high volume of this solution creates a vascular tourniquet and augments the hemostatic effect of the first (higher-concentration) epinephrine injection.

**4** Avoid excess cautery, temporal scalp excision, subcutaneous sutures, or rigid fixation of the scalp. A major complaint following traditional bicoronal brow lift surgery is hair loss. Using the endoscopic technique, smaller incisions are made, so less alopecia is seen. To further reduce the incidence of this complication, avoid cautery to the incision sites, direct the incisions in line with the hair shafts (not through them), do not excise temporal hair-bearing scalp to aid in brow elevation, do not use subcutaneous sutures to close the temporal incision sites, and do not perform rigid fixation of the scalp.

### Before & After



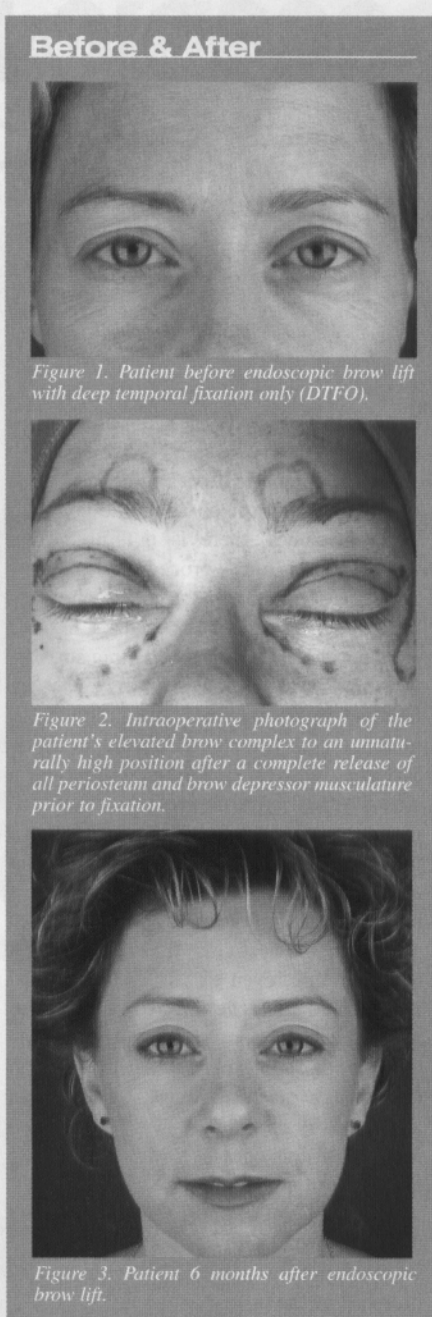
53 year-old woman who had previous upper blepharoplasty and complained of heaviness to her brows, which she felt descended after blepharoplasty. (A) Before, and (B) 8 months after bilateral endoscopic brow lift.

In general, the less manipulation of the surgical wound, the less chance of hair loss. We feel that this is an absolute dictum during surgery. If these guidelines are followed, hair loss should be nearly nonexistent.

**5** Be aware that periosteal release is a necessity, but temporal suborbital orbicularis oculi release is also essential. An emphasis on complete periosteal release (elevation, incision, and spreading) has been stressed since this procedure was first described.<sup>1</sup> While this is a critical step in the surgical technique, it does not, used alone, lead to sustained long-term brow elevation. During the postoperative phase, creating unopposed elevation of the temporal brow until it scars into place is critical. To achieve this, one must strip the only temporal brow depressor (the temporal orbital orbicularis oculi muscle). We spread and release the muscle until the yellow brow fat pad is exposed. This additional step in periosteal and central brow-depressor musculature release has been the most important component of the surgery that we have identified. It has not only stabilized long-term brow position, but has also obviated the need for paracentral bony fixation.

**6** Remember that bony fixation is unnecessary and only leads to complications. Rigid fixation of the scalp, using staples behind screws (most common) or other techniques, puts undue tension on the scalp skin and hair follicles. This invariably leads to hair loss and scarring. With a complete release of periosteum,<sup>2</sup> central brow-depressor musculature, and lateral supraorbital orbicularis oculi muscle (caveat 5), the entire brow complex will be elevated to an unnaturally high position without any tension (see figure 1) and eliminate the need for paracentral fixation (caveat 8). Avoiding this step reduces complications, shortens surgical time, does not adversely affect outcomes, and makes the procedure more acceptable to patients.

**7** Avoid glabellar muscle excision. A complete central brow depressor (corrugator supercilii, procerus, and depressor supercilii) myectomy may lead to indentations and depressions in the glabellar and medial brow skin, prolonged sensory deficits, and unexpected intraoperative bleeding. If medial brow elevation is needed, a complete myotomy of the medial brow depressors is performed. Conversely, if little or no medial brow elevation is needed, a limited myotomy is performed. The most important point that we want to stress is that the release of all brow depressors creates unopposed elevation of the medial and central brow during healing. Inevitably, glabellar musculature function returns after a few months. We tell patients that the procedure



elevates the ptotic brow. We do not suggest that it consistently eliminates frown lines. Patients are instructed that botulinum toxin is an excellent adjunct to surgery if the desire is to reduce frown lines.

**8** Deep temporal fixation only (DTFO) using absorbable sutures is all that is needed to maintain brow height. We only fixate the released composite temporal flap. Brow fixation is achieved by securing the superficial temporal fascia medially to the deep temporal fascia in a superolateral vector with two 2-0 polydioxanone horizontal mattress sutures while the brow is lifted suprolaterally and overcorrected. Permanent suture fixation can lead to possible long-term suture extrusion, granulomas, palpable masses, and tenderness.

**9** Overcorrect brow height. As with traditional brow lifting techniques, a degree of overcorrection of brow height is necessary to compensate for the inevitable drop in postoperative brow height. If a complete release of all periosteum and brow-depressor musculature is performed, the entire brow complex will be elevated to an unnaturally high position. Even with overcorrection, the brow tends to settle to an optimum position within the first postoperative month. While we have had patients desire a higher brow than has been obtained through surgery (usually an overexaggeration of normal brow position), the opposite has not occurred. Therefore, do not be concerned with what appears to be an overly elevated brow during the immediate postoperative period.

**10** Note that botulinum toxin is an excellent adjunctive treatment during the preoperative or postoperative period. It can be used during the preoperative period to weaken (cause atrophy of) the supraorbital orbicularis oculi and glabellar musculature. This appears to make the release of these muscle groups easier. We prefer not to use botulinum toxin preoperatively, however. If an inadvertent ptosis were to occur, it might require delaying surgery (especially if blepharoplasty is being added).

Botulinum toxin may be used synergistically with the surgical release of the brow-depressor musculature in an effort to weaken the inferior vector forces and promote the maintenance of the newly elevated brow. Botulinum toxin is used to block the depressor function of the corrugator supercilii, procerus, depressor supercilii, and lateral supraorbital orbicularis oculi muscles.<sup>3</sup> Patients are injected with botulinum toxin 1 to 2 weeks following surgery. The corrugator, procerus, and depressor supercilii muscles are typically injected with a total of 18 units of botulinum toxin, and the lateral supraorbital orbicularis oculi muscles (lateral brow depressors) are injected with 4 to 6 units of botulinum toxin on each side. In these areas, botulinum toxin helps to ensure unopposed frontalis-muscle action (elevation of the brow) during the critical healing period after surgery; consequently, no botulinum toxin is injected into the frontalis muscle. We have not found an increased risk of diffusion and ptosis from the injection of botulinum toxin following surgery.

**11** Be aware of, but do not fear, neurological deficits. Permanent motor damage is rare. Sensory deficit is common and usually temporary. Motor nerve injury to the frontal branch of the facial nerve is a rare occurrence. When it does occur, it typ-



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ically results from the dispersion of heat from cautery to the superficial temporal vein, from undue upward traction on the flap, or from inadvertent dissection in an inappropriate plane. In our experience, motor injury has occurred in less than 2% of cases and has universally been resolved during the first 4 to 6 weeks following surgery, with or without the use of oral steroids.

Sensory deficit is common after surgery. We have found that at least 50% to 75% of patients describe some form of paresthesia. These changes include decreased sensation (most common), tingling, and itching, which is the most troublesome (and, fortunately, rarest) symptom. Sensory changes can last up to 6 months. Usually paresthesias subside first in the forehead, next in the temples, and last in the rest of the scalp.

**12** Postoperative dressings can increase periorbital swelling and ecchymosis. We have found that compressive forehead dressings increase periorbital swelling and bruising. If bleeding may be a problem, place a 10 French drain into the right temporal incision and run it along the orbital rim until it reaches the opposite temporal wound (at the canthus). The drain is removed 24 to 48 hours following surgery. One of the authors (PSN) routinely uses plasma with good results. In either case, we find pressure dressings to be unnecessary.

**13** Be careful when adding blepharoplasty. When blepharoplasty is added to a brow lift, careful attention must be given to creating an unnatural appearance, and preventing eyelid closure. When the brow is lifted, the underlying brow fat pad is also elevated. This, in itself, hollows the sulcus to a degree. When blepharoplasty is performed simultaneously, sulcus deficiency can easily occur and be a significant problem (especially nasally and centrally). To avoid this, conservative amounts of skin, mus-

cle, and fat should be excised. In addition, the combination of elevating the brow and excising anterior lamellar eyelid tissue can easily lead to lagophthalmos. This can occur when adequate skin for eyelid closure exists (resulting from orbicularis dysfunction). When we combine these procedures we do not excise orbicularis muscle. We believe the combination of brow lift and blepharoplasty adequately debulks the eyelid so that the orbicularis excision is superfluous and can only lead to eyelid closure difficulties.

The endoscopic brow lift has become an essential tool of the facial cosmetic surgeon. It has transformed the brow lift into a procedure that is minimally invasive and performed through small incisions. The caveats described above are based on observations developed over time, with experience. We believe that if one follows these guidelines, consistent, reproducible, and superior results may be achieved. ■

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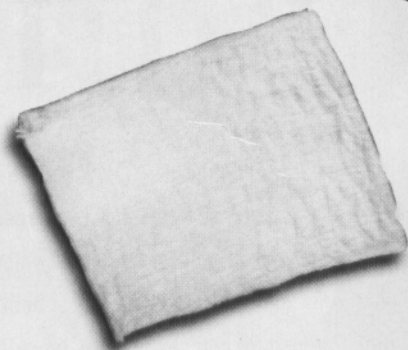
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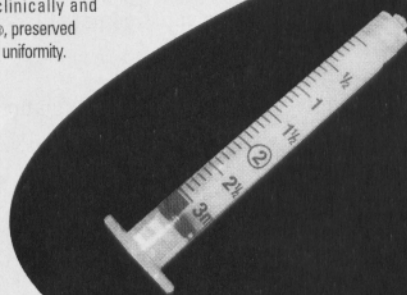
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