



Our Experience with Brow Ptosis Correction: A Comparison of 4 Techniques

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Background: Brow elevation is one of the goals of surgical rejuvenation procedures. In this article, the authors reviewed their experience with brow lift, and they compared 4 different techniques: direct brow lift, brow lift with endotine ribbon device, brow lift with temporoparietalis imbrication, and brow lift with Mersilene mesh to provide long-lasting results.

Methods: This is a retrospective study of 80 patients (20 for each group), aged between 48 and 75 years undergoing brow lift surgery, between January 2011 and January 2013. In all cases, the brow lift was associated with an upper blepharoplasty. The amount of brow elevation reduced was assessed by comparison of the preoperative and postoperative vertical distances between the superior eyebrow hairline and the midpupil and lateral and medial canthal angle. The average follow-up period was 18 months.

Results: No incidences of infection, alopecia, or excessive scarring were noticed. The main complication associated with direct brow lift was visibility of the scar in 2 patients. One patient treated with brow lift with suture had recurrent eyebrow ptosis. Transient frontal paresthesia was noticed in 1 case treated with endotine ribbon device and in 1 case treated with Mersilene mesh, but this sensation returned by 6–12 weeks.

Conclusions: In our experience, there does not exist a technique better than the other, but the best procedure depends on eyebrow contour, sex and age of the patient, magnitude of desired correction, presence or absence of patient's hair, and patient's expectations. (*Plast Reconstr Surg Glob Open* 2015;3:e337; doi:10.1097/GOX.0000000000000310; Published online 30 March 2015.)

The brow lift is an essential element in the rejuvenation of the aging face. As people age, brow ptosis occurs to varying degrees, changing the shape and position of the brows.¹ Various techniques have been described for periorbital rejuvenation and correction of ptotic brow, including the coronal brow lift, the endoscopic brow lift, the anterior hairline forehead plasty, in the subgaleal, subperiosteal, or subcutaneous planes, the subcutaneous temporal brow lift, the

transpalpebral brow lift, and the direct brow lift,^{2,3} with their advantages and limitations. Many differences can be observed in the type of incision and in the plane of dissection, but all of them have a common denominator: an unpredictable degree of relapse. Recurrent eyebrow ptosis mostly occurs because of fixation failure caused by using too weak materials.⁴ The authors reviewed their experience with brow lift, and they compared 4 different techniques: direct brow lift, brow lift with endotine ribbon device, brow lift with temporoparietalis imbrication, and brow lift with Mersilene mesh (Ethicon Johnson & Johnson Medical Ltd., New Brunswick, N.J.) to provide long-lasting results and to understand potential differences in long-term stability and the effectiveness in the lifting of different segments on the basis of the presurgical diagnosis.

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PATIENTS AND METHODS

A retrospective study on consecutive 80 patients (20 for each group), aged between 45 and 75 (average age of 61) undergoing brow lift surgery, between January 2011 and January 2013 was performed. All patients were treated under local anesthesia and conscious sedation. In all cases, the brow lift was associated with an upper blepharoplasty. Full-size, 1:1, standardized black-and-white photographs (Frankfort horizontal plane) were taken of each patient before surgery. An additional set of photographs was taken postoperatively. The postoperative photographs included at least 1 image with a scale (cm and mm) to validate measurement accuracy. The distance between a horizontal line drawn through the medial canthus and the eyebrow superior margin was measured on each side of the before and after images:

1. At medial canthus level.
2. At mid-pupil level.
3. At lateral canthus level.

The measurements were recorded and compared. To analyze the statistical variability between preoperative and postoperative measurements, the authors applied the paired *t* test. A value of $P < 0.05$ was considered significant.

The postoperative follow-up was 12–24 months, with an average of 18 months.

Technique

When the direct brow lift is performed, the operative technique is the following: while the patient is awake and in a tending position the new brow form and position including the amount of skin resection and brow thinning, are drawn.⁵ After infiltration of 1% lidocaine with 1:500,000 adrenaline, the skin is excised holding the blade of the scalpel parallel to the axis of the eyebrow hair shaft and taking care to deepen the resection not beyond the subcutaneous fat to avoid injuring the sensory and motor nerve endings. The orbicular muscle is never resected. A narrow undermining below the eyebrow is performed. This maneuver frees the brow, ensures better scar stability during the healing process, and reduces the risk for recurrence of brow ptosis. The wound margin is sutured with a few single stitches with vicryl 4/0. Then, the intradermal suture with monocryl 5/0 is performed. An upper blepharoplasty can be performed at the same time.

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When the 3 different fixation techniques for the temporal brow lift are performed, after local infiltration, bitemporal 3–4cm incisions were placed 2cm behind and parallel to the hairline. Through the temporal incision, dissection was carried out superficially to the deep temporal fascia and extended until the temporal crest and inferiorly along the superior and lateral orbital rim and the anterior third of the zygomatic arch. The conjoined fascia was taken down lateral to medial and superior to inferior under direct visualization. Thus, a frontotemporal flap was created through a combination of subperiosteal and superficialis temporalis fascia dissections changing along the temporal crest. This entire structure was released to obtain optimal elevation of the lateral brow. Then, an upper blepharoplasty was performed at the same time.

If brow lift with endotine ribbon was performed, its full length of 15.5cm was shortened to 5–6cm, thus obtaining 2 devices that can be used for both sides. Then, the shortened ribbon was set and anchored by its holes to the deep temporal fascia with 4-0 polydioxanone mattress sutures. The lateral temporal flap was pulled along a traction vector of 45 degrees, and the height and shape of the brow were evaluated. When the desired lifting was achieved, digital pressure was used to ensure penetration of the temporalis superficialis fascia on the ribbon tines.¹

When the brow lift with Mersilene mesh procedure was applied, the superior orbital rim was exposed a little more extensively, thus the supraorbital nerve was identified, where it arises from the frontal bone, and preserved.⁴ Then, a mesh strap, 3cm in width, was placed into the dissected tunnel. The caudal end of the mesh was sutured to the undersurface of the superior margin of the orbicularis oculi muscle. Then an ideal eyebrow position was obtained by traction of the cephalic end of the mesh suspender. At this point, it is possible to modify also the central and lateral brow shape, modulating the mesh tension more laterally or medially. Finally, the cephalic end of the mesh was fixed to the deep temporal fascia using 4-0 running polydioxanone suture.

If the suture technique was chosen, a lateral temporoparietalis fascial flap was obtained and a suspension fixation was performed by means of superficial temporal fascia/deep temporal fascia imbrication with nonresorbable 4.0 Prolene stitches (Ethicon Johnson & Johnson Medical Ltd., New Brunswick, N.J.).⁶ Very limited removal of scalp excess was performed in all 3 techniques, avoiding any superficial tension that instead appeared uniformly distributed along the entire length of the flap. The scalp incisions were closed with a running 4-0 Vicryl suture (Ethicon Johnson & Johnson Medical Ltd., New Brunswick, N.J.).

RESULTS

The paired *t* tests, on raw measurement data, a statistically significant variability in the 3 portions studied ($P < 0.001$). The main complication associated with direct brow lift was visibility of the scar in 2 patients. One patient treated with temporoparietalis fixation had recurrent eyebrow ptosis. Transient frontal paresthesia was noticed in 1 case treated with endotine ribbon and in 1 case treated with Mersilene mesh, but this sensation returned by 6–12 weeks. In our study, the direct brow lift, endotine lift, and brow lift with Mersilene mesh gave long-lasting results over time compared with suture technique. The average elevation of the lateral and medial portion of the eyebrow is comparable with these 3 techniques. With the direct brow lift and Mersilene mesh, fixation is possible to obtain global brow reshaping. Clinical photographs from 2 patients in our series can be seen in Figures 1 and 2.

DISCUSSION

Multiple and diverse techniques continue to be advocated by various authors to obtain the optimal brow lift, and no single technique has completely satisfied the demands of surgeons.

As many factors are involved in selecting the best procedure for the patient, it is critical to understand how each one of these techniques can determine the final cosmetic and functional outcome.⁷ In our experience, the direct brow lift was the first choice especially in male patients with baldness or high anterior hairline (major or equal to 10 cm) and with brow asymmetry. When the entire eyebrow must be lifted, the direct brow lift is the best technique. This procedure is also useful in brow asymmetry because it allows a degree of control when determining the vector and extent of the lift.⁸ The surgical technique with endotine ribbon permitted a vector of traction lateral, making an angle of 45 degrees with a horizontal plane. This vector is pulling obliquely in a lateral direction almost along the temporal crest and it gives a good elevation of lateral brow and a good even if more limited lifting in the central portion.

The technique with a permanent Mersilene mesh exhibited a good lifting of the lateral brow and a more sensible elevation of the central brow compared with the endotine ribbon. In fact, by suturing the caudal portion of the mesh behind the orbicularis muscle, the medial end of this device can be pushed near the eyebrow body. With the mesh device, it is possible to elevate the brow and at the same time to reshape the entire arch.⁹ Moreover, during surgery, it is possible to check the brow's lift and evaluate the symmetry. The technique with the suspension suture instead is both temporal and spatial limited. In fact, it results in



Fig. 1. Preoperative (A) and 1-year postoperative (B) frontal view of a 43-year-old patient with severe asymmetry of the brows. The direct brow lift was performed on the right side only to correct the asymmetry.

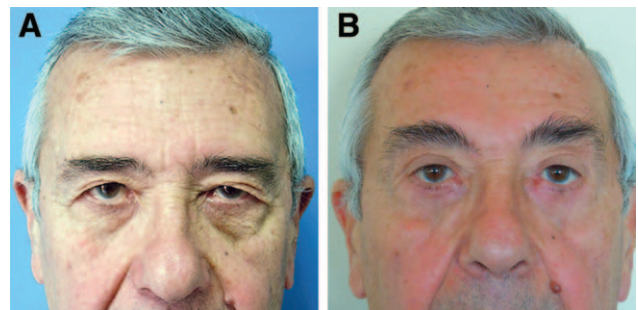


Fig. 2. Preoperative (A) and 1-year postoperative (B) frontal view of a 63-year-old patient treated with Mersilene mesh and the upper blepharoplasty.

a good elevation of the lateral portion of the brow at the beginning, but this result is limited in the central brow. Moreover, in this study, we noticed a certain degree of relapse in the medial and lateral region after 1 year, giving the relatively recidivism of the brow ptosis.

CONCLUSIONS

In summary, there does not exist a technique better than the other, but the best procedure depends on eyebrow contour, sex and age of the patient, magnitude of desired correction, presence or absence of patient's hair, and patient's expectations.

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REFERENCES

1. Pascali M, Gualdi A, Bottini DJ, et al. An original application of the Endotine Ribbon device for brow lift. *Plast Reconstr Surg*. 2009;124:1652–1661.
2. Passot RL. *Chirurgie Esthétique Pure: Techniques et Résultats*. Paris: Gaston Dorn et Cie; 1930.
3. Guyuron B, Davies B. Subcutaneous anterior hairline forehead rhytidectomy. *Aesthetic Plast Surg*. 1988;12:77–83.

4. Mutaf M. Mesh lift: a new procedure for long-lasting results in brow lift surgery. *Plast Reconstr Surg.* 2005;116:1490–1499; discussion 1500–1501.
5. Feinendegen DL. The direct brow-lift using the flat incision technique. *Aesthetic Plast Surg.* 2012;36:468–471.
6. Tuccillo F, Jacovella P, Zimman O, et al. An alternative approach to brow lift fixation: temporoparietalis fascia, galeal, and periosteal imbrication. *Plast Reconstr Surg.* 2007;119:692–702.
7. Georgescu D, Anderson RL, McCann JD. Brow ptosis correction: a comparison of five techniques. *Facial Plast Surg.* 2010;26:186–192.
8. Bidros RS, Salazar-Reyes H, Friedman JD. Subcutaneous temporal browlift under local anesthesia: a useful technique for periorbital rejuvenation. *Aesthet Surg J.* 2010;30:783–788.
9. Hintschich CR, Zürcher M, Collin JR. Mersilene mesh brow suspension: efficiency and complications. *Br J Ophthalmol.* 1995;79:358–361.