

## Imbrication and Double Imbrication Fixation Technique in Endoscopic Face Lifting

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### ABSTRACT

Efficacy of endoscopic face lift technique is dependant on complete release of the brow at the supra orbital rim, brow depressor muscle resection and tension free fixation of the brow position until healing has occurred. In the midface adequate release of the cheek from the bone and fixation are mandatory. The techniques of dissection and release have been extensively explained in the literature and have become a standardized method. Still, there is much controversy about the best technique for the soft tissue fixation. In this study the author presents a simple imbrication method using Gor-Tex sutures. With the aid of Fournier's needle and these permanent sutures the endoscopic midface and forehead lift became simplified and reliable. Thirty one cases are presented in this study. In the first 5 cases the forehead was fixed using the cable stitch of Isse. In the following 26 cases the author used the imbrication technique. The long term stability of the results was achieved up to 3 years.

### INTRODUCTION

Endoscopic brow lift is a safe and an effective technique for increasing mean pupil to brow height. It is gaining acceptance as a method of elevating the brow without the morbidity of a bicoronal incision. Core et al. [1] described the endoscopic coronal lift. Later, Isse [2] and Rameriz [3,4] described the subperiosteal dissection. It consists of ablation of the brow depressor muscles, that may be accomplished through release, division or resection of the corrugators supercilii, procerus and depressor supercilii and fixation of the brow at an elevated position. Although it has become a well-established procedure for restoring a youthful face, considerable debate has arisen over the various fixation techniques [5].

The various available techniques of fixation have been comprehensively reviewed by Rohrich and Beran [6]. They include bolsters, [7] posts, [8] resorbable screws, [9-11] pins [12] and tacks, [13] Kirschner wires, [14] frontal periosteum and galea to occipital periosteum and galea suturing, [15] tissue adhesives, [16] transcalvarial suture fixation,

[5] lateral spanning suspension/subperiosteal pulling sutures, [17] fibrin glue, [18] cortical v-shaped tunnels, [19] lateral fixation from the galea to the deep temporal fascia and central bony fixation in the parasagittal position, [20] the use of skin staples secured behind screws anchored in the calvarium, [21] V-Y suture techniques of the linear wound, direct approximation of the anterior scalp to the posterior scalp and finally, no fixation at all. Still there is no standardized technique for fixation as each has its drawbacks and disadvantages.

In this article, we blend different techniques of endoface lifting to take the merits of each one. In addition, we apply a new simplified method by imbricating the galea-periosteum-scalp complex using Gor-Tex permanent sutures with the aid of Fournier's needle.

### MATERIAL AND METHODS

Thirty one cases were done from June 2003 till December 2006. Twenty eight cases were females and 3 males. Their ages ranged between 42 and 71 years. Endoscopic subperiosteal forehead and midface lift was done in all cases. All cases had lipoinjection as ancillary procedure in different parts of their faces. In 26 cases the procedure was combined with neck lift and blepharoplasty. These were the older group over 49 years of age.

Preoperative assessment is initially performed to define the adequate brow elevation vectors and their location in the forehead. All cases were assessed by their pre- and post-operative photographs and follow-up was continued from 6 months to 3 years.

The instruments used are minimal, two periosteal elevators, a Fournier's needle, a 30 degrees wide angled endoscope lens and sheath retractor. The CV-3 Gore-Tex permanent suture was used for fixation (Fig. 1).

The incisions are 5 in the scalp (two temporal, two paramedian and one in the middle) and one intraoral opposite upper canine on both sides.

In all cases dissection and muscle ablation was done by the standard subperiosteal endoscopic face lift technique of Rameriz [4,5,7]. In the forehead tissue imbrication using the Fournier's needle was the method of fixation (Fig. 2).

#### *The Imbrication and double imbrication technique:*

The Gor-Tex suture is first threaded in Fournier's needle then the needle is introduced into the scalp through the midline incision. Bites of scalp-galea-periosteum complex is taken, with the aid of the needle, in the manner of a running stitch at the level of the hair line. The thread is then retrieved through the right temporal incision. It is passed again, with the help of Fournier's needle, under the galea-periosteal flaps, passing directly over the bone to resurface from the opposite temporal incision. It is introduced one last time through the temporal incision to finally come out from the midline incision taking with it bites of galea-periosteum complex (Figs. 2,3). When the 2 ends of the sutures are tightened, pleating of the forehead occurred in a uniform pattern while raising the eyebrows in a uniform way. This technique is easy to perform, consumes less operative time and prevents the deep pleat that occurs with Isse's technique. The whole length of the eyebrow is raised and not just the tail and the tension is distributed over a large area of the galea-periosteum complex and not just at the 2 ends of the temporal incision (Fig. 3). When there is asymmetry of the eyebrows a modification is done using 2 separate sutures, one on each side of the forehead. It is introduced through the midline incision, retrieved from the temporal incision taking with it bites of galea-periosteum complex. The cortex is then re-introduced through the temporal incision subperiosteally to come out this time from the midline incision. The procedure is repeated on the other side. We end up with 2 sutures that need to be tied from the midline incision. The sutures are then tied separately in different degrees to raise each brow independent of the other (Fig. 4).

In midface suture suspension was done with the aid of the Fournier's needle using the CV-3 Gor Tex permanent suture. Two suspension sutures were used for each cheek. The placement of the first suture was in the cheek at a point where the horizontal line from the oral commissure intersects the vertical line of the lateral canthus. The second suture is placed one cm lateral to the first one (Fig. 5). Both sutures were anchored to the deep temporal

fascia using an interlocking mattress suture to prevent cutting through the temporalis muscle.

After the endoscopic brow lifting is performed the galea and skin are closed in layers. The author does not excise the excess hair bearing scalp so as not to cause alopecia. It is rather the galea than is excised and placing tension stitches with 2/0 vicryle on it. Next the hair bearing scalp is left to redrape comfortably (Fig. 6).

The forehead and cheeks are taped with micropore for 2 days. No drains were left. The patients were given combination antibiotics and mouth wash for 1 week.

## RESULTS

In a 4-year period from June 2003, 31 patients underwent endoface lifts. The first 5 cases were done using the cable stitches in the forehead after the technique of Isse [2]. In the other 26 cases the imbrication technique was used. All operations were performed with the patients under general anesthesia. The mean follow-up period was 2 years. Satisfactory forehead rejuvenation was obtained in all patients with correct eyebrow movement. Correction of brow asymmetry was obtained in all patients using the double imbrication technique (6 cases).

The sagging of the eye brows, lateral canthus, eyelid hooding, increased length of lower eyelid, tear trough deformity, increased depth of nasojugal and prominent nasolabial folds, depressed angle of mouth and even the jowls improved in all cases (Figs. 7,8). The eyebrow asymmetry was corrected using the double imbrication technique (Fig. 9). The results were maintained throughout the study period.

There were no reports of excessive elevation of the eyebrows, shifting of the hairline or alopecia.

In two cases mild erythema occurred in the cheek which resolved with antibiotics. After that a combination of Gram +ve and Gram -ve antibiotics was given routinely postoperative together with a mouth wash. Five cases had numbness in the upper lip which resolved spontaneously in 3 months. One case had decreased movement in one eyebrow which also resolved in 3 months.

In the 26 cases that were done by the imbrication technique there was no complaint of the folding that occurred in the forehead using Isse's technique. It was also noticed that with the cable sutures only the lateral part of the brows were raised but with the imbrication technique the whole length was raised in a uniform manner even the medial part (Figs. 3,4,10).



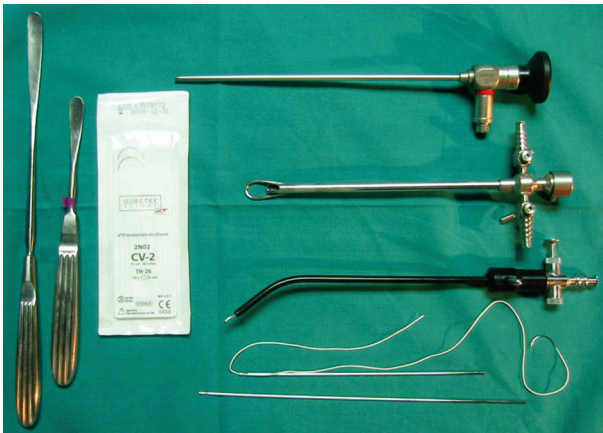


Fig. (1): Instrumentation.

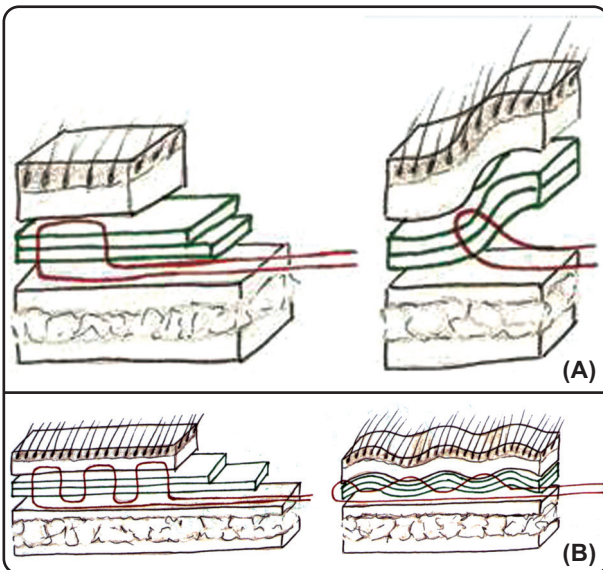


Fig. (2): Comparison between the cable sutures of Isse (upper 2 diagrams) and imbrication technique (lower 2 diagrams). The cable sutures leave grooves, while in the imbrication technique the excess tissue is distributed evenly on the forehead.

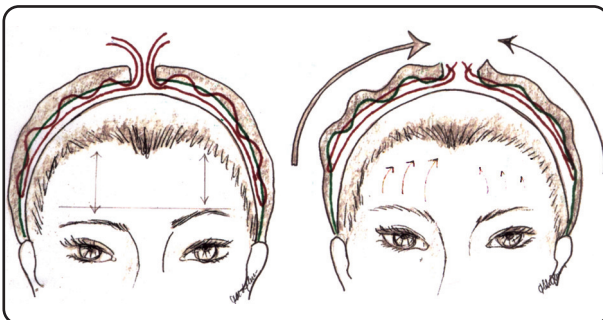


Fig. (3): The imbrication technique. Fournier's needle is introduced through the midline incision (A) to come out through the temporal incision (B), then it passes subperiosteally to come out of the other temporal incision (C). It then passes back to come out of the midline again

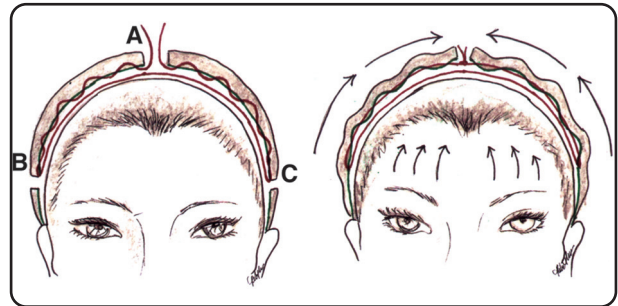


Fig. (4): The double imbrication technique using two separate sutures one on each side. The sutures are tightened with different degrees to raise one brow more than the other.



Fig. (5): The direction of introduction of Fournier's needle. Two suspension sutures were used for suspension of each cheek.

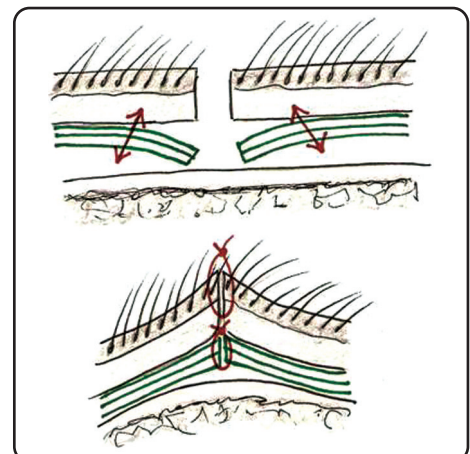


Fig. (6): Technique of scalp closure. The hair bearing scalp is not excised but rather the galea. When the galea is approximated no tension is transferred to the scalp where the excess forms a bridge.





Fig. (7): A 68 year old patient who requested facial rejuvenation. Endoscopic forehead and mid face was done. The procedure was combined with neck lift, reduction of the ear pinna and fat grafts in the face. Pre and 1 year post operative photographs.



Fig. (8): A 63 year old patient that underwent endoscopic forehead and mid face lift with blepharoplasty and fat transfer. The neck was not lifted. Pre operative, 3 and 19 months post operative photographs showing long term stability of the results.

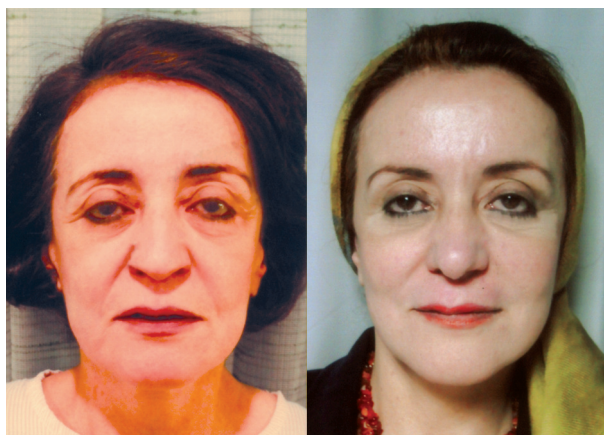


Fig. (9): A 56 year old female that had brow asymmetry which was corrected by the double imbrication technique. Pre and 8 months postoperative photographs showing stability of the results.



Fig. (10): Photograph showing the vertical fold that appears in the forehead after the cable suture. It is also noticed that only the lateral part of the brow is raised.

## DISCUSSION

There has been much debate about fixation methods in endoscopic brow lift [20-33]. The criticisms against most methods of fixation include failure to provide long-term results and alopecia. The best technique is yet to be determined. There is some evidence that fixation longer than a few days or weeks is needed [31]. The bolster techniques may lead to alopecia, presumably due to excessive tension and circulatory impairment. The external bolster has the disadvantage of applying its pull on the surface of the scalp rather than on the periosteal/galeal layer, where the long-term fixation of periosteum to bone will take place. It also

prevents patients from washing their hair for many days postoperatively (approximately 10 days) [6,20].

Screw technique is costly and requires patients to accept hardware protruding from their wounds. There is a possibility of placing the mini-screws too deeply and if placed in the midline, into the sagittal sinus. When incisions are placed on either side of the midline to avoid sagittal sinus, an additional scar is created and another screw is required. The patients especially those seeking esthetic surgery are reluctant to accept drill holes in their skulls and put screws.

Brow suspension methods that place the tension of the lift on the hair-bearing scalp may result in wider scars and alopecia. McKinney et al. [33] described an approach involving a tunnel, drilled in the outer cortex of the calvarium through which a suspension suture can be anchored. Later on, they described a modification to this technique [20]. They used lateral fixation from the galea to the deep temporal fascia and central bony fixation in the parasagittal position. Guyuron and Michelow [21] introduced a new tool specifically designed to make this tunnel drilling less problematic. Unfortunately, drilling a tunnel in the calvarium has some disadvantages as expense of implanted hardware and the concern of the surgeons that they are uncomfortable with neurosurgical procedures. The blind passage of a drill into the calvarium has the potential risk of perforating the inner calvarial table. It can also be difficult and awkward to pass the needle of a suspension suture through the tunnel [21].

Correct brow fixation to achieve the desired position depends on forehead fixation and maintenance of skin redraping until healing is complete [6,29-30]. By using the imbrication method we were able to achieve long term brow elevation with no recurrence and without the need of bone fixation methods. The vector of force is distributed along the whole forehead and transferred to the whole length of the eyebrow. This will result in a uniform lifting of the whole length of the eyebrow and not just the tail of it.

The versatility of the double imbrication technique is that it allows correction of asymmetric brows without the need for additional sutures or procedures.

We prefer the subperiosteal dissection [2,10]. The subperiosteal lifts are more stable and the reflective properties of the periosteum allow for lower-wattage light (approximately 150 W). The optical cavity is also more easily maintained [12].

The endoscopic technique allows the separation and repositioning of the periosteum of the orbital rims and zygomaxilla. Important technical details include complete release of the orbital rims, release of the nasal radix periorbital and release of the corrugator-procerus muscles.

Since the tension is on the galea-periosteum complex sparing the hair-bearing layer, no alopecia was observed (Fig. 6).

We had no recurrences of brow ptosis or failure of the procedure. With this procedure, complications are few and include swelling, periorbital ecchymosis and paresthesia to the forehead and scalp that last 2 weeks. Frontal paresthesia is resolved in 3 months. Apraxia of the frontal branch of the fascial nerve was seen in only one patient, who experienced spontaneous recovery after 6 weeks. This apraxia is due to the stretching of the nerve because of the skin elevator. That is why the time procedure must be quick. No complications were recorded that were directly related to this fixation technique. The position and shape of the eyebrows were aesthetically superior to those with previously attempted methods. In addition, patients are not burdened by bulky dressings, tapes, or external screws.

With this approach, we can avoid the associated concerns and expense of implanted hardware. We rely on the adequate soft-tissue undermining and release, the upward and lateral redraping of the undermined tissues and the stable fixation of the elevated tissue flaps [10]. We have observed satisfactory and long-lasting results. There is no limitation to the degree or direction of the pull on the brow; however according to our experience, we have found an overcorrection at the time of surgery is not needed. We did not have under- or overcorrection cases.

### *Conclusion:*

There are many ways to suspend the brow fixation. We describe an alternative method of fixation during endoscopic brow lift. This imbrication and double imbrication method allows specific suspension of the scalp-galea-periosteum complex with positive positioning until the third phase of wound healing is complete. It provides a straight forward, inexpensive, effective and secure system of fixation with the proper vector force without any risk of long-term postoperative complications from permanent indwelling devices. It is also a fast method as the whole time is about 1 and half to 2 hours.



We consider this approach to be a simple, rapid, secure and reliable forehead fixation method for endoscopic brow lift that allows satisfactory and long-lasting cosmetic results.

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