



Midface Lift through Lower Lid Blepharoplasty Incision

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Abstract

Background: Today's concept of facial rejuvenation emphasizes a harmonious natural look without the visible signs of surgery. Various techniques have achieved elevation of the midface in the pursuit of the anatomical repositioning of tissue congruent with youth. An open approach via the transcuteaneous blepharoplasty incision allows for direct fixation of tissues along the periosteum of the inferior orbital rim, respecting the vertical vectors and reshaping the face by restoring volume to the midface.

Methods: Between 2004 and 2011, 298 patients, (237 females and 61 males) underwent a midface lift through subciliary incisions of lower eyelid blepharoplasty, either with or without simultaneous endobrow lift, upper lid blepharoplasty, and/or lipofilling. In order to assess patient satisfaction, a telephone questionnaire was administered to 80 of the 298 total patients. To develop a more objective assessment of the results, 42 patients' photographs were randomly selected to measure and to quantify the improvement in the elevation of the midface.

Results: The majority of the interviewed patients (89%) were satisfied with their physical appearance and happy (77%) with the results one year post-op. Sixteen patients (20%) referred transitory minor complications as edema, chemosis and alterations of eyelid shape. No patients had to undergo surgical revision related to these complaints. Analysis of the measurements showed a positive correlation between patient satisfaction and quantifiable improvement. There was a reduction of the distance from the pupil to the nasojugal fold postoperatively compared to preoperative values, with $p < 0.001$.

Conclusion: The open subciliary supraperiosteal midface lift is an effective, low morbidity technique yielding high patient satisfaction.

Keywords: Midface lift; Lower lid blepharoplasty; Rejuvenation

Introduction

Today's concept of facial rejuvenation emphasizes harmonious natural looking without the stigma of surgery. Several techniques have thus far effected elevation of the midface through various approaches to anatomical repositioning of tissues. Currently, however, to achieve the signs of midface aging with a more natural result is entirely related to vectors and volume. Improved understanding of the facial aging process has led to the concept of repositioning volume as a three-dimensional tissue structure mobilized upward in a vertical direction [1]. Based on this concept, procedures for facial rejuvenation are in constantly evaluation. Techniques development began with Hinderer [2-6], a pioneer in anatomical description of periorbital region, and more specifically, the nasojugal groove. He described open surgical techniques for repositioning tissues in this region, via lower blepharoplasty incision.

Since 1991, in addition to the periorbital region, attention also turned to the midface, especially with the work of Isse [7,8] and Ramirez [9]. And also Graf [10], suggested endoscopic repositioning of mid facial tissues. New surgical principles were introduced, such as preservation and repositioning of the periorbital fat [11], treatment for muscles of glabellar region [12,13], and repositioning of orbicular is muscle and suborbicular is oculi fat (SOOF) [14-16]. The open approach discussed here, through lower blepharoplasty incision, allows direct fixation of tissues along inferior orbital rim periosteum, respecting vertical vectors, so the upper nasolabial fold and lid-cheek junction are directly improved [17].

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Figure 1: Standard measurement from pupil to nasojugal fold in photographs.

In order to obtain the desired lower eyelid tonicity and to maintain a natural and youthful aesthetic of eyelid shape, a lateral canthopexy is performed. Two common and troubling complications of blepharoplasty, scleral show and ectropion, are greatly decreased as a result of the midface direct fixation and the lateral muscular canthopexy [18,19].

Patients and Method

All patients in this study underwent treatment of the midface through a subciliary incision; the same incision used for lower blepharoplasty and was treated by the senior author during 2004-2016. Inclusion criteria were age homogeneity, signs of aging in periorbital and midface regions, showing inferior orbital rim, with clear presence and accessible nasojugal groove.

Follow up at least until one year postop of all patients was made to achieve a more objective understanding of patient satisfaction. Postoperative care was more frequent at first months and patients were followed each month after third post op month.

One hundred patients' photographs were randomly selected and evaluated using Image J Software. In each photograph, one line (the distance - MPN) from the pupil to the pre- and post-operative nasojugal fold was measured (Figure 1). After obtaining this distance, a statistical analysis was performed, of the median, average, minimum and maximum values for the standard deviation. The Jarque-Bera test was used to establish the norm, with $p < 0.05$.

Surgical Technique

Patient underwent local anesthesia and sedation (160 ml of 0.9% saline solution, 20 ml of lidocaine 2%, 20 ml of 0.5% Marcaine and 1 ml of 1:200,000 epinephrine). From this solution, 20-30 ml was used in total for the upper and lower eyelids. A subciliary incision is made and continued laterally into a crow's feet line. A skin flap is developed 1.5 centimeters inferiorly. Undermining is performed through the orbicularis oculi muscle, while maintaining the pre-tarsal strip of the orbicularis muscle (3-4 mm). Maintaining this muscle portion intact is important for lower eyelid closure and support (Figure 2). Care must be taken to not damage the buccal branch from the zygomatic nerve innervating the orbicularis oculi muscle to avoid postoperative hypotonicity of the lower lid [20]. Orbital septum is also maintained intact (Figure 3). Mild third elevation will hide a mild to moderate amount of infraorbital fat protuberance. If periorbital fat is grossly herniating, electro-coagulation of the septum will reduce the fat pads into the orbital cone [21-23] (Figure 4). In patients with moderate to severe infraorbital fat protuberance fat excision is not performed but rather perform orbital septum electrocoagulation to shrinking and

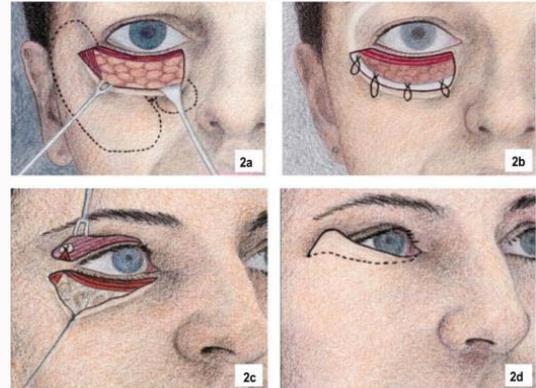


Figure 2: Steps of surgery. a) Sub ciliary incision showing skin flap due to a supramuscular undermining. b) Four stitches for midface suspension. c) Lateral canthopexy with orbicularis muscle. d) Conservative resection of skin of the lower eyelid.



Figure 3: Dissection above orbital septum to expose periosteum at infraorbital rim.



Figure 4: Orbital septum coagulation in order to reduce fat pads herniation.



Figure 5: Caudal and supraperiosteal undermining along inferior orbital rim, toward the midface, under the orbicularis muscle and suborbicularis oculi fat pad (SOOF).

move back the fat pad preventing the occurrence of enophthalmos.

Caudal and supraperiosteal undermining along the inferior orbital rim, toward the midface, under the orbicularis muscle and suborbicularis oculi fat pad (SOOF) is done (Figure 5), releasing orbital retaining ligament following the inferior orbital rim (Figure 6), avoiding going to medial to preserve the angular artery and the buccal branch from the zygomatic nerve. An immediate lifting of the lateral canthus is observed (Figure 7). Inferior and lateral to the infraorbital nerve, the pre-zygomatic space described by Mendelson [24] is undermined until nasolabial fold.



Figure 6: Orbital retaining ligament releasing.



Figure 7: Excessive skin showing midface suspension after SOOF undermining and orbital retaining ligament releasing. No depression at infraorbital rim after retaining ligament releasing.

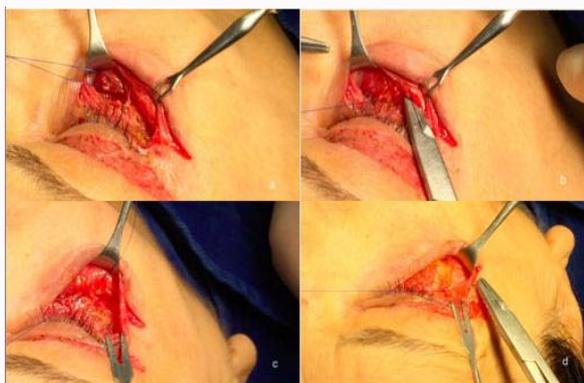


Figure 8: SOOF fixation suture to lower orbital rim.

Detached midface tissue is vertically suspended with prolene 4.0 and fixed to the periosteum of lower orbital rim in four points; first, medial to the infra-orbital nerve, setting the lowest portion of the orbicularis, and second, central portion of the orbital rim (pupil line), lateral to the infra-orbital nerve, then third, to the inferolateral orbital rim, thus suspending and fixing the SOOF, and finally, fourth, securing the orbicularis muscle to the lateral orbital rim at the level of the pupil (Figure 8). Four stitches (prolene 4-0) are used initiating 0,5 cm from lacrimal punctum until lateral part or inferior orbital rim (from medial part to lateral part of inferior orbital rim suspending midface soft tissue taking care of with angularis artery), aiming to transpose this descended tissue, to fill up the tear trough deformity and to obtain an effective and long-term result in midface suspension.

Lateral canthus support (prophylactic canthopexy) is a routine component of the procedure, used to obtain the desired lower eyelid tonicity and to maintain an aesthetic, natural eyelid shape. Associated complication rate is acceptable [19]. Dissection is carried out through the upper blepharoplasty incision. A submuscular tunnel is created toward the lateral portion of the inferior preseptal orbicularis muscle. Through the tunnel, the orbicularis muscle of lower lid is clamped

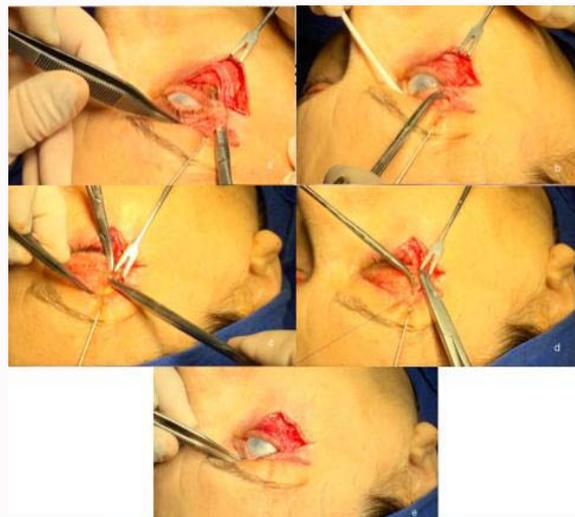


Figure 9: Lateral canthus support (prophylactic canthopexy) used to obtain the desired lower eyelid tonicity and to maintain an aesthetic, natural eyelid shape. a) Submuscular tunnel. b) Orbicularis muscle clamped and pulled up. c,d) Muscular fixation to periosteum. e) Final aspect, with natural eyelid shape.



Figure 10: Conservative inferior eyelid skin resection.



Figure 11: Intradermal sutures.

and pulled up vertically and medially, anchored to the periosteum of the inferior border of the superior orbital rim (Figure 9).

Conservative resection of lower eyelid skin is performed after assessing static and dynamic tissue surplus (mouth opening) (Figure 10). Intradermal sutures are made (Figure 11). Dissected areas are taped over, to minimize tissue edema and to maintain suspension (Figure 12).

Results

457 patients underwent surgery between 2004-2016, 373(81.6%) women and 84(18.4%) men, between 36 and 79 years-old, mean age 51 years old. Seventy five percent of these patients underwent to primary surgery and 25% had had previous blepharoplasties.

Three hundred thirteen patients (68.4%) were reached for interview and could be evaluated postoperatively, with average



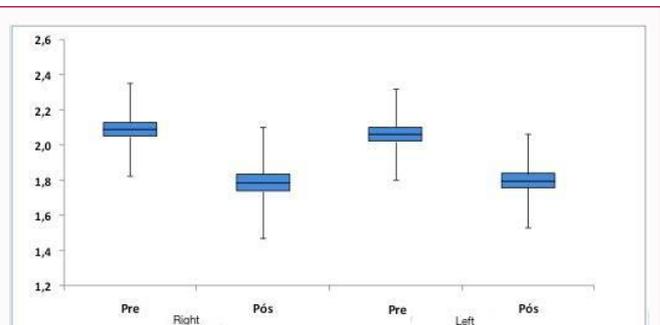
Figure 12: Dissected areas are taped over, to minimize tissue edema and to maintain suspension.



Figure 13: Patient male, 53 years old, pre- and 5 year post-operative views, showing the results obtained with the technique described.



Figure 14: Patient female, 68 years old, pre- and 3 year post-operative views, showing the results obtained with the technique described.



Graphic 1: Mean and standard deviation of all cases, compared into two times (pre and post operative) in both eyes. Measures from pupil to nasojugal fold were made in unit/pix.

Table 1: In this table, mean and standard deviation of all cases are compared into two times (pre and post operative) in both eyes. Measures from pupil to nasojugal fold were made in unit/pix.

Side	PreOp	PosOp
Right	2.09 + 0.26	1.79 + 0.32
Left	2.06 + 0.26	1.80 + 0.27

of 42 months after surgery. Two hundred sixty three (84%) were women. From the survey, twenty-eight patients (9%) referred minor complications as edema, chemosis and eyelid shape change. The other patients could not be found at the time of the interview.

Retouch surgeries happened between 4 to 12 months after first procedure (average of 8 months) and they were made in nine patients. They were related to a unilateral new canthopexy for symmetrization (5 patients), removal of excessive skin (2), fatpad excess removal (1) and removal of a thin muscular strip (1). Minor complications were transitory and disappeared at least in three months, after local massage. These patients had a closer follow-up and were found to answer the questionnaire.

Regarding the patients interviewed, 84% (264/313) thought that blepharoplasty enhanced their physical appearance and judged as an excellent result. 21 patients were happy with the results one year after the surgery. Only 9 percent (28/313) were not completely satisfied with the result and minor complications were observed, all related to bruises on the skin 21 days after the surgery. No ectropion was observed. Ninety-one percent (285/313) of the patients stated that relatives thought they had a much younger appearance post-operatively. The most commonly mentioned improvements were in the sub palpebral pouches and in the palpebromalar groove (85% and 71% respectively, among those reporting good results). Ninety-three percent of patients liked their new appearance after the surgery, and their mean time of self-assessed rejuvenation was 6 years. Figures 13 and 14 show the results obtained with the technique described herein.

In the analysis of the photographs of 100 patients, randomly selected, the distance from the pupil to the nasojugal fold (MPN)

measurement of the preoperatively and postoperatively are compared. Among these patients, the photographs were taken at one-year post-op. Analysis of pre and postoperative times were compared considering "t" Student test for independent samples. Confidence interval of 95%, considering both eyes of each patient, was considered by Hotelling T2 statistic. There was a reduction of MPN postoperatively compared to preoperative values, with p=0.002 (Table 1 and Graphic 1).

Discussion

Harmonious facial appearance is determined by a balanced relationship between all facial features. With advancing age, that balances between bone, muscle, fat and skin is often lost as progressive changes occur in their volume, shape, position, texture and consistency [25,26].

Yousif [27] studied changes of the midface area, observing that with age, the cheek mass appears to descend. With this descent, there is a depression in the infraorbital area, giving a hollow, gaunt look that varies in depth and shape. Descent of cheek mass away from lower eyelids and a subsequent soft-tissue deficit creates visual elongation of the lower lids, extending them beyond inferior orbital rim.

The four most important features of midface aging, as summarized by Hester et al. [28], are: (1) descent of malar fat pad, with loss of malar prominence; (2) deepening of tear trough (nasojugal fold); (3) exaggeration of nasolabial fold; and (4) gradual ptosis of cheek skin below the inferior orbital rim, with descent of attenuated lower eyelid skin, creating a skeletonized appearance, with infraorbital hollowness.

The nasojugal groove, an area of continuing discussion for its difficulty in treating harmoniously, is an extremely common and consistently deforming characteristic of lower orbital region. It is this groove that creates a transition of color and shading, visible in lower periorbital region. The nasojugal groove begins at the medial aspect of the lower eyelid and is created by the descent of midfacial structures away from lower eyelids and becomes gradually prominent with aging. The bulging of descended orbital fat and the prominence of the orbital rim after descent of the malar fat pad all contribute to increase nasojugal groove [29,30]. Malcolm Paul [1] described tear trough deformity as a groove located at orbital rim base. Volume loss allows the surface anatomy to appear as a triangular confluence of inferomedial part of orbicularis oculi muscle, alae nasi levator muscle, and upper lip levator muscle. Increased understanding of facial aging processes introduces the concept of volume repositioning as the upward, vertical mobilization of a three-dimensional tissue structure. Based on this concept, the surgical procedures for facial rejuvenation evolved [1,31].

In 1974, Skoog [32] introduced the deep lateral approach to the midface, and was followed by other similar techniques [33-35]. In 1979, Tessier [36] published his "mask lift," a sub periosteal forehead lift congruous with a vertical sub periosteal approach to the midface. Tessier's [36] principles are still used today and have also been followed in other similar techniques [37]. In 1985, Hinderer [6] published a vertical preperiosteal (sub-SMAS) approach to the midface and periocular frame of eyelids. Hester [15] proposed the "centrofacial" approach for correction of facial aging, which required a full blepharoplasty incision and a canthopexy to support midface suspension. Open techniques created complications, such as lower eyelid malposition and ectropion. In order to minimize postoperative complications, lateral canthopexy and alternative approaches such as the transconjunctival approach were employed [38,39].

Isse [8] first published the endoscopic suprapariosteal approach to rejuvenation of the mid-third face. Isse [7] and Hinderer [6] have addressed approach choice between open, endoscopic, or combined. Ramirez [9] initially proposed the midface is best approached by means of a combination of a temporal slit incision and an upper oral sulcus incision, with no eyelid access used. Hester explained that the lower lid suspensory mechanism is exposed to the weight of the cheek; a strong lateral canthus support is necessary in the form of canthopexy or canthoplasty. Long-term evaluation of the technique revealed a 19% incidence of ectropion [18]. As a result, the original authors now mainly favor a suprapariosteal midface lift with a temporal approach [17]. In our series, there was no ectropion. The orbicularis retaining ligament, when it is released, can maintain lower lid position and shape [31,40].

Rohrich et al. [20] described an important technique with five steps to treat the lower lid detaching retaining ligaments and blending the eyelid-cheek junction. Their technique brought us the new concept for the modern blepharoplasty associated to a prophylactic canthopexy, but do not suspend effectively the midface. The suprapariosteal midface lift has been indicated for treatment of

sagging tissue in malar-orbital area. The goals of the procedure are to adequately correct the eyelid frame, laterally and superiorly rotate the orbicularis oculi muscle and external canthus region, decrease "crow's feet," attenuate nasolabial folds, and suspend submalar fat pads and cheeks, thus elevating and minimizing the nasojugal groove [41,43]. An open approach via transcutaneous blepharoplasty incision allows direct fixation of tissue along periosteum of the inferior orbital rim, respecting vertical vectors and reshaping the face by restoring volume to the midface. Periosteum is a hard and inelastic tissue, which makes difficult to elevate midface tissues. For this reason, suprapariosteal undermining is chosen in this technique. Besides that, intact periosteum is a support for SOOF fixation. Nerve or vascular lesions were not identified in our casuistry. Pre zygomatic space described by Mendelson is undermined and it is an avascular plane. All retaining ligaments are totally released in suprapariosteal plane.

For effective correction of mid-facial tissues ptosis and raising the nasojugal groove, it is extremely important to correct any tissue displacement as well as perform an efficient method of suspension and fixation of tissues (muscle and orbicularis SOOF). The open subciliary suprapariosteal technique advocates the release of the orbicularis to the fullest extent of inferior orbital rim, preserving some of its medial portion, with detachment performed suprapariosteally at the inferior orbital rim and at the maxillary region at the pre-zygomatic space to the nasolabial fold (Figure 1).

Routine lateral preseptal muscular canthopexy with the midface direct fixation decreases scleral show and ectropion, the most common complications of blepharoplasty [44].

The open subciliary technique allows the vector of suspension of the cheek to be strictly vertical, rather than lateral or superolateral. This achieves a direct, significant lifting of the upper nasolabial fold and accomplishes an anatomical correction of the downward descent of the cheek complex that occurs over time.

Blepharoplasty techniques aim in the majority treat nasojugal fold. Besides that, our objective is to elevate midface. With undermining in pre-zygomatic space, soft tissues from midface are repositioned, filling depression areas created by aging process. Sutures for suspension and fixation at the periosteum are a contributing factor for a long-last result.

Conclusion

The open subciliary suprapariosteal midface lift is an effective, low morbidity technique yielding high patient satisfaction and offering long lasting results for rejuvenation of the periorbital and midface region.

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