

Endoscopic aesthetic facial surgery: technique and results

Saulius Vikšraitis, Tautrimas Aštrauskas, Aurika Karbonskienė, Germanas Budnikas¹
Plastic Surgery Center, ¹Kaunas University of Technology, Lithuania

Key words: plastic surgery, face rejuvenation, subperiosteal facelift, endoscopy.

Summary. The endoscopic approach to forehead and midface lifting has become popular method of face rejuvenation with minimal incisions. We have performed 67 endoscopic facelift procedures in the last four years. Forehead lifting technique included five small scalp incisions, wide subperiosteal elevation, endoscopic myotomy and forehead tissue fixation with screws, superficial temporal fascia (STF) suture to deep temporal fascia (DTF). Midface lifting technique included temporal 2.5 cm and 1.5 cm vertical intraoral incision, midface subperiosteal undermining and midface elevation with cable sutures Bichat's fat to DTF.

Age mediana of patients who underwent endoscopic front lift was 46, patients who had endoscopic front lift and midface lift procedure age mediana was 40. Postoperative complication rate was 7.5% and included frontal branch weakness (n=2), hematoma (n=1), infraorbital nerve paresthesia (n=1) and asymmetrical smile (n=1). The main question is the quality of the results. We have reviewed 49 patients who were followed 6 months or more. Preoperative and postoperative life-size photographs were analyzed. The mean elevation mediana at medial canthus was 2.2 mm, at medial limbus 2.3 mm, at lateral limbus 2.5 mm, at lateral canthus 2.9 mm. Midface – lift effect resulted cheek elevation from 1.07 till 4.71 mm lip corner elevation 1.03 mm to 3.27 mm. We observed cheek elevation, improving nasolabial line, increasing volume of malar region, elevating lip angles in patients after endoscopic midface lift. We have found that important advantage of subperiosteal midface lift, when performed in conjunction with endoscopic brow lift, is its ability to move the cosmetic eye unit, proportionally, leading to a harmonious facial appearance. Endoscopic facelift is effective procedure for face rejuvenation especially for eyebrows and cheek elevation.

Introduction

With increasing age and in response to gravitational forces, the fat and soft tissue of the cheek drift downward in relation to the underlying bony skeleton. Subperiosteal elevation provides fixation mechanism for elevating the soft tissue of the face over the underlying skeleton. Subperiosteal rhytidectomy is a procedure designed to rejuvenate the upper and middle thirds of the face by means of bicoronal incision (1, 2). The objective is to elevate soft tissue over underlying skeleton to reestablish patient's youthful appearance (3, 4).

Use of endoscope enables surgeons (3, 5, 6) to minimize scalp subciliary or intraoral incisions for subperiosteal face dissection. Endoscopic brow lift has become the method of choice for forehead and upper orbital rejuvenation for many surgeons because of its manifest advantages (Fig. 1):

- Short incision, no scalp resection;
- Low risk of dividing sensory nerves;



Fig.1. Endoscopic approach to forehead lifting

- Decreased hair loss;
- Good for patient with alopecia;
- Precise muscle modification with the aid of magnification.

Endoscopic surgery requires special anatomic skills, endoscopic surgery experience and special equipment. The equipment is used as follows: 4 mm straight endoscope, special videocamera that magnifies the operation view by 10–12 times, light source, TV monitor, long endoscopic elevator's (curved and straight), endoscopic scissors, sharp-tipped dissector and electrocoagulator.

Purpose of this study is to present endoscopic technique in aesthetic facial surgery and our initial experience of 67 cases.

Materials and methods

We introduced endoscopic approach to forehead and midface lifting in 1997. It was the first experience in endoscopic aesthetic facial surgery in the Baltic States (7).

Forehead lifting. We determined the primary and conditional indications for endoscopic forehead lifting (8).

Primary indications:

- Ptosis of the eye-brows;
- Significant asymmetry of the eyebrows.

Conditional indications:

- Distance between eyebrows and eyelids too small;
- Vertical glabella frown lines;
- Transversal forehead wrinkles;
- Transversal wrinkles of the nasal root.

Endoscopic facelift procedures were done with local anesthesia and monitored intravenous sedation or general anesthesia.

We used 0.5% lidocaine with 1:200 000 epinephrine for infiltration forehead, temporal, malar and sublabial regions.

Forehead lifting operation technique

We modified endoscopic subperiosteal forehead technique (5, 9). Three 1.5 cm incisions perpendicular to the hairline were done. Subperiosteal dissection is carried out dorsally. In the temporal regions we used a 2 cm - long incision on each side that runs parallel and 2 cm dorsally to the hairline. Through these temporal incisions we dissected toward the midline, below the superficial fascia of the temporal muscle, until we reached the subperiosteal frontal dissection.

A 4-mm endoscope was then inserted into one of the incisions. Through a second incision a blunt periosteal elevator was inserted to dissect the area of the corrugators, orbicularis and procerus muscles. After that we switched to a sharp-tipped special dissector and incised m. depressor supercilii, m. corrugator, up-

per part of m. orbicularis oculi, m. procerus. Through temporal incision we cut adhesio frontotemporalis, which is very important for the eyebrows elevation. We have found that cutting adhesio frontotemporalis is enough for eyebrows lateral part elevation. If clinical situation required to decrease vertical glabella frown lines and to improve nasofrontal angle, we performed endoscopic myotomy.

We use only one-point fixation (STF) sutures to (DTF) in lateral eyebrows modified elevation.

Finally, elevated forehead tissue was fixated in two ways: first, took sutures superficial temporal fascia (STF) to deep temporal fascia (DTF) in temporal region and second, fixated forehead tissue with screws.

Midface lifting

The main operative indication was isolated significant ptosis of the deep soft tissue of the middle third of the face. The best candidates for the surgery are young patients (between 30–40) with a relatively small amount of skin relaxation and good cervical region.

Endoscope assisted midface lift we begun with a small gingival buccal sulcus incision, which was made superior to the canine tooth and extended approximately 1 cm laterally. Subperiosteal dissection of the anterior maxilla, zygoma, inferior lateral orbital rim and anterior third of the zygomatic arch was performed (Fig. 2). A headlight is critical for this dissection. The dissection was extended over the tendon of the masseter muscle. Under endoscope visualization the infraorbital complex is identified and preserved.

Next, a temporal scalp incision was made, incising through the temporal fascia. Inferior dissection was initiated in a plane superficial to the superficial layer of deep temporal fascia. Under endoscope



Fig.2. Relation of anatomy of the forehead region and coronal approach during forehead lifting

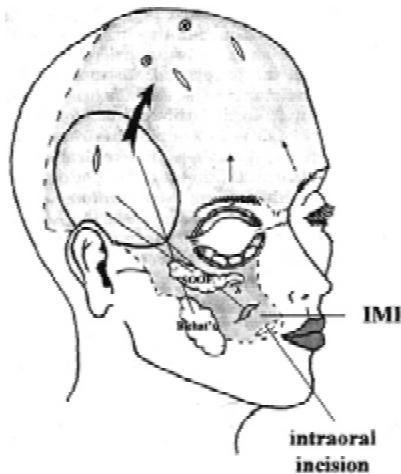


Fig. 3.1. Midface lifting: suspension sutures, according O. Ramirez



■ Poantkaulinis atidalijimas

Fig. 3.2. Our original two-point fixation method in midface lifting

Suspension sutures done in the lowest (A) and lateral (B) points of ptotic Bichat's fat pad and fixed to deep temporal fascia (DTF).

visualization, the dissection was continued over the frontal bone, lateral orbital rim and the zygoma, connecting intraoral dissections. We modified Ramirez (Fig. 3.1) fixation and created original two point fixation method in midface lifting. The first 3/0 PDS or Monocryl suspension suture we took in the lowest point of ptotic Bichat's fat pad to DTF. The second 3/0 PDS or Monocryl suspension sutured the lateral point of Bichat's fat pad to DTF (Fig. 3.2). The first cable suture elevated lip angle and increased volume of malar region, second suture decreased the ptosis of m. depressor anguli oris and restored the mandibular line of the face. Finally, we took sutures STF to DTF. The excess scalp and skin were resected, bilateral drains were placed, and the incisions were closed.

Postoperative results objectivity

We have created an original program for postoperative results analysis. The photographic analysis was done with specially created computer program. Pre-operative and postoperative photographs were done in the same face position. We measured interlateral



Fig. 4. Distance between eyes lateral limbus was measured during autorefractometry

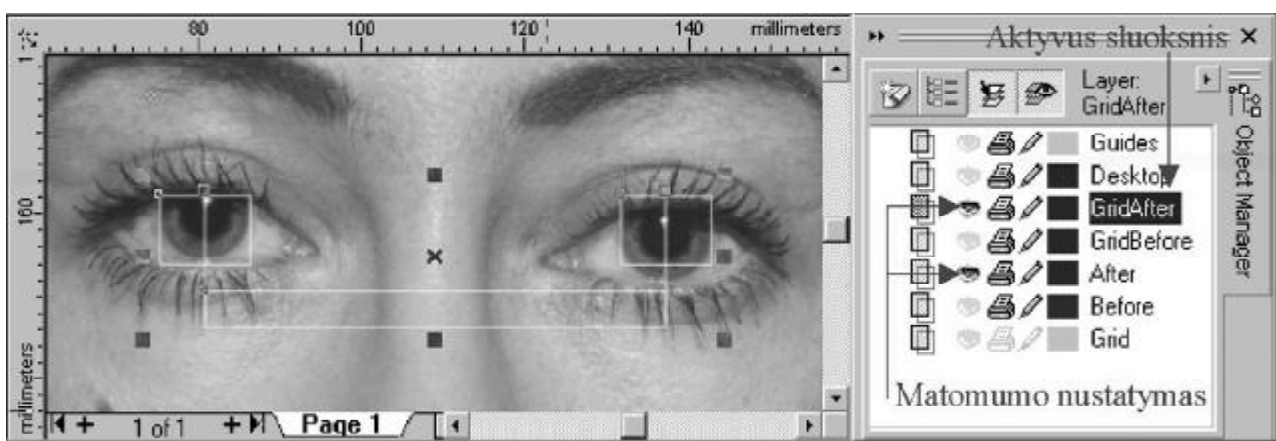


Fig. 5. Our program, which makes life-size photographs considering the distance between eyes lateral limbus

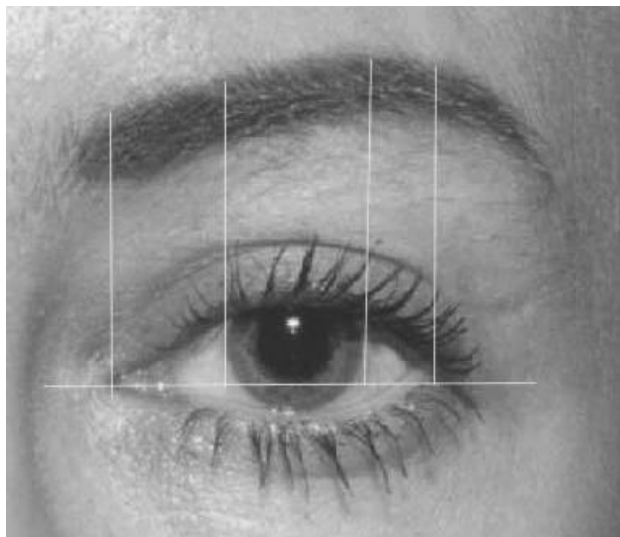


Fig. 6. Eyebrow elevation: points of measurements

limbus distance with an autorefractometer (Fig. 4) and combining its results with computer programs (Fig. 5) we got one-to-one life size preoperative and postoperative photographs. The elevation of eyebrow was measured in medial canthus, medial limbus, lateral limbus and lateral canthus (Fig. 6). Midface elevation was analyzed measuring distance between lower lid margin and lid-cheek junction line in 3 points: medial limbus, lateral limbus and lateral canthus also by measuring lip corner elevation (Fig. 7.1, 7.2, 8).

Results

Endoscopic subperiosteal face rejuvenation procedures have been performed in 67 clinical cases. There were 65 female and 2 male patients. Age of patients, who underwent endoscopic front lift, ranged from 22 to 63 years (mediana 46), patients, who had endoscopic front lift and midface lift procedure, were in the range from 27 to 54 (mediana 40). In our series, complication rate was 7.5 percent and included frontal branch weakness (n=2), hematoma (n=1), infraorbital nerve paresthesia (n=1) and asymmetrical smile (n=1); 4.5 percent of complications occurred during our first 10 operations. One patient experienced 2 complications: hematoma and infraorbital nerve paresthesia. In the other 57 clinical cases we had only 2 complications: transient frontal branch weakness and asymmetrical smile.

We observed cheek elevation improving nasolabial line, increasing volume of malar region, elevating lip angles in patient after endoscopic midface lift (Fig. 9.1–9.3)



Fig. 7.1. Endoscope-assisted midface-lift effect: cheek elevation before operation



Fig. 7.2. Endoscope-assisted midface-lift effect: cheek elevation after operation



Fig. 8. Lip corner elevation measurements



Fig. 9.1. 37-year-old patient before endoscopic facelift



Fig. 9.2. 37-year-old patient after endoscopic facelift



Fig. 9.3. Right side - before operation, left side - after operation.

Comments: forehead wrinkles disappear, contour of eyebrows changes - lateral part was elevated more than medial, youthful eye in left side - lateral angle of eye higher than medial, decrease lid-cheek junction distance, was elevated lips corner and changed central oval of face.

The main point is the quality of the results. We have reviewed 49 patients who were followed 6 months or more. Preoperative and postoperative life-size photographs were analyzed. The mean elevations ranged at medial canthus from 0.89 to 5.60 mm, at medial limbus from 1.68 to 4.59 mm, at lateral limbus from 1.33 to 4.82 mm, at lateral canthus from 2.35 to 4.13 mm (Fig. 10). Mediana of eyebrow elevation showed lateralization of them (Fig. 11). Midface-lift effect resulted in cheek elevation from 1.07 till 4.71 mm and lip corner elevation 1.03 to 3.27 mm.

Discussion

Our technique represents a new approach in facelift. The endoscopic technique allows rejuvenating face in early forties, when aging process consists of

eyebrows and malar ptosis without excess of the skin. Midface subperiosteal undermining allows to correct central oval of the face without preauricular incision. If patient's face has a laxity of skin in preauricular and cervical region, we would perform classic facelift. The most frequently mentioned complication in subperiosteal lifting is temporary paralysis or paresis of the frontal branch of the facial nerve (2–5% of all clinical cases) (1, 2, 4). We observed two patients, who developed a transient frontal nerve paresis, and fully recovered on 53rd and 75th day after operation. We agree with authors (6, 11, 3) that careful dissection with endoscopic visualization, allows avoiding trauma to the temporal branch of the facial nerve.

We have found important advantage of subperiosteal midface lift. When performed in conjunction with



Fig. 10. Objective results of eyebrow elevation

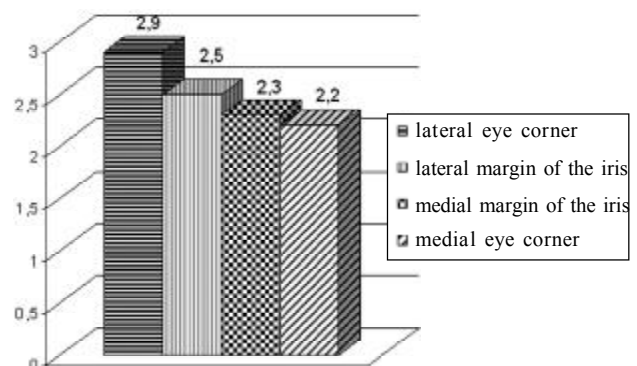


Fig. 11. Mediana of eyebrows elevation



Fig. 12.1. 35-year-old patient before endoscopic face-lift, upper eyelid surgery and neck liposuction



Fig. 12.2. 35-year-old patient after endoscopic facelift, upper eyelid surgery and neck liposuction

endoscopic brow lift, it enables to move the cosmetic eye unit proportionally, leading to a harmonious facial appearance (Fig. 12.1, 12.2). We have never got a “surprised-look” appearance after endoscopic facelift, which could be seen postoperatively in brow lift patients. The upper cosmetic eye unit was repositioned superiorly, but lower eye unit was not moved enough in front lift. Subperiosteal midface lifting repositioned lower eye unit, this way eliminating “surprised-look” appearance. Some authors (6, 13) performed midface lifting by placing two suborbicularis oculi fat sutures. We have found this method helpful in flattening the nasolabial line, but not enough for malar region augmentation and cheek elevation. We improved cheek duplication method (10) and used two point suspen-

sion sutures in the lowest fat and lateral points of Bichat’s fat pad. We have found that our midface suspension method repositioned tissue more gradually and in several directions (Fig. 13.1–13.4). We used suborbicularis oculi fat pad suspension sutures only for patients with festoons.

Conclusions

Based on our experience we have found endoscopic subperiosteal rhytidectomy to be an effective procedure designed to rejuvenate the upper and middle thirds of the face for young patients with a relatively small amount of skin relaxation. However, the endoscopic subperiosteal lift must be performed by experienced surgeons due to encountered difficulties.



Fig. 13.1. 42-year-old patient before endoscopic facelift



Fig. 13.2. 42-year-old patient after endoscopic facelift



Fig. 13.3. 42-year-old patient before endoscopic facelift



Fig. 13.4. 42-year-old patient after endoscopic facelift

Endoskopinis veido pakėlimas (technika ir rezultatų objektyvizavimas)

Saulius Vikšraitis, Tautrimas Aštrauskas, Aurika Karbonskienė, Germanas Budnikas¹

Plastinės chirurgijos centras, ¹Kauno technologijos universitetas

Raktažodžiai: veido atjauninimas, poantkaulinis veido pakėlimas, endoskopija, rezultatų objektyvizavimas.

Santrauka. Endoskopinis kaktos ir vidurinės veido dalies pakėlimas – tai būdas veidui atjauninti panaudojant minimalius pjūvius veido srityje. Per pastaruosius ketverius metus endoskopiniu būdu atlikome 67 veido pakėlimo operacijas. Kaktos pakėlimui daryti penki (1–2 cm ilgio) skalpo pjūviai: plačiai atkeliami poantkauliniai kaktos minkštieji audiniai, įpjunami kaktą traukiantys raumenys, kaktos audiniai fiksuojami minivaržtais, kaktos šoninės dalys patempiamos, paviršinė smilkinio fascija prisiuvama prie giliosios smilkinio fascijos. Vidurinės veido dalies pakėlimui daromi smilkinio srities (2,5 cm ilgio) ir viršutinio žandikaulio gleivinės (1,5 cm ilgio) pjūviai: poantkauliniame sluoksnyje atidalijama vidurinė veido dalis ir ji pakeliama specialiomis inkarinėmis siūlėmis.

Rezultatams objektyvizuoti sukūrėme originalią kompiuterinę programą. Naudojant šią programą matuojamas pooperacinis antakių, skruostų ir lūpų kampų pakilimas. Nustatėme, jog atlikus vidurinės veido dalies ir kaktos endoskopinį pakėlimą, atjauninamas veidas.

Adresas susirašinėjimui: S. Vikšraitis, Plastinės chirurgijos centras, Savanorių 284, Kaunas

El. paštas: Saulius.Viksraitis@takas.lt

References

1. De La Plaza R, Valiente E, Arroyo JM. Supraperiosteal lifting of the upper two-thirds of the face. *British Jour Plast Surg* 1991;44:325-32.
2. Ramirez OM. The subperiosteal rhytidectomy: the third-generation face-lift. *Ann Plast Surg* 1995;2:218-32.
3. Ramirez OM. Endoscopic techniques in facial rejuvenation: an overview. Part I. *Aesth Plast Surg* 1994;18:141-7.
4. Psillakis JM, Rumley TO, Camargos A. Subperiosteal approach as an improved concept for correction of the aging face. *Plast Reconstr Surg* 1988;82:383-94.
5. Ramirez OM, Pozner JN. Subperiosteal endoscopic techniques in secondary rhytidectomy. *Aesth Surg* 1997;17:22-6.
6. Harvey L, Heinrichs MD, Ashton K. Subperiosteal face lift: a 200-case, 4-year review. *Plast Reconstr Surg* 1998;102: 843-54.
7. Vikšraitis S, Astrauskas T. The endoscopic approach to forehead and brow lifting. *Baltic AMPS III Congress, Tartu*; 1999. p.74.
8. Vikšraitis S, Astrauskas T. Endoskopinė viršutinės veido dalies chirurgija. (Endoscopic surgery of upper face.) *Medicina (Kaunas)* 2000;36:711-5.
9. Isse NG. Endoscopic facial rejuvenation: endoforehead, the functional lift. Case reports. *Aesth Plast Surg* 1994;18:462.
10. Little WJ. Volumetric perceptions in midfacial aging with altered priorities for rejuvenation. Discussion 286-9. *Plast Reconstr Surg* 2000;105(1):252-66.
11. Swift RW, Nolan WB, Aston SJ, Basner AL. Endoscopic Brow Lift: Objective Result After 1 Year. *Aesth Surg* 1999; 19:287-92.
12. Vikšraitis S, Astrauskas T. Endoscopic Aesthetical Facial Surgery: Technique and Objective Results. 6th Panhellenic Congress of Plastic Reconstructive and Aesthetic Surgery, Athens; 2003. p.84.
13. Anderson RD, Mikel WL. Endoscopic malar/midface suspension procedure. *Plast Reconstr Surg* 1998;102: 2196-208.

Received 13 November 2003, accepted 16 January 2004