Ancillary Soft Tissue Procedures of Zygoma Reduction

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Pearls

1. While performing malar contouring procedure in Asians, plastic surgeons should pay special attention to ethnic characteristics of Asians whose prominent high cheekbone is usually accompanied by up-slanted eyes as well as abundant and thick soft tissues.
2. The up-slanted eyes leave a wide margin below the eyes and emphasize their high cheekbones, especially when smiling. Also abundant soft tissues and thick skin frequently cause cheek drooping and exaggeration of the nasolabial fold after zygomatic reduction. If worse comes to worst, descent of midcheek fat and skin causes jowls to develop.
3. To attain a more satisfactory midfacial contour, complementary procedures, when well-thought-out and implemented optimally, can in some cases have as much or more effect on the final result than the zygomatic reduction alone. The most representative "big two" procedures of those complementary procedures include lateral canthoplasty and midface lifting procedures.
4. There are several advantages of combining these operations in one sitting. One is the added periorbital approach enables us to reduce the remaining protruding inferolateral orbital rim, which will help refine the contour of the periorbital region including the upper zygomatic body. Another advantage is that reversion of mongoloid slant reduces the wide margin below the eyes and makes their high cheekbones less conspicuous, especially when smiling. In addition, soft tissue sagging is minimized by superomedial repositioning of the osteotomized malar complex and midface lifting procedure.
5. Surgical method of lowering lateral canthoplasty combined with zygoma reduction consists of two parts. One is a standard reduction malarplasty using L- or High L-shaped osteotomy via intraoral and preauricular approach. The other is a lowering lateral canthoplasty combined with protruding inferolateral orbital rim reduction, if necessary.
6. Midface lifting procedure using elastic thread is a preferred method for relatively young Asian patients who undergo facial bone contouring surgery.

Introduction

As surgeons, we see a patient requesting a reduction malarplasty. Then we perform a reduction malarplasty using our best skills and technique and (hopefully) get an esthetically pleasing result. One possible source of these problems is the soft

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tissue structure in the midface. However, we sometimes cannot obtain the satisfactory result for both surgeons and patients. Although zygomatic reductions are effective for midface contouring, some soft tissue procedures, when well-thought-out and implemented optimally, can have as much or more effect on the final result than the zygomatic reduction alone. Recently, we see more demands for the malarplasty patients with features such as single-eyelid, small palpebral fissure and high cheekbones. Their soft tissues over the malar area tend to be abundant, and even thick. Particular attention should be paid to the mongoloid slant of the palpebral fissure as well as cheek soft tissues for successful midface contouring. For example, some Asian patients with slanted eyes or thick soft tissues are not fully satisfied with the outcomes by simply reducing zygomatic prominence, even though surgical and technical issues are absent. They even request further surgery (Fig. 22.1).

Fig. 22.1 An example of unfavorable results after standard reduction malarplasty using L-shaped osteotomy. This patient with prominent cheekbones and up-slanted eyes underwent reduction malarplasty using standard L-shaped osteotomy. Although malar prominence was effectively reduced from the three-quarter oblique view, she complained that she still had a wide margin below the eyes from the front view. Thus, she wanted to have a further surgery, a lowering lateral canthoplasty, to attain a softer image as a separate procedure

There are two main reasons. One is because much attention on the contouring procedure has focused on the position of the zygomatic body and arch. As a result, periorbital appearance including mongoloid slant of palpebral fissure and the protrusion of the orbital rim as well as cheek soft tissues are often overlooked or ignored. Therefore, remaining up-slanted eyes leaves a wide margin below the eyes and become obvious among their high cheekbones, especially when smiling. Although prominent high cheek bones with the superolateral orientation of the brow and the mongoloid slant of the palpebral fissure are regarded as attractive and youthful by Western standards of beauty, they are not by Asians as it gives a strong and aggressive impression. Thus, recently, to attain a more attractive and smooth midfacial contour, lowering lateral canthoplasty are widely performed with reduction malarplasty as well among Asians.

However, the author believes that there are several advantages of combining the two operations in one sitting. One is the periorbital approach for canthoplasty enables us to reduce the remaining protruding inferolateral orbital rim, which will help refine the contour of the periorbital region including the upper zygomatic body. Another advantage is that reversion of mongoloid slant reduces the wide margin below the eyes and makes their high cheekbones less conspicuous (Fig. 22.2).

Abundant soft tissue and thick skin frequently causes cheek drooping and exaggeration of the nasolabial fold. Descent of midcheek fat and skin causes jowls to develop [1–3]. Many procedures from the least invasive laser rejuvenation to the most invasive conventional face lift surgery are available to correct soft tissue sagging. However, patients who undergo reduction malarplasty are usually young [4–6]. Thus, we prefer thread lift using elastic thread (Elasticum®, Korpo SRL, Genova, Italy) despite of its limitations.

Patient Consultation and Assessment

Preoperative Evaluation

Patient's photographic documentation and radiologic examination that includes zygomatic arch view and three-dimensional computed tomographic image are routinely obtained. A comprehensive evaluation of the entire midface including malar prominence, infraorbital rim protrusion, globe-orbital rim relationships, lateral canthal angle, and overlying soft tissues is essential to determine the combination of the procedures needed.

Preoperatively, the patient's periorbital appearance including lateral canthal slant and inferolateral orbital rim projection is thoroughly examined and discussed in sitting position and

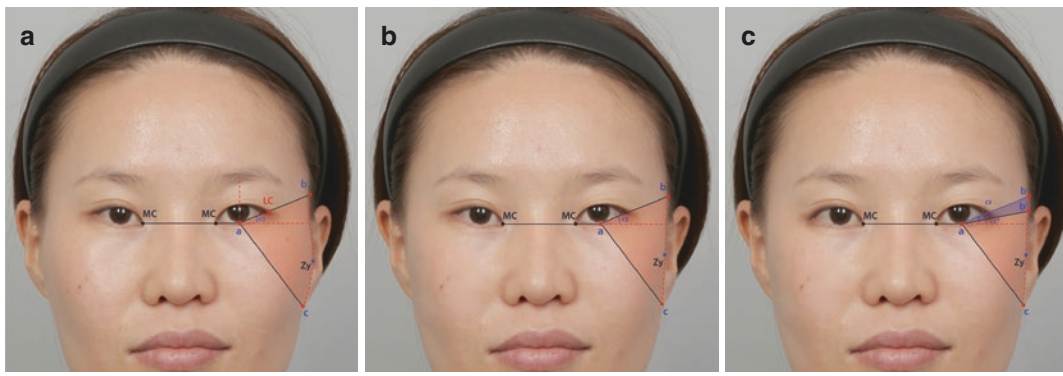

Fig. 22.2 Simulating the lowering lateral canthoplasty after reduction malarplasty. This simulation can demonstrate how vertical lowering and horizontal expanding of the lateral canthus make the high cheek bone less conspicuous by reducing the surface below eyes. 9.2% of malar surface area (a-b′-c) is decreased more than that of reduction malarplasty alone (a-b-c). Through virtual plastic surgery, we can verify the effectiveness of the combination of zyR and LLC. Also it shows the patients the potential changes that might occur

in order to determine how much lower the lateral canthus vertically and lengthen the palpebral fissure horizontally. The degree and location of external orbital rim prominence should be evaluated through three-quarter oblique view of the 3D CT to determine how much reduction of the rim by shaving method. Especially, in case of enophthalmic eyes with well-developed orbital rim, it should be reduced more than expected.

The lower lid itself should also be examined for laxity. A preoperative snap-back test and measuring intraoperative lid distraction are useful indicators of lower lid tone. This information can then be used to determine if a canthopexy vs. canthoplasty would be beneficial in restoring lower lid support and preventing postoperative complications related to lid malposition. Similarly, the degree of eye proptosis should also be noted prior to surgery, as this can influence optimal placement of the canthal anchoring suture. In particular, patients with slightly protruding eyes, lateral canthal suture should be placed superiorly to prevent for scleral show.

Patient Selection

Lowering Lateral Canthoplasty (LLC)

The main inclusion criteria were the presence of zygomatic prominence with up-slanted eyes. The exclusion criteria were acute or chronic sinus infection and lack of permeability of the osteomeatal complex. Also, the cases with a small eyeball surrounded by a prominent lateral orbital rim (enophthalmic eyes with well-developed orbital rim) were excluded as the lowering lateral canthopexy (LLC) may be less effective and may keep the lower lid away from the eyeball. In particular, patients with very protruding eyes ought to be excluded for fear of scleral show.

Simultaneous reduction of inferolateral orbital rim may be indicated in selected patients.

Cheek Lifting Procedure

After assessment of the patients' age, volume of fat and skin elasticity in an upright sitting position, the high-risk groups for skin and soft tissue sagging are selected as follows: (1) age over 40, (2) abundant cheek fat, and (3) thin skin and skin laxity. This is evaluated before the surgery because once the patient lies on a bed, soft tissue distribution is changed. Then, fat removal area, soft tissue sagging area, and lifting design are marked on the patient's face.

Surgical Technique

Lowering Lateral Canthoplasty Combined with Zygomatic Reduction

This LLC-Zy contouring procedure involves two, and sometimes three, basic maneuvers, which includes bone sculpturing along with high L-shaped osteotomy, inferolateral orbital rim shaving, if necessary, and, finally, repositioning of lateral canthus (Figs. 22.3 and 22.4). Under general anesthesia, with the patient in neck-extended supine position, the patient's zygomatic contour was designed. Two possible periorbital approaches are used depending on (1) whether the redundant skin of the lower eyelid needs to be excised or (2) the tendency of entropion. When excision of the lower eyelid skin is required or when ectropion is anticipated after LLC, the subciliary incision is useful. The transconjunctival approach allows for better scar camouflage. A continuous oblique canthotomy incision starting is made from the lateral canthus and extending laterally and inferiorly according to the slope between the lateral part of the upper eyelid and the lateral canthus. The length of the incision is usually 3–4 mm. Then dissection is carried out through preseptal space toward infraorbital rim. It is important to identify the infraorbital nerve and the zygomaticofacial nerve. Of these, the infraorbital nerve should be protected. However, the zygomaticofacial nerve might be

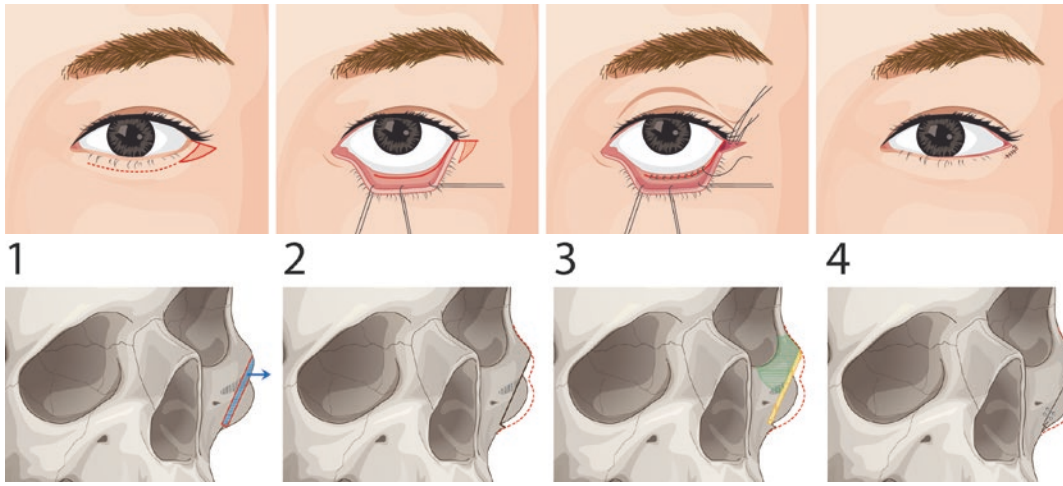

Fig. 22.3 Overview of complimentary procedure 1: lowering lateral canthoplasty combined with zygomatic reduction. (*Upper row*) once all of the contouring is finished, the detached lateral end of lower lid tarsus is secured toward inferolateral direction onto the periosteum of the lateral orbital rim (a lowering lateral canthoplasty). Canthopexy with section of the canthal ligament and low neo-canthal positioning alter the tilt of the eyelids. (*Lower row*) after the reduction and setback of the zygomatic body, protruding external orbital rim is reduced

Fig. 22.4 Clinical photographs show a step-by-step description of the LLC-Zy contouring technique. The process of lowering lateral canthopexy is divided up into these stages after the completion of the inferolateral orbital rim reduction through lower lid. A Senn retractor and a malleable retractor are used to retract the lower lid and the orbital contents

sacrificed inevitably to allow the medial oblique osteotomy to be placed close to external orbital rim. When combined with LLC procedures, this high-L osteotomy is a preferred method. The main difference of this technique with conventional L-shaped osteotomy is in the oblique part of the osteotomy line; the oblique line is moved more toward the external orbital rims in comparison with the L-shaped osteotomy, in which medial oblique osteotomy is placed lateral to the zygomaticofacial nerve foramen to avoid the injury. Reduction malarplasty is done in the same way. The lower lid and midface soft tissues are freed by subperiosteal dissection (area of dissection shown in green). It is important to eliminate any possible interference and inspect the transition zones, paying special attention to avoid any periorbital soft tissue injury.

Once all of the contouring is finished, the detached lateral end of lower lid tarsus is secured toward inferolateral direction (usually at lower pupil margin level) using nonabsorbable 5-0 nylon suture onto the periosteum of the lateral orbital rim. It is important to ensure that a new lateral canthal angle is formed as desired and that the proper contact between the eyeball and palpebral conjunctiva is maintained by preventing ectropion of the lower eyelid. Then pull the end of conjunctival flap and suture it to the skin of the lateral corner. The wound is closed while removing the dog-ear skin surrounding the lateral canthus by making the minimal incision following the cilia on the lower eyelid.

Elasticum Midface Lifting Combined with Zygomatic Reduction

The most important thing in our elastic lift is the exit point and thread returning point. Firstly, draw around the soft tissue bulge in the cheek; secondly, mark the point of maximal bulging. Thirdly, mark the exit point distal to the maximal bulge, keeping in mind the depth of subcutaneous needle penetration and direction of pull.

The elastic lifting procedure is performed under intravenous sedation in isolated cases and under general anesthesia in simultaneous cases with facial bone contouring surgeries. The incision sites at both scalp were infiltrated with 2% lidocaine and 1:100,000 epinephrine. Two vertical stab incisions are made with no.15 blade at the level of the highest point of ear helix. Then a sharp mosquito was used to dissect down deep to the temporal fascia. An Owl was used to anchor an elastic thread at the deep temporal fascia. The free end of the elastic thread was pinched with a mosquito to prevent it from pulling inside. Then the Jano needle®was inserted through the incision site opposite to the free end. The needle was passed through the deep subcutaneous tissue plane and extracted at the target point. It is important not to extract the needle entirely. There are five depth marks on the needle at each interval of 5 mm. So, the surgeon can adjust the distance from the needle exit site to the tissue which was actually to be lifted. The needle was extracted until the last one or two depth marks was shown, and the elastic thread was pulled through the needle exit site as much as possible. Then the needle was rotated toward the incision site bearing the free end. The needle was passed through deep subcutaneous layer with the posterior tip now becoming anterior and extracted fully at the incision site of the free end. Now, surgeon should evaluate that lifting layer was appropriate and lifting didn't cause any dimpling, depression, or soft tissue bunching by pulling the elastic thread with adequate power. The elastic thread was knotted under tension and placed deeply not to be exposed. The same procedure was carried from the opposite incision site with opposite direction use of Owl. The two stab incisions were sutured with no.4-0 nylon (Fig. 22.5).

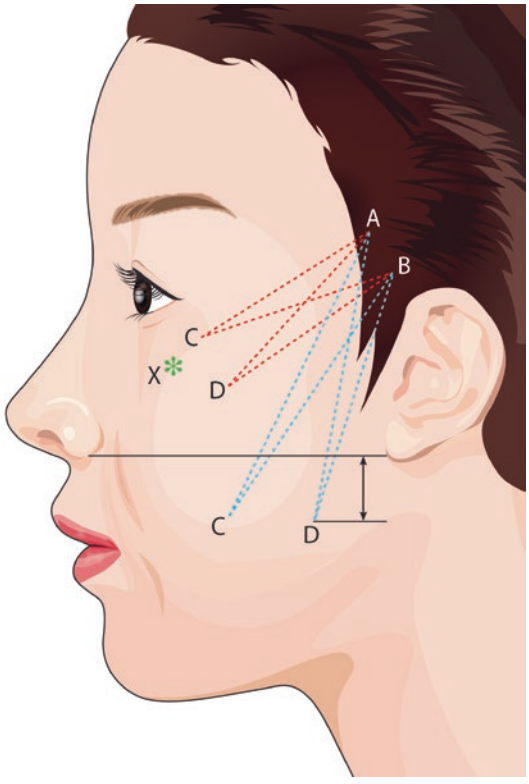

Fig. 22.5 Overview of complimentary procedure 2: elasticum-midface lifting combined with zygomatic reduction. Points A and B were drawn at the lower temporal region within the hairline. The line that connects the lateral margin of the alar base and the root of ear lobe was drawn. We drew points C and D, the malar fat pad region (located 1.0 cm proximal to the point "x"; 2 cm below the lateral canthus)

Cases

Case 1

Preoperative views of a 22-year-old female patient presented with a prominence cheek bone and up-slanted eyes. In anterior view, she showed a facial asymmetry and small lateral scleral triangle because of steep mongoloid slant. From the oblique view, a severely projected 45° zygomatic body and abundant soft tissues over malar area were noted. After reduction malarplasty using high L-shaped osteotomy (body resection 5/6 mm, setback 3/4, arch medialization 4/5, posterior arch shaving on both sides), mongoloid slant lowering was completed with downward movement of 2 mm and lateral extension of 3 mm on both sides. Five months postoperatively, the protruding cheek bone was reduced, mongoloid slant became less steep, and the lateral scleral triangle was enlarged (Fig. 22.6).

Fig. 22.6 Preoperative views of a 22-year-old female patient in Case 1 (*Left column*). Postoperative views after zygoma reduction combined with lowering lateral canthoplasty (*Right column*). Six months postoperative views showed that the contour of midfacial margin was smooth. And the slope of palpebral fissure became less steep. The lateral canthus was extended laterally and inferiorly exposing more sclera which gives a softer image, especially, while smiling

Fig. 22.6 (continued)

Case 2

A 52-year-old female patient with moderate skin sagging and wrinkle sought for minimally invasive facial rejuvenation with a low risk of complications and rapid recovery time. She underwent elastic midface lift and showed excellent results (Fig. 22.7).

Fig. 22.7 Preoperative views of a 52-year-old female patient in Case 2 (*Left column*). Postoperative views after elastic midface lift (*Right column*). Postoperative views showed that the contour of midfacial margin was smooth, which gives a softer image

Discussion

Reversion of mongoloid slant reduces the wide margin below the eyes and makes their high cheekbones less conspicuous, especially when smiling. Good candidates are patients with (1) exophthalmic eyes, (2) a distance of 4 mm or more between the lateral canthus and lateral orbital rim, and (3) a lateral fornix deeper than 3 mm [7]. It should be considered that the average value of the slant of palpebral fissure was 8.5 +/− 2.0 degrees for males and 8.8 +/− 2.5 degrees for females. When lateral canthoplasty is to be performed on an Asian patient, it would be better to apply 8.5 degrees as the standard for male patients and 8.8 degrees as the standard for female patients [8].

There is no single technique that can address the full spectrum of small palpebral fissure, and the surgeon must rely on a set of techniques that are applicable to specific types of small palpebral fissure. Of the appropriate techniques, the surgeons can use the most comfortable technique with themselves.

The two most frequent complications were under-correction and asymmetry. Under-correction usually is caused by relapse or inappropriate placement of the canthal anchoring suture. Under-corrected lateral canthus can be revised within the first few week of the initial operation. Beyond this period, however, revisions should not be attempted until after 6 months, or until the hypertrophic response has subsided. Frequently, revisions are required due to asymmetry in the lateral canthal angle and horizontal length. To prevent unnecessary revision, patients should be provided with sufficient explanations about how two lateral canthi have different horizontal length and vertical direction. The surgeon should inform patients about the possibility of developing minimal difference between the left and right, the possibility of additional operations, and the limits of these operations before surgery. Disadvantages of our method are exposure of red conjunctiva when the conjunctiva is pulled too much and a visible scar at the lateral part of the lower eyelid.

Patients with a significant amount of soft tissue would get minimal changes by facial bone contouring surgery alone, because the fatty layer and hypertrophic muscle conceal the effect of facial contouring surgery. Also it may cause cheek drooping [1–3]. To overcome these problems, soft tissue lifting procedures are required. Among the various methods, the author prefer to use less invasive elastic thread lifting ((Elasticum®, Korpo SRL, Genova, Italy). Elastic lift has four advantages over barbed thread lift. First, it can give more long-term elevation effect than absorbable barbed threads [9]. Second, elastic thread has elasticity that gives more natural lifting effect in resting and dynamic stage. Third, the elastic thread is impalpable because it has the same consistency with soft tissue and it has no barb. Fourth, when removal of the elastic thread is required, elastic thread can be easily removed because the core of nonabsorbable thread is silicon that does not cause adhesion with surrounding connective tissues. But it has also some limitations. First, many patients fear the placement of nonabsorbable materials in their faces. Second, it takes time for surgeon to learn about the insertion layers, traction force control, etc. Third, it has less data about the long-term effect and complication than barbed thread lift.

To accomplish the most natural, harmonious midface contouring, especially in cases of East Asians with unique anatomical characteristics as well as specified requests and goals, the surgeon should master not only the zygomatic reduction techniques but also the synergistic procedures (lowering lateral canthoplasty and midface lifting). When these procedures are applied optimally, they produce true synergy.

References

1. Jin H. Reduction malarplasty. J Korean Soc Aesthetic Plast Surg. 2010;16:1–8.
2. Baek RM, Kim J, Kim BK. Three-dimensional assessment of zygomatic malunion using computed tomography in patients with cheek ptosis caused by reduction malarplasty. J Plast Reconstr Aesthet Surg. 2012;65(4):448–55.

3. Jin H. Reduction malarplasty using an L-shaped osteotomy through intraoral and sideburns incisions. Aesthet Plast Surg. 2011;35(2):242–4.
4. Garvey PB, Ricciardelli EJ, Gampper T. Outcomes in threadlift for facial rejuvenation. Ann Plast Surg. 2009;62(5):482–5.
5. Abraham RF, DeFatta RJ, Williams EF III. Threadlift for facial rejuvenation: assessment of long-term results. Arch Facial Plast Surg. 2009;11(3):178–83.
6. Rachel JD, Lack EB, Larson B. Incidence of complications and early recurrence in 29 patients after facial rejuvenation with barbed suture lifting. Dermatol Surg. 2010;36(3):348–54.
7. Fox SA. Opthalmic plastic surgery. 5th ed. New York, NY: Grune & Stratton; 1976. p. 223–5.
8. Park DH. Anthropometric analysis of the slant of palpebral fissures. Plast Reconstr Surg. 2007;119(5):1624–6.
9. Huggins RJ, Freeman ME, Kerr JB, et al. Histologic and ultrastructural evaluation of sutures used for surgical fixation of the SMAS. Aesthet Plast Surg. 2007;31:719–24.