Surgical Softening of the Nasolabial Folds by Liposuction and Severing of the Cutaneous Insertions of the Mimetic Muscles

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Abstract
Background A surgical technique was developed to soften the nasolabial folds by liposuction and severing of the cutaneous insertions of the mimetic muscles. This procedure was used for 11 patients from September 2006 to June 2009.

Methods With the patients under local tumescent anesthesia, extraoral incisions were made in nine cases and intraoral incisions in two cases. Liposuction was performed superior and lateral to the nasolabial fold using an order-made one-hole 2.5-mm cannula. After liposuction, the fibrae septa and the cutaneous insertions of the mimetic muscles in the nasolabial region were severed by a sharp-edge eye scissors. Compressive dressings were maintained for 3 days.

Results All the patients, followed up from 3 months to 3 years, were satisfied with the aesthetic results. Both the depth and the length of the nasolabial folds were decreased conspicuously. The most obvious change was improvement in the lateral part of the nasolabial folds. The extraoral scars were almost imperceptible. Severe complications were not observed in this series.

Conclusion Surgical softening of the nasolabial folds by liposuction and severing of the cutaneous insertions of the mimetic muscles is especially suitable for 40- to 60-year-old women with aging faces who are unwilling to undergo a face-lift. The procedure is simple, and the anatomic causes for deepening of the nasolabial folds can be corrected. Patients usually are satisfied with the final postoperative results.

Keywords Liposuction • Mimetic muscles • Nasolabial folds

Introduction
The nasolabial fold is an anatomic boundary between the cheek and the upper lip. Prominence of the fold is one of the most obvious features in the lower aging face. Numerous surgical and nonsurgical techniques for improving the nasolabial fold have been advanced. Collagen, hyaluronic acids, and botulinum toxin type A [1] are used to soften the nasolabial crease, but they last for only a few months and need injection repeatedly [2].

Poly-L-lactic acid hydrogel [3] and calcium hydroxylapatite [4] are long-lasting filling agents. They last for approximately 6–12 months. However complications such as erythemas, hematomas, granulomas, and even skin necrosis [5] are always troublesome.

Although trends of minimally invasive or nonsurgical techniques currently prevail, plastic surgeons never stop seeking a more satisfactory technique to ameliorate the nasolabial fold. An extensive list of methods for the treatment of the aging nasolabial fold is described. These techniques include burying Gore-Tex strips or soft-form tubes under the skin [6], direct excision of the nasolabial fold [7], rhytidectomy with liposuction [8], and extended superficial musculoaponeurotic system (SMAS) dissection with periosteal fixation [9]. However, some of these methods are not suitable for most eastern Asian patients.

Compared with Caucasians, pigmentary changes occur with a greater incidence than skin wrinkling among Asians.
The age at which skin wrinkling appears also is later in Asians [10]. Crow’s feet and prominent nasolabial folds substitute for slack and sagging of the skin in most eastern Asian patients. Therefore, it is not surprising that some patients desire a youthful nasolabial fold but not a face-lift at our clinic. On the basis of anatomy [11] and the mechanism of the aging nasolabial fold [12], we prefer liposuction and severing of the cutaneous insertions of the mimetic muscles in the nasolabial region.

Materials and Methods

From September 2006 to June 2009, in our department, 11 patients (one man and ten women) underwent surgical softening of the nasolabial folds by liposuction and severing the cutaneous insertions of the mimetic muscles in the nasolabial region. The average age of the patients was 48.7 years (range, 40–65 years). Preoperative preparation included communication with the patients and taking of medical photographs. The clinicians listened patiently to every individual desire. Changes in the nasolabial fold and the anticipated postoperative appearance of the fold were demonstrated according to the patient’s desire. Informed consent was obtained.

Surgical Procedure

All patients underwent local tumescent anesthesia. A solution of 0.25% lidocaine with 1:10^6 epinephrine was infiltrated in the nasolabial regions. The extraoral mini-incision was placed on the inferior extremity of the nasolabial crease lateral to the commissure. The bilateral incisions were symmetric and 5 mm long. The extent of liposuction was 5 cm superior and lateral to the nasolabial fold. Pretunneling beneath the subcutaneous layer was performed by a specially made one-hole 2.5-mm cannula (Fig. 1). Adipose tissue was aspirated from the nasolabial region using the cannula connected to a disposable 20-ml syringe to maintain the negative pressure.

After liposuction, the fibrae septa and the cutaneous insertions of the mimetic muscles in the nasolabial region were severed by a sharp-edge eye scissors (Fig. 2). Incisions were irrigated with saline and closed with 6-0 nylon. Compressive dressings were maintained for 3 days. Sutures were removed on postoperative day 5.

We encountered two patients who were unwilling to have any scars left on their faces. A vertical incision 5 mm long was made on the oral mucosa in the same location as the caudal portion of the nasolabial fold. Then a tunnel was undermined at the level of the subcutaneous layer. Aspiration and severing of the cutaneous insertions of the mimetic muscles were performed through the intraoral approach.

Results

The aesthetic results, as estimated subjectively by both patients and our surgical team, were satisfactory in all 11 cases during the follow-up period of 3 months to 3 years.
(Figs. 3, 4, 5, 6, 7). Both the depth and the length of the nasolabial fold were decreased conspicuously. The most obvious change was the improvement of the lateral nasolabial fold. The facial expression appeared more natural and the appearance of the middle face was youthful. The

Fig. 3 Preoperative view of a 58-year-old woman with deep nasolabial folds

Fig. 4 Postoperative view of the woman in Fig. 3 showing softening of the folds 1 year after surgery

Fig. 5 Preoperative view of a 46-year-old woman with deep nasolabial folds

Fig. 6 Postoperative view of the woman in Fig. 5 showing her appearance 3 months after surgery
extraoral scars were almost imperceptible. Postoperative swelling was mild and remitted in 2 weeks. Bruising seen in six patients subsided 3 or 4 weeks after surgery. No skin irregularities were observed in any patients. Severe complications such as facial nerve injury and hematoma were not observed in our series.

Discussion

The nasolabial fold is located at the junction of the alae nasi, the cheek, and the upper lip. It curves downward and laterally to end below and lateral to the commissure of the mouth. Individuals seldom pay close attention to this region when they are young because it looks natural and inconspicuous on the face.

The nasolabial fold is only an anatomic landmark before it deepens with age. The appearance of the deep nasolabial fold may be considered as a signal of face aging. Numerous surgical and nonsurgical techniques for improving the nasolabial fold have been advanced. Softening of the nasolabial fold is a great challenge for cosmetic surgeons.

The nasolabial fold is no longer an enigma in facial rejuvenation. The anatomy is clearly defined, and the mechanism of animation is studied. The nasolabial fold is caused by skin, fat, muscle, and bone [1]. Lateral to the fold, a generous layer of fat surrounds the bellies of the mimetic muscles and extends superficially between these muscles and the dermis [11]. There also is a nasolabial fat compartment, which lies anterior to medial cheek fat and overlaps jowl fat [13]. Medial to the fold, almost no subcutaneous fat exists between the dermis and the orbicularis. At this location, the skin adheres to the orbicularis oris directly.

With aging, descent of the malar fat pad takes place in an inferior and medial direction. Some resorption of the bone also occurs at the malar eminence. These phenomena result in loss of malar prominence and deepen the nasolabial fold [14]. As shown by magnetic resonance imaging, both a redistribution of the cheek fat (ptosis) and increased volume of the fat (hypertrophy) may contribute to deepening of the nasolabial fold with age [15].

The nasolabial fold is caused not only by the fat lateral to it. Pogrel et al. [16] suggested that the difficulty eliminating or reducing the depth of the nasolabial fold is due to the interaction of muscle, fat, and connective tissues in the overlying skin. Rubin [12] showed that the nasolabial fold is made up of dense fibrous tissue, muscle fibers branching from the elevators of the upper lip muscle, elevators of the upper lip muscles passing through the fold on the way to the upper lip vermilion, and muscle fibers originating in the labial fold fascia.

The nasolabial fold deepens due to a dynamic process of contracting mimetic muscles. Traction on the levator labii superioris alaeque nasi muscle markedly accentuates the medial nasolabial fold, whereas traction on the levator labii superioris muscle deepens the middle nasolabial fold, and traction on the zygomaticus major muscle has a minimal effect on the lateral nasolabial fold [17].

In view of the aforementioned anatomic studies, two solutions offer improvement of the anatomy behind the nasolabial fold. The one solution is to alter the bulge that develops lateral to the fold [8]. The other solution is to sever the muscles and tendons that connect to the dermis of the nasolabial region and to prevent their reattachment [8, 16].

We combine liposuction and severing of the cutaneous insertions of the mimetic muscles to soften the nasolabial fold. The extent of liposuction is 5 cm superior and lateral to the nasolabial fold but not medial to the fold. Liposuction may reduce the volume of the cheek fat, the malar fat, and the nasolabial fat.

To avoid contour irregularities, pretunneling is important to establish the subcutaneous planes of fat removal. It can prevent inadvertent removal in the subdermal fat layer. Severing is along the course of the nasolabial fold and 1–1.5 cm medial and lateral to the fold. Excessive severing is prohibited to avoid ptosis of the soft tissues after surgery. Thus, the dense fibrous tissue and muscle fibers described by Rubin [12] and the cutaneous insertions of the mimetic muscles can be separated from the dermis of the nasolabial fold.

Fig. 7 Postoperative view of the woman in Fig. 5 showing her appearance 3 years after surgery. The nasolabial folds are apparently improved, especially in the lower part of the folds.
fold. Although the muscle fibers will reattach to the dermis, redistribution of the reattachment points will occur.

After surgery, both the depth and the length of the nasolabial fold are decreased conspicuously. The facial expression appears natural, and the appearance of the middle face becomes youthful.

Conclusion

Surgical softening of the nasolabial folds by liposuction and severing of the cutaneous insertions of the mimetic muscles is especially suitable for 40- to 60-year-old women with aging faces who are unwilling to undergo a face-lift. The procedure is simple, and the whole operative time is less than 1 h. Anatomic causes for deepening of the nasolabial fold are corrected. Patients usually are satisfied with the final postoperative appearance.

Conflict of interest None.

References

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