Fat Grafting for Facial Contouring (Nose and Chin)

Tsai-Ming Lin, MD, PhD\textsuperscript{a,b,*}, Shu-Hung Huang, MD, PhD\textsuperscript{b}, Yun-Nan Lin, MD\textsuperscript{b,c}, Su-Shin Lee, MD\textsuperscript{b}, Yur-Ren Kuo, MD, PhD\textsuperscript{b}, Sin-Daw Lin, MD\textsuperscript{b}, Hidenobu Takahashi, MD\textsuperscript{d}

KEYWORDS
- Facial contouring • Nose • Chin • Profiloplasty • Microautologous fat transplantation (MAFT)

KEY POINTS
- Microautologous fat transplantation (MAFT) has been postulated by the primary author, who have demonstrated its efficacy using the MAFT-GUN.
- The indispensability of MAFT in facial applications has been shown for sunken upper eyelid, temple and forehead recontouring, primary augmentation rhinoplasty, and gummy smile correction.
- The technique for Asian profiloplasty, using MAFT on the nasal dorsum and chin areas, has shown a favorable aesthetic result.

INTRODUCTION
In 1963, Dr Landazuri was the first surgeon to use the term “profiloplasty,” defined as rhinoplasty plus mentoplasty.\textsuperscript{1} Asians often look to enhance the appearance of the nasal dorsum and chin profile due to certain ethnic deficiencies. Various nasal and chin implants have been adopted for this purpose. However, the results seemed unsatisfactory and potential morbidities were often bothersome. In past decades, fillers have garnered attention, despite complications and other concerns such allergy, necessity of repeat injection, and the cost-effectiveness.

Fat grafting was first described by Neuber in 1893\textsuperscript{2} and continues to be performed frequently because of the ease of fat harvest, abundance of graft material, and the lack of transplant rejection.
unpredictable, and complications such as abscesses, cysts, nodulation, and neurovascular injury may occur. Microautologous fat transplantation (MAFT) has been postulated by Lin and colleagues, and its efficacy has been demonstrated using the innovative instrument, MAFT-GUN to illustrate the indispensability in clinical applications for facial and body contouring and rejuvenation. In this article, the authors further demonstrate the technique for Asian profiloplasty of the nasal dorsum and chin areas to achieve favorable aesthetic appearance.

**PREOPERATIVE EVALUATION AND SPECIAL CONSIDERATIONS**

Preoperative evaluation included previous operative history and existing sequelae due to any filler injection. The best candidates for MAFT in these areas are patients without history of surgery (synthetic implant or autologous/allogenic cartilage or bone graft) or filler injections. Nevertheless, MAFT might be considered in selected cases due to unavoidable previous procedures.

Preoperative markings were made with the patient seated. In the nasal dorsum, the recipient area for fat transfer was drawn in the shape of an I (width, 6–8 mm) from the nasal tip to a point approximately 15 mm above the intercanthalline (A) with a fan-shaped cephalic end. This pattern was further divided into upper, middle, and lower zones (B). The fat parcels were transplanted in 3 layers (ie, from the deep areolar plane to the vascular/fibromuscular plane to the subcutaneous areolar plane) (C). In the chin area, a bell shape was designed centrally from the margin of chin lower border to 5 mm above the mentolabial sulcus (D) further symmetrically divided into upper/lower, right/left portions. (E) Anatomic multiple-layer (deep: supraperiosteum, middle: perioisteum to mentalis muscle/intermentalis muscle, superficial: mentalis muscle to skin) transplantation was performed in chin area according to surgical planning. (E and F, light brown) For those who wish to reduce the sharpness of the mentolabial sulcus, MAFT was deployed in multiple layers from oral mucosa to sulcus skin (E and F, yellow). (Courtesy of Chia-Hsiu Chien and Siang-Ting Ciou.)
portions (Fig. 1E). The recipient areas were multiple layers from deep, middle to superficial layers (Fig. 1C, F).

**Surgical Procedure**

All patients received total intravenous anesthesia before fat grafting. Appropriate local anesthesia was applied at donor and recipient inserting sites with 0.3 to 0.5 mL of 2% lidocaine HCl with epinephrine (1:50,000). Lipoaspirates were harvested from the lower abdomen or inner thigh where the adipocyte viability was greater. The donor site was infiltrated with a tumescent solution (10 mL of 2% lidocaine [20 mg/mL]: 30 mL of Ringer lactate solution: 0.2 mL of epinephrine [1:1000]). Approximately 10 to 15 minutes after infiltration, fat was harvested from the donor site with a blunt-tip cannula (diameter, 2.5 or 3.0 mm; ≥1 holes sized 1 mm × 2 mm). The lipoaspirate volume was approximately equal to the volume of the tumescent solution to ensure that fat constituted a major proportion of the lipoaspirate. To minimize damage to the lipoaspirate, the plunger of a 10-mL syringe connected to a liposuction cannula was withdrawn to approximately 2 to 3 mL to maintain a negative pressure of 270 to 330 mm Hg. Lipoaspirates were processed and purified by centrifugation at 3000 rpm (approximately 1200 g) for 3 minutes as described by Coleman. This procedure minimized graft contamination due to environmental exposure and manual manipulation. Centrifugation facilitated separation of the lipoaspirate into layers. The top layer contained oil from ruptured fat cells; the middle layer contained purified fat; and the bottom layer contained blood, cellular debris, and fluid. The purified fat was carefully transferred into a 1-mL Luer-slip syringe using a transducer. The syringe containing purified fat was loaded into a MAFT-GUN and connected to an 18-gauge, blunt-tip cannula. The device was set by adjusting a dial to deliver fat parcels of 0.0067 mL (ie, 1/150 mL) to 0.0083 mL (ie, 1/120 mL) with each trigger deployment (see Fig. 2). A puncture incision was made on the nasal tip/bilateral mouth angles with a no. 11 scalpel blade (see Fig. 1B, E) as an insertion point.

**Fat Grafting Injection**

**Microautologous fat transplantation to the nasal dorsum**

The fat transplantation procedure to the nasal dorsum was performed by pulling the trigger while withdrawing the MAFT-GUN. Meticulously, the parcels were transplanted in 3 layers of the nasal dorsum from the deepest to the most superficial layers (ie, from the deep areolar plane to the vascular/fibromuscular plane to the subcutaneous areolar plane) (see Fig. 1C). During MAFT, downward traction was applied to successive zones of the nose with the surgeon’s nondominant hand. First, traction was placed on the middle third of the nose while grafting the upper third. Next, traction was placed on the lower third of the nose (ie, the nasal tip) while grafting the middle third. Fat was transferred to the nasal tip last. The nasal dorsum is roughly divided by three (upper-, middle- and lower-third) as figure. The volume of fat grafting to be transplanted on nasal dorsum was roughly distributed on each third. However, the upper third was approximately 40-50% of the total volume. The insertion wound was subsequently closed with 1 suture (6-0, nonabsorbable) (Videos 1 and 2).

**Microautologous fat transplantation to the chin**

Anatomic multiple-layer (deep: supraperiosteal, middle: periosteal to mentalis muscle/intermentalis muscle, superficial: mentalis muscle to skin) transplantation was performed in the chin area according to surgical planning (see Fig. 1E, light brown). For those who wished to reduce the sharpness of the mentolabial sulcus, MAFT was particularly emphasized to blend this sulcus for a pleasing obtuse appearance (see Fig. 1E, yellow). Although in this sulcus, the multiple-layer transplantation was also applied from oral mucosa to skin. The average volume in this sulcus area was 1.0 to 2.0 mL (see Fig. 1E, yellow) and the volume of the chin augmentation was 2.0 to 4.0 mL (see Fig. 1E, light brown). The bilateral insertions were closed with 6-0 nonabsorbable sutures (Videos 3 and 4).
POSTOPERATIVE CARE

Massage was avoided postoperatively in the recipient area. The donor area was dressed with compressive garments and the recipient with adhesive paper tape to alleviate swelling. Routine postoperative care, oral antibiotics, and nonsteroidal antiinflammatory drugs were administered for 3 days or as needed. The suture placed at the insertion site was removed 2 to 3 days postoperatively, and the sutures placed at the donor site were removed 1 week postoperatively. Gentle lymphatic drain massage was suggested 7 days after surgery to relieve swelling. All patients received routine follow-up at an outpatient clinic at 1, 3, 6 months and even longer postoperatively. Photographs were taken at each visit for comparisons over time.

EXPECTED OUTCOME AND MANAGEMENT OF COMPLICATIONS

About 80% of patients in the authors’ series (more than 500 cases, contouring for nasal dorsum/chin or combined) for profiloplasty by MAFT technique were satisfied with a single procedure. No infections, cyst formations, nodulations, irregularities, or any severe complications were reported.

Fig. 3. A 26-year-old man presented for augmentation rhinoplasty with fat grafting to increase the height and length of his nose (A, C, E). MAFT was performed to place a 3.5-mL fat graft (1.5, 1.0, and 1.0 mL in the upper, middle, and lower thirds of the nasal dorsum, respectively). One year after a single MAFT session (B, D, F), the fullness over nasal dorsum was shown with the height and length maintained.
REVISION OR SUBSEQUENT PROCEDURES

Touchup MAFT might be performed 4 to 6 months after the first procedure for those who requested further enhancement of the contouring.

CASE DEMONSTRATIONS

Case 1. See Fig. 3.
Case 2. See Fig. 4.
Case 3. See Fig. 5.
Case 4. See Fig. 6.

DISCUSSION

Despite the fact that fat grafting has become popular in the past decade, several unresolved issues exist for fat grafting procedures. Particularly, patient dissatisfaction often occurs because of unpredictable absorption rates and potential morbidities such as visible nodulation and fibrosis.3 There remains a lack of evidence regarding long-term outcomes. Lin and colleagues4 demonstrated the clinical feasibility and indispensability of MAFT for facial recontouring.
and rejuvenation of the sunken upper eyelids, nasal dorsums, temples, and foreheads. They also proposed a new strategy for combined augmentation of the nasolabial groove, ergotrid, and upper lip for the treatment of gummy smile, illustrating an easy, reliable approach for facial contouring.

The concept of MAFT, as proposed by Lin and colleagues in 2007, emphasized that the volume of each delivered parcel should be less than 1/100 mL (<0.01 mL) to avoid potential fat grafting morbidities. The patented MAFT-GUN provides surgeons with a tool to control the parcel volume and therefore substantially avoid central necrosis and its associated complications. The long-term results specifically demonstrated accurate and consistent control of the fat parcels (1/60, 1/90, 1/120, 1/150, 1/180, and 1/240 mL) by avoiding occasional dislodgement of larger parcels that result in central necrosis and subsequent nodularity and skin irregularity over time.

There are numerous strategies for facial contouring for the nose and chin and each has its individual indications and potential complications. Nevertheless, no single procedure fulfills all the requests from all patients. With application of MAFT, the
traditional morbidities after fat grafting are decreased with promising long-term results. Furthermore, the rejuvenating effects of skin texture are also noted (see Figs. 4 and 5), further demonstrating the feasibility of fat grafting for facial contouring of the nose and chin.

**SUMMARY**

In search for a better profiloplasty strategy in Asians, there are many strategies with individual indications. Nevertheless, there seems to be no single way to fulfill all the goals. By avoiding the potential complications of fat grafting, MAFT provides an innovative breakthrough strategy in precise delivering of small fat parcels. The authors presented a simple, reliable, and consistent procedure developed based on MAFT for profiloplasty. Favorable outcomes with sustainable long-term effectiveness were obtained, further confirming that the MAFT technique is an alternative for facial contouring in the nose and chin.
SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.cps.2019.08.009.

REFERENCES