34 Refinements in Nasal Tip Surgery

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34.1 Introduction

The shaping and final positioning of the nasal tip complex is the most critical and sophisticated stage of rhinoplasty. Increased control and predictability of this part of the procedure is achieved by preserving the anatomical structures of the nose using suturing techniques that are reversible and incremental [2, 8]. Limiting visible onlay tip grafts also fits the concept of nondestructive techniques in modern open rhinoplasty. At the same time some of the well described maneuvers can result in consequences or can even cause complications of the procedure. For instance, dome definition sutures and extensive correction of the lateral alar convexities can lead to pinching of the tip and external nasal valve narrowing with breathing problems [3, 4]. Decreasing the tip projection by resection of dome segments should be followed by the use of camouflage tip grafting [7], which causes the same problems as application of the other grafts in the tip and supratip areas (distortion, dislocation, contour visibility, etc.).

The purpose of this study was to work out a complex of techniques to improve the results of open structure tip rhinoplasty.

34.2 Sliding Technique for Lowering Tip Projection

The first technical improvement described in this chapter is the method of decreasing tip projection without distortion of rim strip integrity. Using the idea of a tripod, shortening all three legs should result in backward and upward movement of the tip. Using the proposed technique, it is possible to achieve lowering of the tip projection via mobilization of the lower lateral cartilages from the middle of the lateral crus to the level of the juncture between the medial crus and the infralobular segment (Fig. 34.1A). Sliding the dome segment towards the medial crus reduces the length of both lateral and medial crura, causing a lowering of the tip projection. Integrity of the lower laterals is restored by suturing of duplicated components of the medial crus (Fig. 34.1B). This helps to increase the stability of tip support even without insertion of a columella strut.

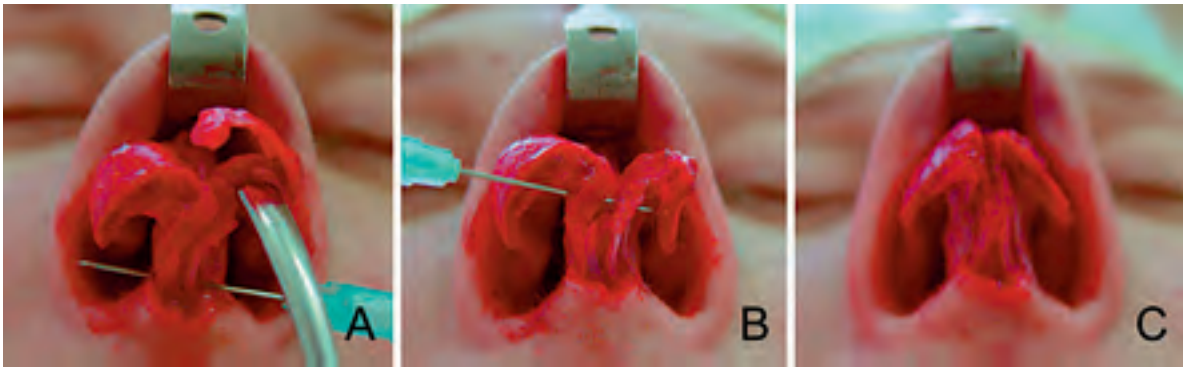

Fig. 34.1. Sliding technique for lowering of nasal tip projection. **A** Crosscuts of medial crura. **B** Temporary fixation of medial crura after sliding of crosscut parts. **C** Dome recreation with sutures

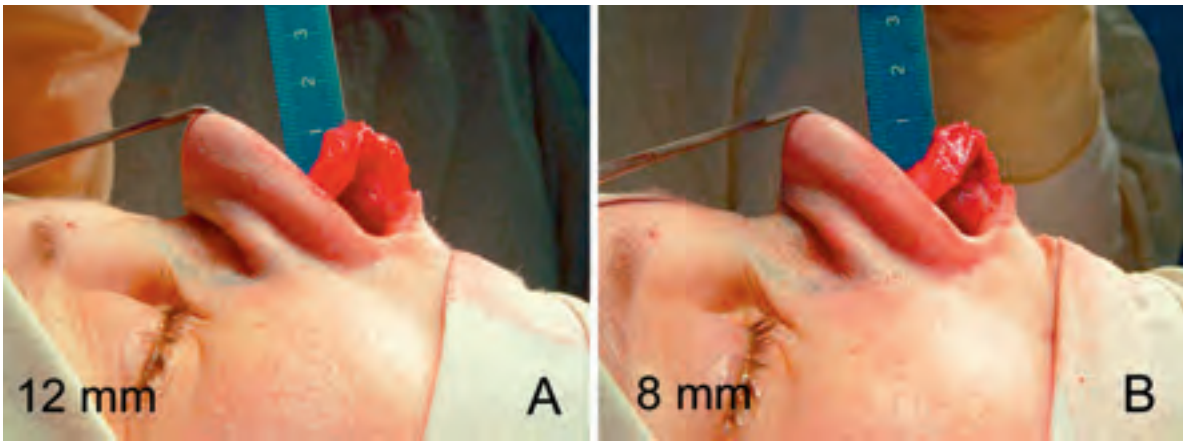

Fig. 34.2. Intraoperative measurements of dome projection. **A** Before lowering of tip projection. **B** After lowering of tip projection

Fig. 34.3. Clinical example of tip projection lowering with the sliding technique. **a** Side view of the nose before (*left*) and 6 months after surgery (*right*). **b** Three-quarters view preoperatively (*left*) and postoperatively (*right*)

Recreation of domes from the lateral crus is achieved using conventional suturing techniques with application of transdomal and interdomal stitches (Fig. 34.1C). Coaptation of soft tissue flaps to the mobilized lower lateral cartilages can be completed using side-to-side resorbable mattress sutures. The results of cartilage modifications and the appearance of the nose are shown in Figs. 34.2 and 34.3.

A similar cartilage overlapping technique was proposed by G. Aiach to correct an overprojecting tip, to correct a plunging tip that requires a cephalic rotation and for correction of excessive width of the domes [1]. We independently presented this method in 2002 at the 16th ISAPS Congress in Istanbul, Turkey [6].

34.3 The Second Interdomal Stitch

Another technical maneuver for nasal tip creation we advocate is a second interdomal stitch (SIDS). Reducing nasal tip width usually begins with resection of the cephalic portion of the lateral crura. This is according to the algorithm of placing sutures in the lower lateral cartilages and between them; the first stitch is between the medial crus and the next one is between the domes (interdomal stitch – IDS) [3, 8]. The following delicate sutures usually applied are transdomal ones (TDS), reducing the flare of the lateral crura, creating tip defining points and slightly adjusting tip projection. At the same time, TDS as well as dome spanning sutures (DSS) can result in convexity of the lateral crural complex, pinching the tip and narrowing the nasal vestibule, so causing breathing problems [4]. Lateral crural struts that were recommended to correct this problem are hardly ever applied because they need abutment with the rim of the piriform aperture [1, 4]. Instead of this we use the stitch between the newly created domes (SIDS) after application of TDS. The newly formed force vector between the upper dome segments causes the following effects for predictable symmetric nasal tip modification: (1) stabilization of tip and dome defi-

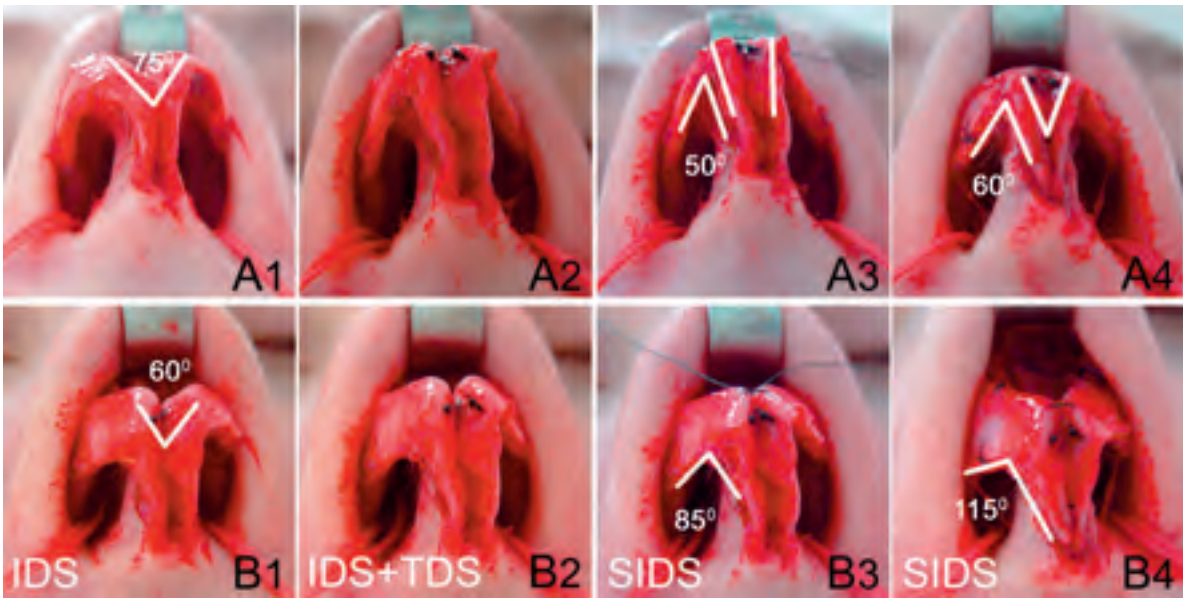

Fig. 34.4. Nasal tip remodeling dynamics with sutures from the basal (*upper row,* **A**) and front views (*bottom row,* **B**). *1* Angle of divergence before suture application (**A**) and after using IDS and TDS on the right side (**B**); *2* nasal tip framework appearance after IDS and TDS application; *3* angle of the external nasal valve before the SIDS tightening; *4* angle of the external nasal valve modification after the SIDS tightening

Fig. 34.5. Virtual equal side triangles over a framework background for tip-defining points created with the second interdomal suture

nition points; (2) manipulation by the angle of divergence and domal angulation; (3) production of a tension force that strengthens the lateral crus; (4) elimination of inversion of the lateral crus; (5) control of the proper position of supratip and infratip breakpoints; and (6) opening of the external nasal valve (Fig. 34.4). In cases of convexity SIDS serves as a lateral crus spanning suture with much more predictable outcomes. As the result of suture application, one can find a cartilaginous framework (Fig. 34.5) fitting the ideal tip characteristics after skin redraping.

Tebbetts [8] systematized suturing techniques for nasal tip remodeling. In his hands medial crural fixation sutures served to establish interdomal width, to adjust dome projection and to control the angle of the crus and the degree of flaring. Gruber [3] used interdomal sutures just posterior to the dome to achieve symmetry and stabilization of the tip cartilages. In the cases reported by Tardy [7], this type of suture sets interdomal width and usually serves as a platform for tip graft. Daniel [2] popularized domal equalization suture between cephalic ends of dome segments. It served to narrow the tip sufficiently and insure symmetry of the domes. At the same time this stitch location did not result in a tension force on the lateral crura that strengthened it and opened the external nasal valve.

The 2nd interdomal suture (SIDS) described in this paper is placed anterior to the previous ones and brings together the cephalic domes with the lateral crura, resulting in additional valuable effects on nasal tip geometry and function.

34.4 SMAS Flap

The nasal profile restoration is especially important in patients with excessive nasal septum resection and loss of cartilaginous dorsum support, in patients with posttraumatic nasal deformities and in patients with long nose after drooping tip lifting. To correct nose contour defects surgeons traditionally use different grafts. But the number of well-known complications – distortion, twisting, resorption, and skin atrophy – has led to a reduction of the indications for subcutaneous graft placing. The search for more reliable materials for contour nasal restoration is therefore continuing.

The goal of that part of our study was to work out the method of surgical correction of nasal dorsum defects

especially in the tip and supratip areas using the superficial musculoaponeurotic layer flap (SMAS flap).

There are four soft tissue layers between the nasal skin and the cartilaginous framework: subdermal fat, SMAS, subaponeurotic fat layer and perichondrium [8]. The superficial musculoaponeurotic layer presents with collagen bunches that surround the nasal musculature and form superficial and deep fascial layers for each muscle. As a result all these structures act as one functional unit – the musculoaponeurotic system of the nose. The basis of the worked-out soft tissue flap is the distal part of the superficial musculoaponeurotic system of the nose with a location above the lower lateral cartilages. The pedicle of the mobilized tissues is directed to the caudal part of the transverse nasal muscle. The blood supply of the flap is achieved via the dorsal nasal artery and external nasal branch of the anterior ethmoidal artery. The branches of the lateral nasal artery serve as the main source of the nasal tip blood supply. They are located in the subdermal fat layer above the SMAS.

Open rhinoplasty begins with subcutaneous soft tissue mobilization above the lower lateral cartilages up to the level of the upper lateral cartilages. The SMAS layer is left underneath the skin envelope. Then the SMAS flap is undermined over the lobules of the lower lateral cartilages. Average dimensions of the flap are as follows: length – 18 – 30 mm, width – 8 – 15 mm, thickness – 1 – 2 mm (Fig. 34.6). The flap transfer is possible under the angle of rotation up to 90 degrees. Small subcutaneous irregularities in supratip area, interlobular bifidity, and retractions in that zone as a result of scarring after previous surgery are possible to manage successfully with the SMAS flap.

We performed 103 rhinoplasties with tissue mobilization within the tip area in two surgical planes: subcutaneously and with SMAS undermining. In 37 cases the SMAS flap was used for nasal tip and dorsum remodeling, whereas in the other 66 cases there were no indications to use it. In these patients we also studied the possibilities for flap rotation and transposition.

34.5 Case Report

Patient K., a 22-years-old female, complained of nasal deformity – hump, supratip depression and entire nose asymmetry. In childhood she had sustained nasal trauma with bone fracture and subsequent repositioning. At the age of 18 she underwent a closed septorhinoplasty with excessive resection of the septal cartilage that caused loss of cartilaginous dorsum support. Secondary open septorhinoplasty was performed. The remnant of the septal cartilage was harvested endoscopically with dimensions of 23×11×2 mm. But it was not sufficient to fill the supratip depression. The SMAS flap was undermined with dimensions of 22×15×2 mm. Two cartilage flaps from cranial portions of the lateral crura with dimensions 16×6 mm were also elevated. The remaining portion of the lateral crura was 6 mm in width. Hump resection and lateral osteotomies were performed. To fill the supratip depression we turned the alar cartilage flaps around the midline overlapping the upper lateral cartilages with the suture positioning. Next the SMAS flap was rolled up above the cartilage flaps. Tip support was restored with a strut graft; dome sutures and a Sheen graft were also applied. The nasal appearance was significantly improved (Fig. 34.7).

In the 5 years of follow-up we have not observed any nose deformities connected with SMAS flap atrophy. There were no secondary procedures after usage of the above-mentioned flap. In all patients we obtained good functional and aesthetic results.

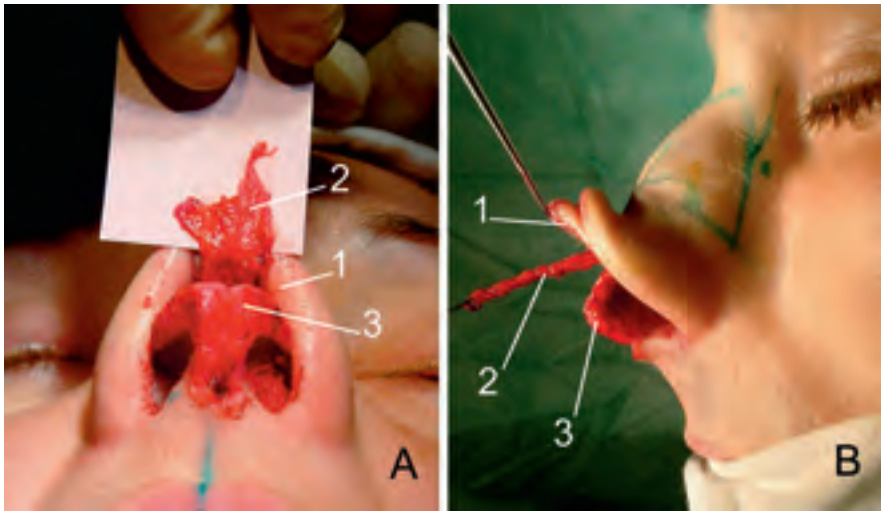

Fig. 34.6. SMAS flap undermining on basal (**A**) and side (**B**) views. *1* Elevated skin envelope; *2* SMAS flap; *3* lower lateral cartilages

Fig. 34.7. Patient K before (*left*) and 2 years after (*right*) open rhinoplasty using SMAS flap to fill supratip depression

Grafts from the temporal fascia and fascia lata were widely used especially in secondary rhinoplasties [2]. The SMAS graft rhinoplasty from the masseterico-parotid area harvested during a simultaneous face-lift was also described [5]. Fascial transplants are very pliable but unfortunately rather unstable. It is well known that the classical open rhinoplasty technique implies dissection in the subaponeurotic layer striving for tissue exposure underneath the perichondrium and periosteum. At the same time in clinical practice skin undermining in columella and tip areas is usually performed subcutaneously with the SMAS layer remaining adherent to alar cartilages. This layer is recommended to be cut off to expose the cartilage of lateral crura and prevent soft tissue fibrosis in the tip area. Thus the utilized material can be turned into the flap. Tip skin blood supply is based on subdermal plexus and the accurate SMAS dissection does not compromise skin vascularization. At the same time precisely elevated skin can better contract and fit the newly formed cartilaginous frame. The previously described ligament flap also included the musculoaponeurotic system of the nose (Yukio Shirakabe 2006, personal communication). This study was presented recently by Dr. Shirakabe (from Tokyo, Japan) at an ISAPS course in Cape Town, South Africa, in 2006 and was dedicated to tip projection adjustments in Oriental patients. Unfortunately we did not receive approval for publication of this data in the journals we sent it to.

34.6 Conclusions

A worked out complex of techniques is a useful modality to improve the results of open structure tip rhinoplasty. The second interdomal suture strengthens the lateral crura and opens the external nasal valve. A sliding technique for lowering of the nasal tip projection preserves the integrity of the domal segment. Application of the SMAS flap diminishes the necessity of cartilage and fascial graft usage, reducing the risk of sequelae connected with them. Two-layer soft tissue separation enables the nasal skin to shrink better and allows adequate redraping of the newly formed cartilaginous framework.

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