Rhinoplasty - Tip Augmentation by Extended Columellar Strip

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Abstract: The surgical technique of nasal tip accentuation with transdomal sutures and tip augmentation using a cartilaginous columellar strut is described and illustrated with diagrams and a surgical patient video. Good surgical results are reported in six patients without significant cartilage absorption at six months follow-up.

Introduction

Rhinoplasty is considered one of the most difficult facial plastic surgeries and surgery of the nasal tip is one of the most difficult parts of a rhinoplasty. One who can control the nasal tip is said to be able to master the rhinoplasty. A projected and well-defined tip is important for successful tip surgery.

Background: The columellar strut is a common procedure in nasal tip surgery. The strut provides a structural foundation for the nasal tip. Although effective for most Caucasians, in Asians the columellar strut often results in a suboptimal result since it does not provide an adequate foundation for support.1 For an optimal outcome, the author proposes a different surgical technique, using a large columellar strut to create a new tip and transdomal sutures for better tip definition.

Surgical anatomy: The external framework of the nose is formed by the paired nasal bone, the paired upper lateral cartilage (ULC) and the paired lower lateral cartilage (LLC). The lower lateral cartilage is the structure which forms the nasal tip. The nasal tip is composed of three-dimensional structures having curves and
angles. The underlying cartilages support and provide the ultimate shape of the nasal tip. More than any other nasal structure, the lower lateral cartilages have their shape, size and position reflected through the skin as surface anatomy. The alar cartilage consists of the medial crus, middle crus and the lateral crus. Each component has its role and influence in the aesthetic part of the nose. The medial crus lie within the columella and join the middle crus. The middle crus bridges the medial and lateral crus (Figure I). The lateral crus extend into and fill the tip lobule. Thus, a tripod is formed by the paired medial crura which are fixed within the columella by the fibrous tissue and the paired lateral crura which extend laterally.

There is difference between tip augmentation surgery and tip accentuation surgery. In tip accentuation surgery, transdomal sutures are passed. The dome of the lower lateral cartilage is pinched superiorly using a nontooth forceps. Sutures are passed from the dome of one lower lateral cartilage to the other (Figure II). This suture effectively increases the height of the nasal dome by about 2 mm. It also makes better definition of the nasal tip. Tip augmentation is required when the surgeon wants to achieve more than 3-4 mm of tip augmentation. It can only be achieved by placement of a graft, either using cartilage or a synthetic implant. Placement of a silicon implant is the most popular operation in Japan, but it is not without the potential for severe complications such as exposure of the implant and implant displacement.

The primary author always uses cartilage for tip augmentation due to the complication rate of silicon implants. Cartilage also provides a natural feeling to the patient, as well as being from the same body so there is less chances of rejection unless infection develops.

**Material and Method**

This is a case study of six patients in which transdomal sutures were applied followed by tip augmentation during the same surgery. All the procedures were done by the first author. Two of the cases were mainly for tip augmentation without any deviation of the external nose hence osteotomies were not required. The elevation of nasal skin was limited and only involved the nasal tip region. The remaining four cases had external deviation of the nose with marked deviation of the septum. In those cases, the skin elevation was elevated off the nasal dorsum to the level of the nasion. Septoplasty and osteotomies were performed for deviation of the septum and external nose.

**Operative steps:** All the cases were performed under general anesthesia with cuffed oral endotracheal tube. The endotracheal tube was positioned strictly in the midline to prevent any artificial tip deviation. After infiltrating the columella with 2% xylocaine with 1:200,000 epinephrine, a midcollumellar inverted V incision was placed at the narrowest part of columella. The nasal skin was elevated to the level of the nasion. At the junction of the nasal bones with the upper lateral cartilages, extreme care was taken not to disarticulate the bony cartilage cantilever articulation. The nasal bone periosteum was elevated along with the overlying nasal dorsal skin.

A mucoperichondrium and mucoperiosteum flap of the septum was elevated completely on one side. In the four cases where there was deviation of the septum, a routine septoplasty was also performed. The entire length of the inferior strip of septal cartilage, about 3 mm in breadth, was harvested taking care to harvest the septal strip in a single piece (Figure III). The harvested cartilage is shaped into a smooth strip using a number 15 Bard Parker blade.

A tunnel is created between the two medial crura of the LLCs. The harvested cartilage strip is positioned between the two medial crura of the LLCs. The strut is sutured using 3-0 non-absorbent sutures, adjoining the medial crura of left and right LLCs to prevent strut displacement.
After assessing the exact augmentation required for the patient, the cephalic end of the strip of the cartilage was placed between and sutured to the right and left upper lateral cartilage (ULC). Transdomal sutures were also placed (Figure IV) for better tip definition. The primary author prefers to fix the entire assembly into position with number 26 gauge needles before placing the transdomal sutures. The cephalic end of the cartilage strip is secured with sutures to the ULC to prevent strut displacement (Figure IV). The midcolumellar skin incision was closed using 6-0 sutures. **Enlarged Pictures at The End of Manuscript**

View YouTube Video:  [https://youtu.be/ti7CcAT7lpE](https://youtu.be/ti7CcAT7lpE)

In patients having an external deviation of the nose, lateral and horizontal osteotomies are performed with the same technique utilized in a standard rhinoplasty.

**Followup:** Paper microplast is applied transversely to the dorsum of the nose, each paper strip overlaps one third of the previous one. Then one long strip is placed on each side of the nose and around the tip. This strip pinches the tip for proper tightening of the entire paper microplast dressing and to prevent hematoma formation. POP cast is applied for three weeks. If POP cast becomes loose in the postoperative period, it is reapplied.

**Results**

All the six cases had significant tip augmentation proportionate to overall facial profile. All cases were followed for 12 months, postoperatively. There was no absorption of cartilage in any of the cases and all the patients were satisfied with their results and overall facial profile. However, some amount of reduction in augmentation was noticed by the surgeon after 3-5 months.
Discussion

Reported complications of cartilage tip graft placement have included a tendency for malposition, displacement, warping, resorption, visible irregularity, extrusion, infection and soft tissue deformation and atrophy. A columellar strut is the most common and standard procedure used in nasal tip surgery. However, in a series of 217 Asian rhinoplasties, Jae-Goo and Junsun have used a modified septal extension graft by means of an extended marginal incision to gain greater control and more predictable outcome in Asian tip surgery.

The suture technique for reshaping the nasal tip has been used for decades. In 1954, Irvine B Goldman described a method for narrowing the tip and increase tip projection known as the “Goldman Tip” procedure in which lower lateral cartilages are completely transected lateral to the LLC dome. Next, the ends of the medial crura are sutured together in the area of the domes adding to the length of the medial crura. This new structure is then anchored to the septum. Although it became a very popular technique, its long term results were poor and often produced a pinched narrow tip.

In 1985, McCullough and English advocated the “double dome unit” procedure to increase nasal tip projection and definition as an alternative to Goldman tip procedure. The double dome unit is created by the morselisation of the medial and lateral side of each dome and placement of a horizontal mattress suture through all four crura just beneath the dome. The result is narrowing of the tip, increased lobular size, increased tip projection and reduction in the interdomal distance. This technique does not allow for alteration of the domes individually.

Tardy and Cheng modified the technique in 1987 by excising the interdomal tissue and scoring the dome. The knot is placed in a more symmetric position deep in the interdomal space. Although Tardy coined the term “the transdomal suture”, as it is known today it is a separate suture placed through the crus of each dome. This suture technique was also described by Daniel as the “dome-definition suture”. Without the transdomal suture, the tip definition is poor (Figure V). The use of transdomal sutures produces better tip definition (Figure VI). For this reason we used transdomal sutures in all of our cases.

Conclusion

The author presents a series of six cases with a twelve month followup. There were no complications encountered during the followup period. Although a small amount of reduction in augmentation was noticed by the surgeon after a three to five month period, the patients were uniformly pleased with the result.

References


Figure 5  Poor Tip Definition

Figure 6  Good Tip Definition