The Tripod Concept for Correcting Nasal-Tip Cartilages

In treating nasal-tip deformities, the authors use the tripod concept to anatomically simulate the paired lower lateral cartilage complexes. They recommend using rib cartilage to obtain predictable and reproducible results. (Aesthetic Surg J 2004;24: 257-260)

We have found the tripod concept useful in correcting severely deformed nasal-tip cartilages. The concept is simple. Nasal-tip support and shape are provided by the paired lower lateral cartilage complexes: Each complex consists of a medial crus, which includes the intermediate crus, and a lateral crus. These paired complexes can be visualized as a tripod, with each lateral crus forming a separate cephalic-lateral leg and the adjoining medial crura forming the caudal-medial third leg (Figure 1). Reestablishment of this tripod should be the goal of any major nasal-tip correction. The tripod structure must have (1) the strength to support the tip and prevent the alar side walls from collapsing and (2) the shape to provide the nasal tip with an aesthetically pleasing, natural appearance.

Preferred Technique

The method used for rebuilding the tripod depends on several factors. The most important factors are (1) how much usable cartilage is present in the tip and (2) what cartilage (septal, auricular, or rib) is available for grafting. In minor tip deformities, when the lateral crura are present but collapsed or mildly deformed, autogenous lateral crural strut grafts are the treatment of choice to reestablish tripod shape and strength. When the lateral crura are absent or so deformed that they cannot be used, correction is more challenging.

If the lateral crura are not usable but the medial crura and domes are intact, a columellar strut is placed between the medial crura and sutured to strengthen the lower leg of the tripod. A columellar strut is used in almost all cases of nasal-tip reconstruction to stabilize the lower leg and thereby resist displacement by scar-tissue contraction or swelling. Next, the vestibular skin is undermined off the deep surfaces of the domes. Strips of autogenous cartilage are sutured to the undersurface of each dome and extended laterally, overlapping the pyriform aperture rim and ending in an undermined pocket inferior to the alar groove (Figures 2 and 3). If increased width is needed between the lateral legs, an alar spreader graft is sutured between the grafts to displace them more laterally (Figure 4).

If the medial and lateral crura are absent or unusable, a shaped autogenous rib cartilage graft is used as a columellar strut to act as the lower leg of the tripod. It is carved to simulate the effect of the caudal margins of the medial crura and medial portion of the domes on the columella-infratip lobule.

The graft has a 0.035-inch threaded internal K-wire that extends within 4 or 5 mm from the tip. About 10 mm of the K-wire protrudes from the base of the graft. For stabilization, the exposed K-wire is placed in a drill hole in the maxilla, in the nasal spine area, after the spine is removed with a rongeur. The drill hole should travel through the midline, just below and parallel to the nasal floor so it will not extrude through the nasal or palatal bony surfaces (Figure 5).

The lateral legs of the tripod are reconstructed in a fashion similar to that used when the domes are present. The only difference is that instead of suturing the medial end of the autogenous cartilage strip graft to the undersurface of the dome, the surgeon sutures the graft to the tip of the columellar strut. It is preferable and easier to suture the graft strips to the domes, assuming that they are present, than to the tip of the columellar strut, but by shaping the ends of the cartilage strips to blend in with the tip of the strut and carefully suturing them together, the surgeon can achieve a natural-looking tip (Figure 6).

Alternative Techniques

We prefer the aforementioned technique for rebuilding the lateral crura; however, if the rib cartilage cannot be
Figure 1. Demonstrates the tripod concept with the 2 lateral crura forming the cephalic-lateral legs and the adjoining medial crura as the third, caudal-medial leg.

Figure 2. Strips of cartilage are sutured to the deep surfaces of the existing domes to replace the missing lateral crura. Note that the lateral end of the graft overlaps the pyriform aperture rim for support.

Figure 3. A, C, Preoperative view of a 24-year-old woman. B, D, Postoperative view 4 months after secondary rhinoplasty. Strips of autologous rib cartilage were used to replace missing lateral crura (as described in Figure 2).
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**Figure 4.** Alar spreader graft is used to increase the width of the lateral legs of the tripod.

**Figure 5.** A shaped columellar strut replaces the missing medial crura. For stabilization, the exposed K-wire is placed in a hole drilled in the maxilla.

**Figure 6. A, C,** Preoperative view of a 14-year-old girl who at age 6, after sustaining trauma, underwent rhinoplasty. **B, D,** Postoperative view 1 year after secondary rhinoplasty, mentoplasty, and suction lipectomy of the cheeks and neck. Secondary rhinoplasty was performed with the use of strips of autologous rib cartilage sutured to a shaped columellar strut. Rib cartilage was also used for the dorsal onlay graft. Both the columellar strut and dorsal onlay graft were reinforced with K-wires.
used, several other choices are available. Auricular cartilage can be used in the shape of a boomerang and sutured to the top of the columellar strut (Figure 7). An anchor graft of auricular cartilage, such as that described by Juri,\(^3\) can also be used (Figure 8). In some cases, auricular cartilage grafts have been carved to the shape of “normal” lateral crura and sutured to the sides at the tip of a columellar strut (Figure 9). We have used these methods with limited success.

These techniques are tedious and sometimes frustrating but always a challenge. It is usually not difficult to improve the airway, but problems arise when one tries to achieve such nuances in nasal-tip aesthetics as a subtle columnellar-lobular angle, a correct infratip lobular width and height, a “seagull” outline of the alar rims, or a supratip break.

The tripod concept for nasal-tip correction has been helpful to us in the treatment of secondary and, occasionally, primary nasal-tip deformities. Using this concept to anatomically simulate the paired lower lateral cartilage complexes has helped us achieve significant improvement in both functional and aesthetic nasal-tip deformities. In our hands, rib cartilage has proved the cartilage of choice for obtaining a predictable and reproducible result.

**References**


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