Grafting Techniques in Primary and Revision Rhinoplasty

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KEYWORDS

• Rhinoplasty • Revision rhinoplasty • Costal cartilage • Auricular cartilage • Cartilage grafts

KEY POINTS

- Patient age, structural requirements, and airflow considerations are critical in selecting between septal, auricular, costal, and cadaveric cartilage tissue.
- There are many variants for spreader grafts placement and design.
- Remnant septal cartilage and auricular cartilage can be used in revision operations; consent for costal cartilage should be obtained, even if probability of rib graft harvest is low.
- Correction/augmentation of dorsal contour deformities are readily accomplished using monobloc and diced/shaved cartilage grafts. However, for airway expansion of the internal valve, dorsally extended spreaders should be considered.
- Tip grafting is nuanced and aesthetic objective must be balanced by considerations over available graft material and airway patency. Always consider turn in flaps and tip suture methods.

Panel discussion

1. How do you treat severe nasal valve collapse and a significant septal fracture deformity in an attractive patient who does not want any major changes in her appearance?
2. How would you manage a patient with a postseptoplasty dorsal depression who originally did not want any cosmetic changes to her nose?
3. How do you correct saddle deformities accompanied by a significant septal perforation?
4. Midvault surgery for obstruction and aesthetics can be challenging. What are considerations in the patient with a prominent dorsal hump? Also, how do you correct the convex lower lateral crura?
5. What grafting techniques can be used to contour and refine a bulbous nasal tip?
6. What grafting methods do you use to correct a pinched tip in secondary surgery?
7. What have you done differently over the past 5 years?

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INTRODUCTION

Rhinoplasty has evolved immensely since the time of Joseph and has become more complex as both aesthetic standards and patient expectations have become more stringent. At the same time, despite improvements in surgical techniques guided by analysis of long-term outcomes, revision rates remain relatively low.[1–5] The cornerstone of contemporary rhinoplasty rests on structural cartilage grafting.[6] Structural grafts resist static forces owing to gravity and aging, and dynamic forces produced by tissue contraction, paranasal muscle activity, and oscillatory pressure gradients during respiration.[7–11] When properly performed, both airway patency and attractive contours are the anticipated surgical outcomes. Structural approaches in rhinoplasty remain dominant, and there has been a proliferation of graft use in both primary and secondary operations. Despite more than 100 years of progress, there is still no consensus about the best way to augment the dorsum, reshape and support the tip, or manage the middle third of the nose. Many controversies remain in rhinoplasty. This articles present different perspectives on these controversial topics.

In the dorsum, multiple approaches and techniques are used to correct deformities as subtle as a slight convexity and as dramatic as those seen in saddle noses affected by vasculitis. Options for correcting these defects, when extensive, can include a monobloc onlay graft, dorsally extended spreader grafts, camouflage grafts, and diced cartilage in fascia,[12] along with its many variants.[13] Septal, conchal, and costal cartilage can be used, with costal cartilage typically used for major deformities requiring strong structural support.

In the nasal tip, over the past decade, there has been a gradual shift away from the pro forma use of cap, shield, and columellar strut grafts and toward techniques that maintain native dome architecture and enhance mechanical stability.[14,15] Caudal septum extension grafts and their variants are now widely used to support the nasal tip, supplementing the popular classic floating columellar strut. Lower lateral cartilage malposition, crural convexity issues, and alar margin shape are treated with a number of techniques, including lateral crural strut grafts with or without repositioning. Less aggressive methods such as turn under flaps, mattress sutures, lateral crural tensioning,[16] and rim grafting,[17,18] are also used.

The middle vault is also a challenging area because it is an important part of the internal nasal valve and is responsible for a smooth brow-tip aesthetic line. Here, the spreader graft has remained the workhorse, although there are many different approaches beyond classic graft placement. Contemporary techniques include spreader flaps (auto spreader grafts),[19] as well as unique ways of reattaching separated upper lateral cartilage to the quadrangular cartilage.

The present article is not meant to be a comprehensive discourse on grafting, but focuses on a few illustrative case studies to demonstrate various techniques as well as controversies in graft placement and use to correct specific deformities.

Question 1: How do you treat severe nasal valve collapse and a significant septal fracture deformity in an attractive patient who does not want any major changes in her appearance?

Case 1: This healthy young woman has difficulty breathing at rest and during exercise (**Fig. 1**A–D). She has near total obstruction of the right nasal airway and no aesthetic concerns; her objective is to breathe better. On examination, with even a mild inspiratory effort, the left sidewall of her airway collapses. Intranasally, she has a severe septal fracture causing a deformity of the septum on the right side resulting in little airflow. This case is challenging in that the overall aesthetics of the patient are good and the patient is attractive. The septum is severely deformed, and this deformation extends to the dorsal quadrangular cartilage. There is also severe left spur and a deviation of the perpendicular plate to the right side, as expected.

FRIEDMAN

I always inquire about the patient's concerns as I try to address their specific needs and meet their expectations. In this case, the patient wishes to maintain her appearance but have improved breathing. My preference is to address the functional concerns and maintain the appearance just as the patient requested. The only way I can achieve this is through an endonasal approach, because if an external approach is used, I am unable to maintain an untouched tip and I will automatically be altering the shape of the nasal tip. I would apply a variety of techniques to straighten the septum, including resection of deviated portions of cartilage and bone, scoring the caudal septum and battening it with cartilage grafts, always maintaining a strong dorsal and caudal "L-strut." I would then add spreader grafts through an endonasal approach to stabilize the dorsal septum and improve the width of the nasal valve area. In this type of case, I also like to crush the inferior turbinates, as indicated, but I never remove