CLINICAL VIGNETTE

Twist and Snout: A Novel Cartilage Graft Alteration for Repairing a Nasal Alar Defect

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Introduction

Free cartilage grafts utilize cartilage from a distant site to reestablish cosmetic, structural, and functional integrity to an impaired anatomic location. This technique is particularly useful for repairing nasal alar defects in which a significant portion of the greater or lesser alar cartilage, or the lateral fibro-fatty alar tissue is removed. This cosmetic free margin requires a rigid framework, which is necessary to prevent alar retraction and nostril collapse, thus allowing for proper airflow during inspiration.[1,2] Here, we present a case in which a free cartilage graft was mechanically altered in order to enhance its strength and provide additional support.

Case Report and Technique

Our patient, a 53-year-old male, underwent Mohs micrographic surgery (MMS) for a biopsy-proven basal cell carcinoma (BCC) on this right ala. Tumor clearance was achieved after four stages. The post-operative defect measured 1.4 cm by 1.6 cm and was relatively deep, such that the ala would collapse with inspiration (Figure 1).

It was determined that a cartilage graft could be utilized to provide additional needed support.

The length of the cartilage graft was determined by measuring the distance between the medial and lateral borders of the defect at the alar rim; approximately 4 mm were added to the measurement, to allow for adequate reshaping after harvesting.

Sterile surgical preparation of the alar defect, as well as the ipsilateral ear, was performed in standard fashion. Following infiltration of 1% lidocaine with epinephrine 1:1,000,000, a partial rectangular incision was made along the antihelix creating a "door-like" skin flap. The skin covering the underlying cartilage was dissected with tenotomy scissors, and the donor cartilage was exposed. Using a 15-blade and tenotomy scissors, cartilage was excised and placed in sterile saline. Hemostasis was achieved using light electrocautery, and the overlying skin was subsequently sutured using 5-0 polypropylene and covered with a bolster dressing.

At the recipient site, the medial and lateral edges of the defect were undermined with tenotomy scissors to create two pockets for placement of the graft. Surprisingly, the cartilage graft was relatively soft and flexible and did not provide adequate structural support to prevent alar collapse. To increase the strength of our cartilage strut, we twisted the graft one full turn into a spiral configuration. The twisted graft was then secured into the recipient pockets using 5-0 polyglactin 910 suture (Figure 2). A melolabial transposition flap was then used to complete the closure. Over the ensuing two months, in an effort to improve the cosmetic outcome of the repair, the patient underwent additional contouring strategies, including: injection with intralesional triamcinolone acetonide, dermabrasion, and surgical revision of the alar crease (Figure 3).

Discussion

Facial reconstruction and repair of defects formed by the surgical removal of cutaneous neoplasms can involve complex decision-making. Nasal alar defects that significantly alter the underlying structural support elements may cause collapse of

the nostril during inspiration, resulting in both cosmetic and functional compromise. Free cartilage grafts can be used to recreate structural support and maintain functionality. These grafts can be obtained from several locations, the ear being one of the most common.

In the case of our patient, the harvested cartilage from the antihelix was very soft and flexible, which would not allow for preservation of the functionality of his alar rim during respiration. Twisting the free cartilage allowed for stronger structural support to the ala. Conceptually, this is comparable to the strength that the twisted configuration imparts to the central cardboard tube of a paper towel roll. This concept has previously been applied to other indications, notably in orthopedic surgery where tendon and ligament grafts have been twisted in attempts to gain a functional advantage. The results have been equivocal regarding twisted, braided, and parallel graft configurations in that setting.[3,4]

Although the twisting configuration in our case did effectively increase the strength of our graft, another potential option is to obtain a thicker graft from the donor site. Another possibility is harvesting cartilage from another location, as auricular cartilage is classified as elastic cartilage and is inherently less rigid than hyaline cartilage.[1,2] However, this is not commonly performed, as the elastic cartilage of the ear is far easier to access.

This case not only illustrates a novel alteration of free cartilage grafts but also several techniques that can be used to improve the final cosmetic outcome of a melolabial transposition flap. Four weeks post-operatively, the area overlying the original primary defect began to have evidence of "pin-cushioning;" therefore, we injected the area with 0.5 mL of intralesional triamcinolone acetonide 10 mg/mL. Next, the patient underwent dermabrasion, six week post-operatively, to improve the contour between the border of his normal nose skin and donor cheek skin. Finally, at eight weeks, we revised the flap to improve his alar groove. Using a 15-blade, we made a deep incision approximately 2 mm thick corresponding to the location and length of the contralateral alar groove and allowed the area to heal by secondary intention. The combination of these 3 scar revision techniques significantly improved the cosmetic outcome (Figure 3).

Our patient experienced a favorable outcome with preservation of function, structure, and cosmesis. To our knowledge, this is the first report in dermatologic surgery of mechanically manipulating cartilage in this fashion in order to enhance its strength. This case effectively demonstrates how alterations in cartilage shape, placement, or configuration, either inherent or mechanically induced, may prove beneficial to achieve maximum cosmetic and functional results.

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Figure 1: The resultant defect, measuring 1.4 cm x 1.6 cm, following four stages of Mohs micrographic surgery.

Figure 2: The free cartilage graft, twisted into a spiral configuration, and secured in place, providing needed integrity to the nasal ala.

Figure 3: Final result, following intralesional triamcinolone acetonide, dermabrasion and a revision of the nasal alar crease, which was left to heal by secondary intention