Diced Cartilage Graft for Revision Rhinoplasty in a 64-year-old Cleft Patient: A Case Report

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Summary: Pure diced cartilage graft has been the technique of choice for revision rhinoplasty in cleft patients since 2003 at our center. This technique has several advantages over the traditional en bloc cartilage onlay graft including minimal risk of warping, its technical simplicity, and the ability to adjust the shape of the graft with manual massage for up to 3 weeks postoperatively. Calcification of the costal cartilage, however, poses a real concern for surgeons. In this case report, we are presenting a 64-year-old woman with a right unilateral complete cleft lip and palate deformity who presented to our clinic for secondary revision. Central-pattern rib calcification was encountered during the operation. Outcomes, details of the operation, and potential limitations of this technique are discussed in this case report. (Plast Reconstr Surg Glob Open 2016;4:e813; doi: 10.1097/GOX.0000000000000827; Published online 21 July 2016.)

CASE REPORT

This is a case report of a 64-year-old woman who presented for secondary revision of cleft lip and nose deformity. On examination, she was found to have a wide visible scar on the lip. The cartilaginous nasal septum and the bony septum were deviated, which resulted in the nasal dorsum deflecting toward the cleft side. The displacement of the lower and upper lateral cartilages corresponded to the nasal deformity with depressed alar rim on the cleft side. The cleft side nasal floor was deficient with asymmetry of the pyriform rim (Fig. 1A, B). Intraorally, she was found to have an unrepai

Technique Description

This patient received 500 mg of cefazolin intravenously shortly after general anesthesia induction. The right chest and the face were prepared and draped in the sterile fashion. 1% lidocaine with 1:100,000 epinephrine was infiltrated along the planned incision site. A 3-cm-long costal graft was harvested from the right seventh rib. One challenge we encountered intraoperatively was the calcification of the costal cartilage. The peripheral rim of the costal cartilage remained collagenous, but the remaining portion of the graft was completely calcified. The cartilaginous portion of this graft was carefully separated from the calcified portion using a number 11 blade and then shaped to form the alar rim graft. The columellar strut was sculpted from the calcified portion of the graft. The remaining calcified portion of the graft was then manually diced into 0.5- to 1-mm cubes using number 11 blades. The diced cartilage was soaked in the antibiotic solution constituted from 500 mg of cefazolin and 500 mL of 0.9% NaCl. A gauze-covered suction tip was used to fill 1-mL tuberculin syringes with the diced cartilage. A total of 3 mL of finely diced cartilage was prepared. The lip defect was reconstructed using the rotational advancement technique. For the nasal deformity, open rhinoplasty incisions were made. The cleft-side alar graft was carved to simulate the shape of the contralateral alar rim. The columellar strut and alar graft were inserted and sutured to the nasal mucosa. A midline subcutaneous pocket was developed from the nasal tip to the glabella, and the diced cartilage was injected for nasal dorsum augmentation. Manual molding of the graft was applied to ensure symmetry of the nasal dorsum. Nasal packing and splint were used to maintain the shape of the nasal dorsum for 7 days. Gingivopalatoplasty was performed to close the oronasal fistula.

Treatment Results

A nose with improved symmetry and increased projection along the dorsum and nasal tip was achieved. No Disclosure: The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by Chang Gung Memorial Hospital.
warping of the diced cartilage graft was observed after splint removal. Postoperative photographs taken 1 year after surgery are shown in Figure 1C, D.

**DISCUSSION**

This article describes the pure diced cartilage technique that has been used at our center for more than 12 years with consistently excellent results and low complication rate. The use of calcified costal cartilage as the donor graft for reconstruction of facial deformities, however, is not commonly reported in the literature. In 2009, a case regarding successful microtia reconstruction using calcified autologous costal cartilage was reported from our center. Calcification of the costal cartilage is not limited to the geriatric population, as it can occur at a much earlier age and female patients may have a different pattern and earlier onset of calcification compared with the male patients. This case report demonstrated that calcified costal cartilage should not be an absolute contraindication for nasal dorsum augmentation in secondary cleft nose revision. This particular patient has central-pattern calcification of the costal cartilage. Despite the increased difficulty in preparing the graft, excellent aesthetic outcome with pleasing dorsal line can be achieved.

Overcorrection is not advocated, because of a low resorption rate of the pure diced cartilage graft. Kazikdas et al demonstrated that bare diced cartilage grafts are largely nourished by diffusion and imbibition during the initial healing period. Ingrowth of vascularized tissue with collagen deposition later occurs around the diced cartilage and helps achieve a solid fusion of the diced cartilage graft with connective tissue filling in the interstices. The

![Fig. 1. Preoperative photograph, frontal view (A); preoperative photograph, lateral view (B); postoperative photograph, frontal view taken 1 year after the operation (C); and postoperative photograph, lateral view taken 1 year after the operation (D).](image-url)
final outcome of this graft has a semisolid consistency on palpation. Daniel and Calvert and Kawamoto et al also demonstrated that pure diced cartilage grafts can be applied in primary and secondary rhinoplasty with excellent results.

This technique has several advantages over other alternative methods for nasal dorsum augmentation. Costal cartilage provides ample graft volume, which is often necessary for structural augmentation of the nasal dorsum defect in cleft patients. It also has the advantages over the use of alloplastic implants with the low infection and graft extrusion rates. The infection rate in our patient population using this technique is around 7.7%, and all cases of infection resolved with the use of oral antibiotics. Romo et al reported the use of porous high-density polyethylene implants for cleft lip nasal reconstruction with a low infection rate of 6%. However, infection of the porous high-density polyethylene implant usually requires intravenous antibiotic treatment and implant removal. Soft tissue ingrowth in the implant might complicate the implant removal, especially in patients with thin skin in the radix area.

The limitations of this technique may include palpability or visibility of the diced cartilage graft on patients with thin skin over the nasal dorsum. Based on our clinical study published in 2011, 8.5% of the 246 patients included in the study had dorsal irregularity visible by the surgeon. Patients are instructed to apply manual massage after removal of the nasal splint to help even out the dorsal irregularity; 9.3% of the patients had to have steroid injection to treat noninfective nasal swelling.

By making an appropriate sized recipient pocket through precise dissection and placement of a nasal splint postoperatively for 7 days, dispersion of the diced cartilage graft has not been a problem. Consistent and reproducible aesthetic results of nasal dorsum augmentation can be achieved with this technique.

**REFERENCES**

1. Chen ZC, Chen K, Jo LJ, et al. Satisfactory reconstruction with autologous costal cartilage graft in a geriatric microtia patient. *Plast Reconstr Surg*. 2009;123:1e–6e.
2. Sunwoo WS, Choi HG, Kim DW, et al. Characteristics of rib cartilage calcification in Asian patients. *JAMA Facial Plast Surg*. 2014;16:102–106.
3. Kazikdas KC, Onal K, Boyraz I, et al. Palisade cartilage tympanoplasty for management of subtotal perforations: a comparison with the temporalis fascia technique. *Eur Arch Otorhinolaryngol*. 2007;264:985–989.
4. Daniel RK, Calvert JW. Diced cartilage grafts in rhinoplasty surgery. *Plast Reconstr Surg*. 2004;113:2156–2171.
5. Kawamoto HK, Desrosiers AE 3rd, Jarrah R, et al. “Stuffy nose” rhinoplasty: diced cartilage grafts for correction of cleft nasal tip deformities. *Plast Reconstr Surg*. 2008;122:1138–1143.
6. Deva AK, Merten S, Chang L. Silicone in nasal augmentation rhinoplasty: a decade of clinical experience. *Plast Reconstr Surg*. 1998;102:1230–1237.
7. Chang CS, Bergeron L, Chen PK. Diced cartilage rhinoplasty technique for cleft lip patients. *Cleft Palate Craniofac J*. 2011;48:665–669.
8. Romo T 3rd, Choe KS, Sclafani AP. Cleft lip nasal reconstruction using porous high-density polyethylene. *Arch Facial Plast Surg*. 2003;5:175–179.