

Izogenic Cartilage Transfer in Rhinoplasty Procedure

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Abstract: Cartilage is commonly grafted during primary and secondary rhinoplasties as a means of addressing both functional and esthetic issues. Generally, such grafts are taken from the nasal septum, but auricular conchae or ribs may serve as donor sites if needed. However, the latter often entail considerable morbidity and graft mismatch. To circumvent these drawbacks, use of implants or processed cartilage (allogenic or xenogenic in origin) has been proposed. Herein, the isogenic transfer of nasal septal cartilage between identical twins is reported.

Key Words: Cartilage graft, rhinoplasty, isogenic

In correcting the spatial defects or inadequacies encountered during rhinoplasty procedures, synthetic alloplastic materials, xenografts, or cartilaginous grafts of various types may be used, but autogenous grafting still constitutes as the gold standard. Donor sites for harvesting autogenous grafts typically include the nasal septum, auricular concha, bone from the iliac crest, and costal cartilage.^{1,2} The most common and practical of these is the nasal septum, because of its ready availability (via septal resection) and ease of access (through existing operative incisions). Alternative substances, namely allogenic³ or xenogenic⁴ cartilage, bone, or implants,^{1,5} are sought if the demand for filling defects or augmentation surpasses the allotted supply.

Identical twins presented to our clinic seeking rhinoplasties for varied problems with their noses. One had already undergone surgery for septal deviation and nasal deformity, but she was dissatisfied with the result and desired a revision. Upon examination, a hanging columella, a residual hump, and a down-rotated tip were evident. The other twin's nose was crooked, with considerable deviation, and her objective was a primary rhinoplasty.

Open rhinoplasties with transcolumellar and infracartilaginous incisions were proposed for both patients. Use of a transfixion incision in the twins subjected to primary rhinoplasty was to be decided perioperatively. For the secondary rhinoplasty, the following were planned: (1) spreader grafts to widen dorsal esthetic lines, (2) columellar strut and septocolumellar suture to correct cephalad tip rotation and hanging columella, and (3) rasping to lower the residual dorsal hump. Physical examination and subsequent computed tomography indicated that the patient lacked sufficient nasal septal cartilage for the revisions as planned (likely because of the previous septal surgery), so remnant cartilage from the other twin was earmarked for this purpose. Before surgery, both patients were screened for hepatitis B, hepatitis C, and human immunodeficiency virus.

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Received November 25, 2013.

Accepted for publication June 19, 2014.

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ISSN: 1049-2275

DOI: 10.1097/SCS.0000000000001173



FIGURE 1. Cartilage for grafting in gentamycin preservative solution.



FIGURE 2. Graft-recipient twin undergoing secondary rhinoplasty.



FIGURE 3. Graft-donor twin undergoing primary rhinoplasty.

Comprehensive consent forms were obtained before surgery and explained added and specific risks. The consent forms were signed before surgery, after thorough discussion of alternative donor sites and possible substitutes to cover any shortfalls in nasal septal graft material. Both procedures were expected to take place on the same day, with the primary rhinoplasty done first.

As anticipated, a routine open primary rhinoplasty (as above) was performed. All unexpended nasal septal cartilage was collected in a sterile cup, preserved in a solution of isotonic NaCl (500 mL) and gentamycin (80 mg) at room temperature. This freshly harvested cartilage was then grafted as planned during the secondary rhinoplasty of the other twin.

At 2-year follow-up, both patients were content with their results (Figs. 2, 3). No short- or long-term complications were experienced, such as infection, resorption of cartilage, tissue necrosis, graft displacement, or warping.

A search of the medical literature for isogenic tissue transfers between identical siblings returned an abundance of articles detailing transfers of whole solid organs,^{6,7} partial solid organs,⁸ bone marrow,⁹ and even epigastric composite tissue,¹⁰ without any mention of isogenic cartilage transfer. As shown here, identical siblings may be ideal as mutual cartilage donors, provided that the risk for cross-contamination can be leveled to near zero.

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Management of a Transcranial Abscess Secondary to Interleukin-1 Receptor Associated Kinase 4 Deficiency

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Abstract: Interleukin-1 receptor associated kinase 4 (IRAK-4) deficiency is a primary immunodeficiency that predisposes to opportunistic pyogenic infections in affected patients. The presentation can be variable, and the microbiological and immunologic management of this condition has been documented; however, the atypical nature of its presentation calls for a different approach in its surgical management. This is the first reported case of transcranial progression of a soft tissue abscess in a patient with IRAK-4 deficiency, with an emphasis on a multidisciplinary approach to treat infection at an extremely vulnerable anatomic site.

Key Words: IRAK-4 deficiency, transcranial, abscess, management

Interleukin-1 receptor associated kinase 4 (IRAK-4) deficiency is a rare primary immunodeficiency that results in impaired signaling

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Received March 24, 2014.

Accepted for publication June 20, 2014.

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The authors report no conflicts of interest.

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ISSN: 1049-2275

DOI: 10.1097/SCS.0000000000001184

within the classical toll-like receptor and interleukin 1 receptor mediated innate immunity pathways.¹ As a result, peripheral blood mononuclear cells fail to produce the proinflammatory cytokines tumor necrosis factor α and interleukin 6,^{2–5} neutrophil migration is reduced,³ and specific immunoglobulin G (IgG) responses can be impaired.⁶ Patients are susceptible to bacterial infections that may lead to meningitis, arthritis, osteomyelitis, and abscesses, usually before the age of 2 years. Patients are often afebrile and appear systemically well during early infection, and their C-reactive protein and white cell counts are classically normal.¹ The clinical presentation may therefore be indolent. Infective organisms may include *Streptococcus pneumoniae*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. Noninvasive soft tissue infections are common and may persist into adulthood.¹ Mortality after invasive bacterial infection in affected children is 37%.

Although the immunologic and microbiological management of infection in IRAK-4-deficient patients is well documented,^{1,7–9} the atypical presentation of soft tissue infections means that traditional management policies may have to be modified. For the patient examined in this study, the classic treatment paradigm for a soft tissue abscess did not initially succeed. Therefore, the multiple learning points that were accumulated during her successful treatment prompted this case report.

CLINICAL REPORT

A 7-month-old girl presented with an asymptomatic 4 cm \times 4 cm fluctuant swelling within the soft tissue overlying the occiput. Skull radiographs were unremarkable, and she was systemically well. No further action was taken, and the swelling seemed to resolve spontaneously. Of note in the history was a previous episode of pneumococcal cellulitis at 5 months of age without fever or elevated inflammatory markers, which also resolved spontaneously.

She presented again at 3 years of age with a recurrence of the swelling that measured 7 cm \times 5 cm. A magnetic resonance imaging (MRI) scan demonstrated a soft tissue abscess that communicated through the calvarium and lay in direct contact with the dura mater, with evidence of early osteomyelitic changes within the bone (Fig. 1). She was systemically well and afebrile, and her white blood cell count and C-reactive protein titers were all normal.

She underwent incision and drainage of the soft tissue collection, and the cavity was packed. At 48 hours, inspection of the wound demonstrated a clean cavity and the wound was therefore closed primarily. Histologic finding confirmed an abscess, and microbiology culture revealed heavy Gram-negative *Pseudomonas aeruginosa* growth, for which she was commenced on ceftazidime for its good bone penetrance.

On day 5 after the admission, it became apparent that pus had reaccumulated within the cavity. Six further washouts of the wound were required on a weekly basis, and the wound was left open and packed with Proflavine (The Bolton Pharmaceutical 100 Ltd, United Kingdom). The view of the multidisciplinary team was that the intracranial component of the abscess should not be explored further because craniotomy with excision of the osteomyelitic bone and drainage of the intracranial infection would have widened the communication between the dura and the soft tissue abscess.

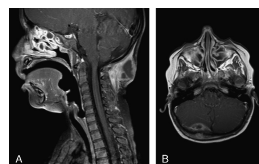


FIGURE 1. A and B, Sagittal and axial MRI views demonstrating a soft tissue abscess communicating transcranially with an extradural component.