



Satisfactory surgical option for cartilage graft absorption in microtia reconstruction



So-Eun Han, Kap Sung Oh*

Department of Plastic Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, South Korea

ARTICLE INFO

Article history:

Paper received 19 May 2015

Accepted 28 December 2015

Available online 6 January 2016

Keywords:

Microtia reconstruction

Rib cartilage grafts

Cartilage graft absorption

Canaloplasty

ABSTRACT

Background: We routinely perform auricular elevation at least 6 months after implantation of framework in microtia reconstruction using costal cartilage. However, in a few cases, cartilage graft absorption has occurred, which has led to contour irregularity with unfavorable long-term results. In the present study, we recount the details of using additional rib cartilage augmentation to achieve an accentuated contour in cartilage graft absorption cases.

Material and methods: The cartilage graft absorption was defined as contour irregularity or cartilage graft deformation as evaluated by the surgeon and patient. Depending on the extent of cartilage graft absorption, another rib cartilage framework was added to the previously implanted framework, targeting the absorption area. We used banked cartilage or harvested new cartilage based on three-dimensional rib computed tomography.

Results: Additional recontouring of framework was conducted in eight patients who were examined for cartilage graft absorption from 1.5 to 5 years after implantation of the framework. Four patients received additional rib cartilage augmentation and tissue expander insertion simultaneously prior to auricular elevation. Two patients underwent auricular elevation simultaneously. In another two patients, additional rib cartilage augmentation was performed before auricular elevation. The mean follow-up period was 18 months, and in all cases reconstructive results were acceptable.

Conclusions: Although further follow-up evaluation is required, additional rib cartilage augmentation is an attractive surgical option for cartilage graft absorption cases.

© 2016 European Association for Cranio-Maxillo-Facial Surgery. Published by Elsevier Ltd. All rights reserved.

1. Introduction

Autologous rib cartilage grafts have been widely used as a frame material for auricular reconstruction with favorable results in experienced hands. Despite the reportedly low complication rates with autologous rib cartilage grafts, the esthetic results of Brent and Tanzer have not always been easily reproduced (Tanzer, 1978; Fukuda, 1990; Brent, 1992). Esthetic auricular reconstruction requires experience coupled with skillful surgical technique and careful evaluation of the patient's condition. Differing skill levels of surgeons, variable surgical techniques, and multiple ear

reconstruction surgery stages make it difficult to obtain consistent esthetic surgical outcomes.

For optimal esthetic results, prolonged maintenance of three-dimensional framework of rib cartilage is required, and to maintain prominent convolution of rib cartilage framework, sufficient healthy normal tissue and favorable blood circulation are essential to resist absorption and deformation in the cartilage. The absorption of cartilage graft and lack of definition are possible outcomes even for operations performed by skillful surgeons. To the best of our knowledge, other studies (Tanzer, 1978; Firmin, 1998; Cho et al., 2007; Zhou et al., 2012) presented their technique of auricular reconstruction and reported cases of blunted convolution of the reconstructed ear due to absorption of cartilage graft. Although, we tried to maintain prominent convolution of rib cartilage framework following others' techniques, we experienced the same problems. Thus, we added the new additional rib augmentation procedure, which was carried out with an extra stage or elevation procedure or with tissue expander insertion if needed. This technique has

* Corresponding author. Department of Plastic Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, 81 Irwon-ro, Gangnam-gu, Seoul 135-710, South Korea. Tel.: +82 2 3410 2210; fax: +82 2 3410 0036.

E-mail address: kapsung.oh@samsung.com (K.S. Oh).

advantages including the simplicity of the method, absence of donor site morbidity, few or no complications, and acceptable esthetic appearance. In this article, we introduced our experience with microtia patients who experienced cartilage graft absorption. These patients had previously received autologous rib cartilage graft auricular reconstruction and had to have an additional rib cartilage augmentation.

2. Material and methods

Eight patients underwent additional rib cartilage augmentation surgery due to rib absorption of the framework between March 2001 and March 2013 (Table 1). The patient records included photographic images and details of the long-term patient follow-ups. All procedures were performed by a senior surgeon (K.S.O.) using autologous rib cartilage grafts. The patient ages at the additional rib augmentation operation ranged from 8 to 27 years. Examination of cartilage graft absorption was from 1.5 to 5 years after implantation of the framework. Additional rib cartilage augmentation was carried out with an extra stage or elevation procedure or with tissue expander insertion. Four patients underwent additional rib cartilage augmentation and tissue expander insertion concurrently prior to auricular elevation surgery. Two patients received additional rib cartilage augmentation and auricular elevation simultaneously. Another two patients had additional rib cartilage augmentation before auricular elevation. Among the subjects, seven had related canaloplasty for aural atresia repair. One had exposure of expander by trauma and experienced postoperative hematoma and infection after implantation of framework.

2.1. Surgical technique

2.1.1. Additional rib cartilage augmentation

As evaluation of cartilage graft absorption is highly subjective, in the present study, the cartilage graft absorption was defined as a prerequisite for an additional procedure due to the occurrence of contour irregularity or cartilage graft deformation, as evaluated by the surgeon and the patient. We routinely perform auricular elevation at least 6 months after implantation of framework in microtia reconstruction using costal cartilage. In acquired traumatic deformity cases, in severe scarring cases, or in patients who did not want additional groin scarring and desired a well-matched skin color for the reconstructed ear, we inserted a tissue expander between the rib cartilage grafts and the auricular elevation to reduce scar contracture and obtain enough soft tissue. In patients with unilateral microtia and aural atresia with normal contralateral ear function, we performed auricular reconstruction with rib cartilage graft prior to canaloplasty; delayed atresia repair was performed at least 1 year after implantation of framework in microtia reconstruction. However, for bilateral microtia and aural atresia, we first consulted an otologist to evaluate hearing ability. In the case of required initial canaloplasty, to avoid unnecessary incision and scar formation at the orifice, we designed an incision line, and aural atresia repair was done by the otologist.

Three-dimensional (3D) reconstructed rib computed tomography (CT) was performed preoperatively using a 64-slice multidetector-row CT scanner to identify remnant viable cartilage (Kim et al., 2014). Preoperative 3D rib CT helped to avoid inappropriate procedures and facilitated appropriate decisions, especially in patients who had undergone rib cartilage grafting surgery at other institutions or in cases of recycled rib cartilage graft with newly harvested rib cartilage. For partial cartilage absorption or absence of available cartilage in preoperative 3D rib CT, we used the banked cartilage that was buried in the subcutaneous layer of the chest during rib cartilage grafting. We harvested the cartilage from

the eighth or ninth rib through a small incision if a considerable amount of cartilage was necessary for a reconstruction.

To prevent further absorption of cartilage, we used the outer rigid layer of the harvested cartilage. Severely blunted area of cartilage graft absorption was measured, and a proper amount of cartilage was subsequently carved using an aseptic transparent x-ray film template. Chisels and scalpels were used for sculpting rather than power tools, to minimize possible chondrocyte damage. The cartilage of the eighth or ninth rib was then carved into a crescent shape to restore the lost length and thickness. This allowed for repositioning of the eighth or ninth rib to accentuate the helix, improving cartilage definition. Smooth assembly with horizontal mattress sutures was required to obtain a natural contour of the helical rim. Careful attention to constructing a pocket with proper thickness overlying the skin was crucial to improve the definition of the cartilaginous framework. We attempted to preserve a subcutaneous pedicle to ensure a sufficient immediate postoperative blood supply to the thin skin flap covering the cartilage. Overly aggressive undermining may compromise blood supply or promote formation of a hematoma. The wound was closed with minimal skin tension. When rib cartilage augmentation and auricular elevation were simultaneously performed, an incision was made along the lateral margin of the ear framework, and the framework was elevated. The superficial temporal fascia was elevated and then folded back to uncover the cartilage blocks, which were previously banked in the subcutaneous layer of the chest during rib cartilage grafting and a crescent shape to restore the lost length and thickness. The posterior raw surface of the ear framework was covered by defatted harvested skin from the groin. Sterilized glasses were used to ensure that they could be worn correctly without problems.

3. Results

The follow-up period for all patients ranged from 15 months to 2 years, with an average of approximately 18 months. Seven patients were male and one female. There were no cases of graft loss, cartilage extrusion, skin flap necrosis, or infection, and all patients were satisfied with the esthetic results.

3.1. Case 1

An 8-year-old boy presented with right-sided congenital microtia (Fig. 1). Autologous rib cartilage was harvested from the sixth and seventh ribs for the framework base, from the eighth rib for the helix, and from the ninth rib for the antihelix. Two years after the initial graft, a canaloplasty was performed by an otologist. Also at 2 years, the graft was judged to be partially absorbed and required attention. All three pieces of rib cartilage that were previously banked in the subcutaneous layer of the chest were used for the corrective procedure. One piece was used for auricular elevation and the other piece for additional rib cartilage augmentation. The reconstructed ear appeared to have a good shape, and there were no complications.

3.2. Case 2

Case 2 was an 8-year-old boy with left-sided congenital microtia (Fig. 2). Rib cartilage graft was performed using the sixth and seventh rib cartilages for the framework base and the eighth rib cartilage for the helix and antihelix. Six months after the rib cartilage graft, canaloplasty was performed by an otologist. Twenty months later, rib cartilage was absorbed, and additional rib cartilage augmentation using eighth rib cartilage and a 60-cc rectangular shape tissue expander (LS 80 060, Sebbin Laboratory, Pontoise, France) was performed. Six months later, the tissue

Download English Version:

<https://daneshyari.com/en/article/3142487>

Download Persian Version:

<https://daneshyari.com/article/3142487>

[Daneshyari.com](https://daneshyari.com)