Microtia with congenital aural atresia is challenging for plastic and reconstructive surgeons to achieve aesthetically and functionally good results. Although several surgical methods for external auditory canal (EAC) reconstruction have been reported where a skin graft is laid onto the temporoparietal fascia or deep temporal fascia flap, complications such as EAC stenosis, chronic infection, and lateralization of tympanic membrane are common.1–4 Narushima et al.5 reported a surgical procedure for reconstruction of congenital aural atresia using a thin free flap, in which double-skin islands of the superficial circumflex iliac artery perforator (SCIP) flap were used for both the EAC and the posterior wall of the ear.5 With this method, however, because compression cannot be applied to the transferred flap postoperatively, the postauricular sulcus becomes less distinct, which may often result in unsatisfactory cosmesis. We herein report a case where a vascularized superthin SCIP flap was used for reconstruction of the external auditory canal (EAC) and a full-thickness skin graft was used for reconstruction of the postauricular region for a 10-year-old male who suffered from microtia with congenital aural atresia. After costal cartilage grafting (the first operation), EAC reconstruction and auricle elevation (the second surgery) was performed. After the atticoantrostomy, a superthin SCIP flap was rolled up in a sac and was inset to the newly created EAC. The postauricular skin defect was covered with full-thickness skin graft. The SCIP flap survived completely and good patency of the reconstructed EAC was accomplished, which results in an improvement of previous hearing loss. The skin graft survived completely, which eventually demonstrated aesthetically satisfactory results. (Plast Reconstr Surg Glob Open 2019;7:e2312; doi: 10.1097/GOX.0000000000002312; Published online 5 July 2019.)

CASE

A 10-year-old boy suffered from right lobule-type microtia with aural atresia. A two-stage operation was performed: 1) costal cartilage grafting and 2) EAC reconstruction and auricle elevation.

The First surgery: Costal Cartilage Grafting

After the sixth to ninth costal cartilages were harvested, a cartilage frame was fabricated according to the previously reported paper.6 A W-shaped incision reported by Nagata6 was made for safe and effective use of remnant skin. After the incision, the skin was undermined 5 mm beyond the proposed area to create the external ear, which was planned according to the location of the tympanic part of the temporal bone. The fabricated cartilage frame was inserted into the subcutaneous pocket. After a silicone drain was placed, the surgical incision was closed and bolster sutures were placed.
The Second Surgery: EAC Reconstruction and Auricle Elevation

A postauricular skin incision was made and the reconstructed ear was elevated anteriorly until the entire mastoid cortex was exposed. After the posterior approach began with the drilling of a hole through the mastoid, an atticantrostomy was performed and a new EAC was created by the otolaryngologists. The harvested temporalis fascia was then grafted on the exposed ossicles to create a tympanic membrane.

A 5 × 6 cm parallelogram skin flap was designed on the right groin area. The superficial branch of the superficial circumflex iliac artery (SCIA) was identified from the first incision. Then, the superficial branch of the SCIA was traced distally until its branch, which we called superficial circumflex iliac artery perforator (SCIP), penetrated the dermis. After that, a superthin flap was elevated from the subdermal layer not including the subdermal tissue. The flap was then rolled up in a sac (diameter of 2 cm, height of 3 cm) and was inset to the EAC (Fig. 1). The superficial branch of SCIA and the superficial circumflex iliac vein were anastomosed to the superficial temporal artery and the vein in an end-to-end fashion, respectively (Fig. 2).

The cartilage block banked in the first operation was retrieved and arranged in an L-shape. The L-shaped cartilage was inserted under the reconstructed ear and firmly sutured to the fascia surrounding the ear and periosteum of the temporal bone. After the elevation of the reconstructed ear, the postauricular skin defect was covered with full-thickness skin graft procured from the right groin. Petrolatum gauze was applied on the grafted skin and fastened with the tie-over technique. The donor site was closed primarily.

The patient was allowed to walk on postoperative day 1. Intravenous vasodilator was administered postoperatively; 40 μg of lipo-prostaglandin E1 was infused over 2 hours 2 times per day, for 1 week. Tie-over dressing was removed on postoperative day 7.

The postoperative course was uneventful. The SCIP flap and the skin graft survived completely (Figs. 3 and 4). Good patency of the reconstructed EAC was accomplished without revisional debulking surgery. Neither ear discharge nor constriction of the EAC was seen. Postoperatively, an improvement of previous hearing loss was found. The pure-tone average calculated from the pure-tone air conduction thresholds at 500, 1,000, and 2,000 Hz was improved; preoperative 85 dB, postoperative 35 dB.

**DISCUSSION**

The use of perforator flaps has become a widely used reconstructive armamentarium due to improved knowledge of the perforator anatomy and surgical techniques. Kimura et al. introduced a new microdissection and worm-eating technique to create thinner perforator flaps, which included the subdermal plexus in 2009. In 2011, Narushima et al. introduced a superthin flap named pure skin perforator flap, which is vascularized by the perforator and dermal plexus without subdermal plexus and applied it to the reconstruction for microtia. In this method, double-skin islands of SCIP flap were used for both the EAC and posterior wall reconstruction. In this case report, we used a superthin free SCIP flap for EAC reconstruction and a full-thickness skin graft for postauricular reconstruction. Using superthin free flap transfer for EAC reconstruction has several advantages. First, it causes less contracture and prevents the postoperative stenosis of the EAC that is often observed when using skin grafts. Second, the superthin free flap can be applied to nonvascularized area such as bony part of the EAC newly created on the temporal bone. Using a full-thickness skin graft for the postauricular area also has several advantages. First, skin grafting is an established technique and can easily be performed. Second, using this method, the contour of the postauricular sulcus is well defined because a skin graft can be laid onto the defect tautly and be compressed (Fig. 4). Therefore, we combined these 2 surgical techniques for the secondary surgery of microtia reconstruction, EAC reconstruction, and auricle elevation.
One of the limitations of this method is that positions of the ears may become slightly asymmetrical, because the position of the reconstructed ear is determined not by the position of the contralateral ear but by the position of the newly created bony EAC. To achieve good patency of the reconstructed EAC, it should be created straightly unlike natural carved EAC, which makes the position of the reconstructed ear slightly higher than that of the contralateral side. Another drawback of this method is the necessity for the surgeon to be highly skilled in performing supermicrosurgical techniques because the diameter of superficial branch of the SCLA is sometimes less than 0.5 mm.

**CONCLUSIONS**

Using vascularized superthin SCIP flap for reconstruction of the EAC and a full-thickness skin graft for reconstruction of the postauricular region for reconstruction of microtia with congenital aural atresia, aesthetically and functionally satisfactory results could be accomplished.

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