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CASE REPORT

Techniques for improving tragus definition in auricular reconstruction with autogenous costal cartilage

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Summary A successful total auricular reconstruction with autogenous costal cartilage depends primarily on the sculpture of the cartilaginous auricular framework. Various refinements and modifications have allowed exceptional results in experienced hands, whereas a high-defining tragus and a deep conchal cavity remain the weak links in most cases. Therefore, we advocate a modification on the fabrication of the tragus. By fastening a cartilaginous cube under the tragus, the reconstructed tragus can be projected adequately and the conchal cavity is deepened simultaneously. A total of 166 consecutive patients underwent auricular reconstruction adopting this modification between 2007 and 2009. Three cases have been selected to illustrate the favourable result of this technique. Consequently, a harmonious contour of the reconstructed auricle with detailed anatomical landmarks is achieved by precise sculpting. The reconstructed tragus is proved to be stable and rigid in the follow-up.

Reconstruction of the auricle is a challenge for the plastic and reconstructive surgeon. Fabrication of a sophisticated three-dimensional framework with precise anatomic landmarks is crucial to the success of auricular reconstruction and yet not easy to master. Numerous refinements and modifications in the construction of the three-dimensional framework have been introduced over the past few decades. Nevertheless, the final resulting appearance of the reconstructed auricle may remain unsatisfactory. In particular, tragal and the conchal cavity definitions are often disappointing.

In this article, we developed a refinement in the grafting of the tragus and reported the results of the auricular reconstruction cases that adopted this technique.

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Figure 1 A 20-year-old female presented with congenital microtia. (Left) Preoperative oblique view of sausage-type microtia. (Centre) The 3-dimensional framework utilised, a cube was fastened under the reconstructed tragus. (Right) Postoperative oblique view, 10 months after grafting the framework.

Methods

The auricular framework fabrication, that we use, corresponds roughly to Brent's method: the sixth and seventh costal cartilages are carved as the base-frame. The eighth costal cartilage is used to construct the helix and crus helicis.[1–4] A tragal strut is constructed from the residual cartilages and is thinned on one side, then curved around and attached to the base-frame to construct the complex of the tragus, incisura intertragic and antitragus. Nonetheless, the tragus's protrusion and the depth of the conchal bowl remain the weak links in the majority of cases, especially when a deep concavity resulted after complete removal of the remnant cartilage. Therefore, one small cartilage cube with 1 mm deep groove on the surface is added vertically under the tragus as the base during the fabrication. The reconstructed tragus can fit in the groove and sit stably after fixation with wire. The height of the cartilaginous cube can be adjusted according to the concavity and the strength of the cartilage. If the tragal strut is strong enough to project the tragus, the height of this small cartilage cube should be lower. After inserting the framework into the subcutaneous pocket, the cartilage cube is affixed to the deep tissue by nylon suture and the tragus is fastened to the anterior tragal flap with through and through mattress sutures. This technique is useful to augment the tragus's protrusion, enhance the conchal depth and secure the reconstructed tragus in a stable projection. Before closing the wound, we routinely simulate the defining relief of the ear form by applying suction. Tension-free skin closure and a firm and stable reconstructed tragus must be confirmed. It is mandatory to lower the height of the tragus if significant skin tensions exist.

Results

From 2007 to 2009, a total of 166 consecutive patients with lobular-type microtia were treated using the described method. Among the 166 cases, 98 cases were right, 64 cases were left and four cases were bilateral. The youngest was aged 6 years and the oldest was aged 42 years (mean age, 16 years). The follow-up period ranged from 3 months to 12 months after the first stage of auricular reconstruction —162 patients were satisfied with the reconstructed auricle and had a well-defined tragus. Cartilage exposure at the tragus region occurred in four patients within 1.5 months. This problem was caused by skin shortage and tension and was solved by removing the cartilaginous cube, which

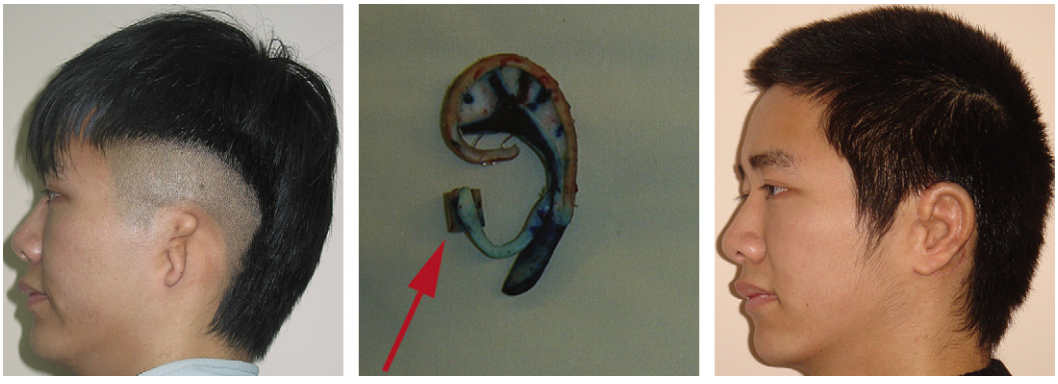

Figure 2 A 19-year-old male presented with congenital microtia. (left) Preoperative lateral view of sausage-type microtia. (centre) The 3-dimensional framework utilised, the black arrow show the cartilaginous cube. (right) The appearance of the reconstructed auricle 8 months after grafting the framework.