

Technical Note  
Reconstructive Surgery

# Reconstruction of low hairline microtia of Treacher Collins syndrome with a hinged mastoid fascial flap

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**Abstract.** Treacher Collins syndrome (TCS) is a rare genetic disorder leading to congenital craniofacial malformations. Although this syndrome presents with various symptoms, corrective surgery for bilateral microtia with low hairline is one of the most challenging operations given the complex contours of the external ear. In this technical note, a novel, simple procedure for dealing with the low hairline by using a hinged mastoid fascial flap simultaneously with costal cartilage grafting is described. Several techniques for the reconstruction of low hairline microtia have been reported previously, such as skin graft, skin flap, and tissue expander, but the high number of repeat operations and residual scars remain problematic. As a simultaneous procedure with framework grafting, the use of a temporoparietal flap with skin grafting is popular; however, its drawbacks include the operative scar, decreased hair growth, and hair thinning. Patients with TCS show anatomical variations of the superficial temporal vessels supplying the temporoparietal flap. In contrast, due to the high vascularity of the mastoid fascia, the mastoid fascial flap can be elevated safely and easily as an anteriorly, posteriorly, superiorly, or inferiorly based flap.

**Key words:** low hairline; hinged mastoid fascial flap; microtia; Treacher Collins syndrome.

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Treacher Collins syndrome (TCS) is a rare genetic disorder leading to congenital craniofacial malformations. Typical symptoms of TCS include down-slanting palpebral fissures, lower eyelid colobomas, microtia, and malar and mandibular hypoplasia. During the process of treatment, it is very important to reconstruct ears with a refined shape. However, given the complex

contours of the external ear, ear reconstruction is a highly challenging operation, requiring almost all the basic techniques of plastic and reconstructive surgery. In addition, the presence of a low hairline in patients with TCS makes ear reconstruction particularly difficult in these individuals.

Aesthetic problems related to hair growth on the reconstructed auricle occur

when scalp skin is included in the reconstruction of low hairline microtia (Fig. 1). To resolve these problems associated with the involvement of the hairline, several techniques, such as the use of skin graft, skin flap, and tissue expanders, have been reported. However, a high number of reoperations and residual scars are the drawbacks of these techniques. A new



Fig. 1. Treacher Collins syndrome showing lobule-type microtia with a low hairline.

technique using a hinged mastoid fascial flap for reconstructive surgery of low hairline microtia is presented here. This technique is performed at the same time as costal cartilage grafting, enabling the reconstruction of the ear in two stages and without leaving residual scars.

#### Surgical technique

A Doppler probe is used to trace the arteries in the temporal region preoperatively. Next, marking of the estimated auricular region is performed, including the hair-bearing skin. The location of the

ear is decided according to the total symmetry and balance of the face using an ear-shaped template. A T-shaped line is marked in the retroauricular mastoid region for elevating the hinged mastoid fascial flap (Fig. 2a). The length of the T-shaped vertical line is slightly longer than the height of the hair-bearing skin. First, the hair-bearing skin in the marked area is removed and the T-shaped line is incised. Diligent haemostasis is important to delineate the anatomical structure of the fascia. In particular, the preoperatively marked arteries should be dealt with carefully. Skin flaps are elevated under the layer including the hair follicles cranially and caudally (Fig. 2b). An anteriorly based mastoid fascial flap of appropriate size to cover the hair-bearing area is then marked, and this flap is elevated on the deep temporal fascia. Subsequently, the costal cartilage graft is performed. After harvesting cartilage from the sixth, seventh, and eighth ribs, a three-dimensional frame for ear reconstruction is created. The subcutaneous tissue, including that in the estimated auricular region, is undermined just under the subdermal vascular network. The subcutaneous pedicle is preserved at the estimated auricular concha region, and the lobule is transposed posteriorly.

The framework is grafted into a subcutaneous pocket (Fig. 2c). The mastoid fascial flap is then turned over to cover the exposed framework (Fig. 3) and sutured to the subcutaneous tissue of the estimated auricular region with 5-0 polydioxanone (PDS-II; Ethicon). Lastly, a split-thickness skin graft is taken from the temporal region beside the T-shaped line (Fig. 2d); this is advantageous as it is easily taken in the same operative field and with a better colour match as compared with a graft from another site. This graft is applied on the fascial flap (Fig. 2e). The T-shaped skin incision is sutured with 5-0 nylon, and the skin incision of the estimated auricular region and skin graft are sutured with 6-0 nylon. To prevent subcutaneous haematoma, Penrose drains are placed and a tie-over dressing is applied using traction sutures (Fig. 4).

#### Discussion

Using scalp skin for the reconstruction of low hairline microtia in patients with TCS leads to aesthetic problems due to hair growth on the reconstructed auricle. Several techniques to resolve this have been reported, such as local skin flap, skin graft, tissue expander, and needle/laser hair removal.<sup>1</sup> The high number of operations,

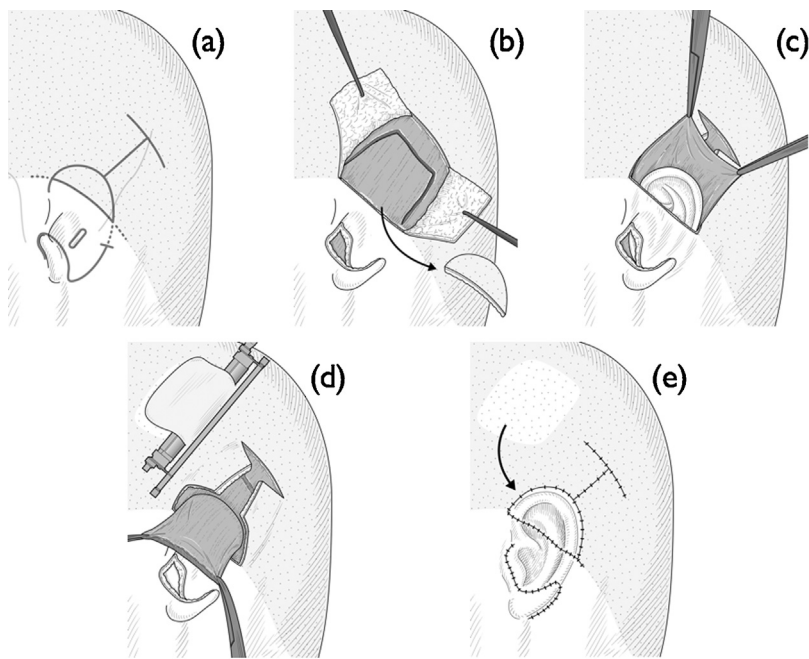


Fig. 2. Schematic drawing of the surgical technique for the hinged mastoid fascial flap. (a) The skin area of the estimated auricular region and a T-shaped line is marked. (b) The hair-bearing skin is removed and the T-shaped line is incised. (c) The anteriorly based mastoid fascial flap is elevated. (d) The mastoid fascial flap is turned over to cover the exposed framework. (e) A split-thickness skin graft taken from the temporal region beside the T-shaped line is applied on the fascial flap.

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