

Autologous Ear Reconstruction

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Abstract

Keywords

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Since the pioneering use of autologous rib cartilage for the reconstruction of microtia, there have been significant advances in surgical technique that have helped to ameliorate the psychological burden of microtia. To date, the use of rib cartilage for auricular reconstruction is one of the most enduring and ubiquitous techniques for microtia reconstruction as it provides excellent aesthetic results with lasting durability. In this review, the authors outline the most common methods of microtia reconstruction with a comparison of each technique and illustrative case examples.

There have been significant advances in reconstructive techniques since ear reconstruction was introduced in the *Susruta Samhita* in 600 B.C.¹ The most radical changes began when Gillies addressed microtia by burying carved cartilage under the mastoid skin and then separating it from the head with a cervical flap.² In 1930, Pierce modified the Gillies technique by lining the reconstructed sulcus with a skin graft and building the helix with a tubed flap.³ In 1937, Gillies reported on his reconstructions of over 30 microtic ears with the use of maternal ear cartilage; however, long-term results were poor as the cartilage progressively resorbed.^{4,5} Steffensen then used preserved rib cartilage and ran into the same problem as Gillies, that is, resorption of the framework.^{6,7}

In 1959, Tanzer made significant headway by using autologous rib cartilage. Lasting results were finally obtained without resorption.^{8,9} In the late 1960s, Cronin used silicone ear frameworks; however, extrusion rates were persistently high. Since that time, the techniques pioneered by Brent,^{10,11} Nagata,¹² Tanzer,⁸ and Walton and Beahm¹³ have served as the foundation for the techniques currently used. To date, the use of autogenous rib cartilage for auricular reconstruction is one of the most enduring techniques for microtia reconstruction as it provides excellent aesthetic results with lasting durability.^{9,11,12,14–19} In this review, we will outline the most common methods of microtia reconstruction with a progression from a multi-staged to a single-staged approach.

Epidemiology, Genetics, and Etiology of Microtia

The incidence of microtia is approximately 1/6,000 births with no difference between ethnicities.^{20,21} The inheritance of microtia is multifactorial with a recurrence risk of 5.7%.²² Most cases are unilateral; the right side is typically favored. The incidence is nearly 2 times higher in males.^{10,19}

The exact etiology for microtia is unclear, but one prevailing theory is that microtia can result from in utero tissue ischemia secondary to the obliteration of the stapedial artery or hemorrhage into the ear.^{23,24} Certain medications (thalidomide, isotretinoin, clomiphene citrate, and retinoic acid among others) have been associated with the development of microtia.²⁵

Diagnosis and Classification of Microtia

There are three widely accepted ways of categorizing microtia: (1) auricular hypoplasia in descending severity,²⁶ (2) Tanzer's method by approach required for reconstruction,²⁷ and (3) Nagata's classification based on reconstructive techniques (– Table 1).¹²

General Considerations

Microtia can cause significant psychological morbidity, and as such, deserves a reconstructive approach to treatment.²⁸ Furthermore, earlier reconstruction may lead to better