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# Prosthodontic Management of Microtia Using Interim Prosthesis – Case Report

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**ABSTRACT**

*Microtia is a congenital anomaly of the ear that ranges in severity from mild structural abnormalities to complete absence of the ear. Microtia can occur as an isolated birth defect or as part of a spectrum of anomalies or as a syndrome. Microtia is often associated with impaired hearing and or total loss of hearing. Such patients typically require treatment for surgical ear reconstruction and for hearing impairment. The reported prevalence varies among the regions, from 0.83 to 17.4 per 10,000 births, and the prevalence is considered to be higher in Hispanics, Asians, Native Americans, and Andeans. The etiology of Microtia and the cause of this wide variability in prevalence is poorly understood. Strong evidence supports the role of environment and genetic causes for Microtia.*

**KEYWORDS: Microtia, Ear stent, Ear prosthesis, Rib cartilage**

**Introduction:** Microtia is an incompletely formed ear. The term "micro" means small and "otia" means ear. At times a bump of tissue is present in the location where an ear would normally be found. In other cases, the lobule, the lower part of the ear, and the concha, the hollow part of the ear, may be partially formed, and the entire upper part of the ear is missing.

Is Microtia has bilateral occurrence: Although Microtia can involve one ear or both ears,80% of the time only one is affected.

There are four distinct grades of Microtia, ranging from mild to moderate.

**Grade I:** Microtia results when a child develops an almost normal looking ear that is smaller than normal, but functioning.

**Grade II:** Microtia involves developing a partial external ear, resulting in partial loss of hearing. Patients with grade II Microtia may have a closed external ear canal, allowing them to hear only muffled sounds.

**Grade III:** Microtia, the most common form of Microtia, with lack of an external ear and ear canal, as well as eardrum. Patients with Grade III Microtia often have a tiny nub or piece of skin where the external ear should reside.

**Grade IV:** Microtia is the most severe form of the defect, where patients have no ear and accompanied by loss of anatomical structures of the ear.

The most common condition in which Microtia is seen is hemi facial microsomia. This is a condition which involves one ear. If both ears are involved it is known as bi-facial microsomia. Another condition to consider if both ears are microtic is Teacher Collins syndrome.

**Etiology:**

1. Both hereditary factors and vascular accidents in utero have been suggested as factors in the etiology of Microtia.
2. Specific causative factors also can include maternal rubella during the first trimester of pregnancy.
3. Brent has reported thalidomide exposure during pregnancy as a cause of Microtia.

**Pathophysiology:**

Microtia has been divided into two descriptive categories. More frequently, the lobular type presents as a soft tissue mass without any concha or auditory meatus formation within the cartilage remnant.

Less often, the conchal remnant type presents with more recognizable portions of a conchal bowl, tragus, and external meatus.

**Indications:**

Both functional and psychological considerations enter into the decision to correct Microtia. Functionally, without the presence of an auricle and its post auricular sulcus, the patient's ability to wear glasses and hearing aids is impaired. Psychologically, the absence of an ear is significant for both males and females. Even after adjusting hairstyles, the absence of an ear is noticeable to peers and others.

**Contraindications:**

The only absolute contraindication to ear reconstruction is a health condition preventing the patient from undergoing a series of 2-3 surgeries under general anesthesia.

**Timing of ear reconstruction:**

The ear reaches approximately 85% of adult size at age 3 years. Growth continues into adulthood but little change in the width or distance from the scalp occurs in individuals older than 10 years. For practical purposes, the normal ear is developed fully by age 6-7 years. To perform an autologous reconstruction, sufficient cartilage must be available. Generally, the costal cartilages are adequate by the time the patient is aged 10 years. The surgeon must balance concerns regarding the psychological impact of the deformity with having sufficient cartilage to carry out the optimal reconstruction in the fewest number of surgeries.

**Reconstruction of the ear:**

Reconstruction of the external ear can be performed in 1 of 3 fashions: prosthetic replacement, reconstruction with a prosthetic framework, or local tissue and/or flap coverage or reconstruction with an autologous framework.

**Surgical reconstruction:**

Reconstruction of outer ear usually takes in approximately four separate operations which are spaced at least three to six months apart.

In the first operation, rib cartilage is taken from the chest, carved to resemble the shape of an ear, placed in a pocket under the skin, and then allowed to heal.

Second stage involves making an incision around the ear to lift it slightly. A skin graft is then placed on the backside of the cartilage.

In third and fourth stages of surgery, small amount of tissues are moved around in order to improve the appearance of the ear. These stages are usually scheduled at least three months apart.

Optimal reconstruction requires costal cartilage of sufficient size and shape to carve the key framework details and maintain the strength to display these details through the overlying skin envelope. While some surgeons begin the reconstruction when patients are aged as young as 5-6 years, clearly better results can be obtained if the reconstruction is performed when patients are aged 9-10 years.

Clearly, the potential psychological issues of the child dealing with his or her deformity need to be balanced with the benefits of delaying the surgery for a few more years.

Opinions vary between surgeons as to the optimal sequence of procedures for reconstruction of the microtic ear.

**Prosthetic ear replacements:**
Prosthetic ear replacements, when made well, can appear quite natural. The newer osseointegrated anchoring systems(Implant system) are more reliable than older adhesive-based systems. The procedure requires placement of a titanium anchor within the drilled temporal bone. After integration of several titanium posts, the surface magnet system and prosthesis can be attached.

**Ear stent:**
Ear stent is a interim prosthesis which helps in keeping the ear pinnae away from the scalpel tissue.

After the surgical separation of the microtic ear pinnae from the scapal tissue with or without cartilage and soft tissue graft while shaping the pinnae ,if left with out any prosthetic stent placement (interim prosthesis) there is every possibility of reunion of scalpel tissue with the graft tissue reconstruction.

The ear stent is very much helpful in such conditions to maintain the separation between the scalpel tissue and the reconstructed cartilage and soft tissue under healing process.

The ear stent is generally placed in position for approximately 3 months till the next stage of surgery is planned or performed.

This is a painless and safe method to maintain the separation of healing pinnae tissue from scalpel tissue.

The ear stent can be retained in position

1. With the help of soft tissue undercuts
2. With the help of pressable or any othe type of ear ornament
3. With the help of spectacle frame
4. With the help of magnets in case of long duration.

As the ear stent is a interim prosthesis it may be constructed in self cure or heat cure acrylic either in clear acylic or by addition of skin pigments to improve the esthetics.

Properly trimmed ,finished and polished ear stent is a useful interim prosthesis to maintain the separation between the healing ear pinnae and scalpel tissue.

**Case report:**
A male patient by name Rajashekar , 13 yrs old referred to the Department of Prosthodontics from plastic surgery department for ear stent prosthesis. The patient had Microtia of right ear (fig1) who under went ear reconstruction surgery with costo-chondral graft (fig2). The impression of the grafted ear was taken with irreversible hydrocolloid material (fig3). Cast was poured with die stone (fig4). Undercuts in the cast was blocked out and self cure clear acrylic ear stent was made(fig5). The stent was removed from cast and finishing polishing was done(fig6). The completed prosthesis was placed on patient's grafted ear(fig7).




**Discussion:**
Reconstruction of the microtic ear is one of the most challenging surgeries for plastic surgeons. Although the surgery is divided into only two to four separate stages – depending on the specific technique chosen – each phase necessitates the highest level of manual dexterity and attention to fine detail.

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**Conclusion:**
The prosthetic ear splint is an important part of the Microtia grafted ear for its success. The prosthodontist plays an important role in the successful outcome of the esthetic ear reconstruction.

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