

## Fabrication of Silicon Prosthesis For a Partial-Auricular Defect in an Eight-Year-Old Patient: A Case Report

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### Abstract

Loss of the external ear can be congenital or acquired due to accidental trauma or malignant disease. Patients usually seek the prosthetic treatment for defects in head and face area when they feel that their function or esthetics are compromised. Literatures show that most of the prosthesis are fabricated in adult patients. Most of the time, dependence of the children on the parents for decision making and finances overshadows the psychological needs and perspectives of children. Present care report highlights the fabrication of silicone prosthesis for partial auricular defect in an eight-year-old child patient, who was conscious about his appearance due to the external defect in his pinna.

**Key words:** Auricular Defect; Ear Prosthesis; Silicone.

### Introduction

Ear is one of the five sensory organs of human beings. Loss of external ear might be congenital or acquired due to accidental trauma or malignant diseases. Congenital anomaly of the external ear is known as "microtia" which includes a spectrum of deformities like a grossly normal but small ear, missing parts of external ear, or the absence of the entire external ear.<sup>1</sup> Here, we present a case in which a silicon prosthesis was fabricated for an auricular defect in an eight-year-old patient.

*Conflict of Interest: None*

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### Clinical report

An eight-year-old male patient reported to the Department of Pedodontics and Preventive Dentistry, B.P. Koirala Institute of Health Sciences, Dharan, Nepal with a chief complaint of a missing part of the left ear. There was a history of dog bite leading to the deformity when he was 1.5 years old. On examination, part of the pinna (scapha) of the left ear was missing (Figure 1A, 1B, 1C). After discussion among the Pedodontists, Prosthodontists, and the parents, a silicone partial-auricular prosthesis was planned for the patient to rehabilitate the defect. Written informed consent and assent were obtained.

The external auditory canal was blocked with cotton to prevent the entry of impression material (Figure 2E). Vaseline was applied to the ear, skin, and hair surrounding the defect. Impression of the auricular defect was made using an irreversible hydrocolloid (Zelgan

2002, Dentsply India, Pvt. Ltd). A double-sided open cylindrical tunnel of modelling wax (approximately 3.5 inches diameter) (Pyrax Polymers Pvt. Ltd) (Figure 2D) was used to support the impression material (Figure 2F), and a backing of quick setting plaster of paris (Figure 3I) was applied. A similar impression procedure was carried out for the contralateral (normal) ear also (Figure 3H). Impressions were poured with dental stone (Type III) (Kalstone, Kalabhai Dental Pvt. Ltd) to obtain final casts (Figure 3J, 3K).

Sculpting of the wax pattern for defective ear was done taking guidance from the normal ear (Figure 4L). Try-in of the wax pattern (Figure 4M, 4N, 4O) was done to check for the symmetry in vertical and horizontal planes, projection of the ear with the side of the head, and the marginal integrity with the surrounding tissues. After try-in, the wax prosthesis was sealed to the model, and the leading edge was thinned to allow the silicone edges to feather out to the natural skin.

After the first pour with Type II gypsum (Kaldent, Kalabhai Dental Pvt. Ltd) up to the leading edge (Figure 5P), a separating medium (Pyrax Polymers Pvt. Ltd) was applied (Figure 5Q) and the second pour was done. Dewaxing was done using a hot water bath under standard specifications (Figure 5R, 5S).

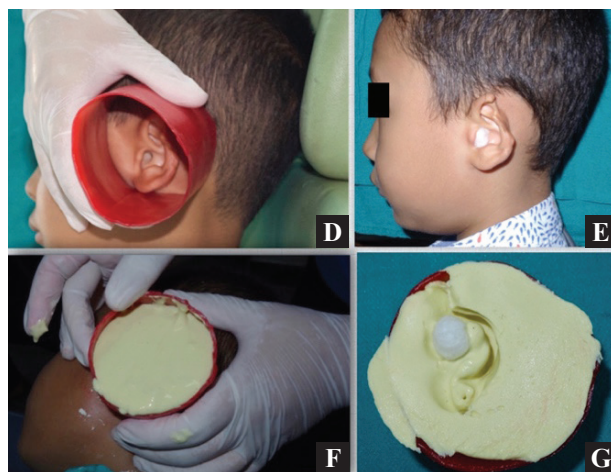
Basic stains (red, yellow, white, brown) (MP Sai Enterprise, Mumbai) of room temperature vulcanizing silicone (RBS Enterprises, Haryana) (Figure 6, 7T) were mixed and matched with the affected ear and the contralateral side till the nearest possible match. After final shade selection, packing with selected silicone shade was done (Figure 7T, 7U). After curing at room temperature for 24 hours, the flask was opened, the prosthesis was retrieved, and excess was

carefully trimmed (Figure 7V, 7W). The final prosthesis was tried on the patient. Bioadhesive (RBS Enterprises, Haryana) was used for retention of the prosthesis (Figure 8X, 8Y, 8Z).

The patient was instructed regarding the use of the prosthesis, application of the adhesive after every 24 hours, regular cleaning of the prosthesis (lauryl sulfate solution) and limiting the sun exposure to avoid discoloration of the prosthesis. Follow-up was done after three and six months of insertion.

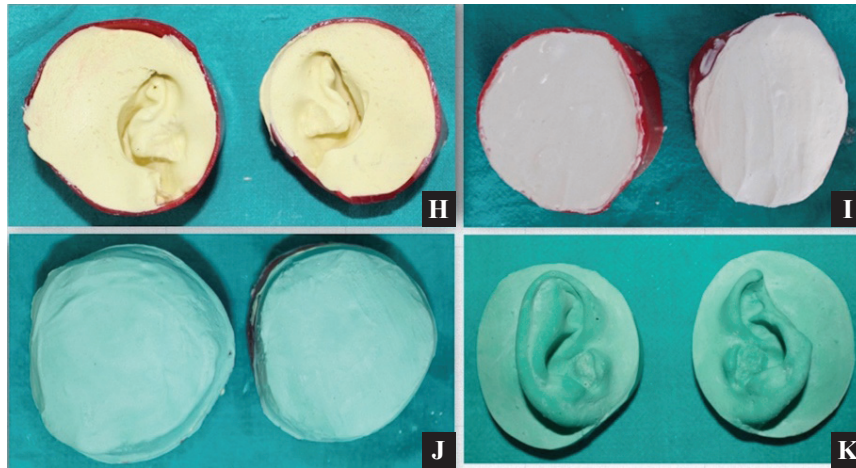


**Figure 1:** Auricular defect.



**Figure 2:** (D) Tunnel of modelling wax. (E) Auricular meatuses are blocked with cotton. (F) The impression made using irreversible hydrocolloid material (higher water: powder ratio). (G) Final impression.

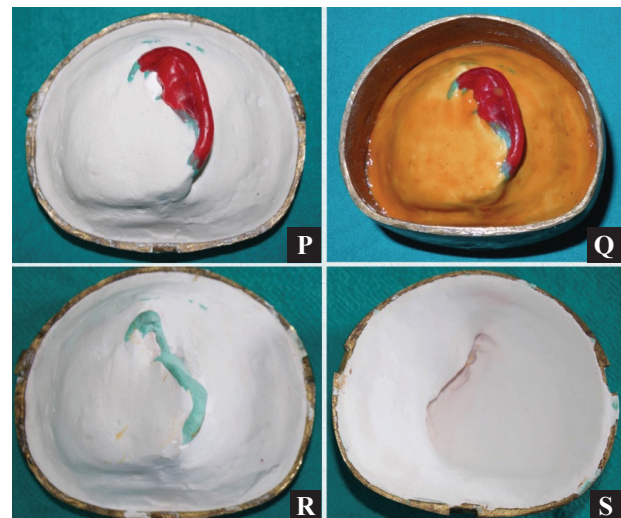




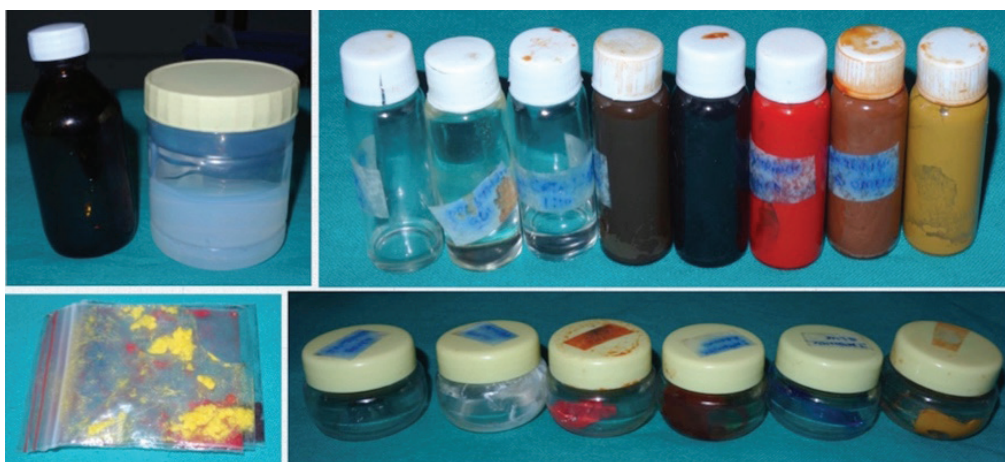
**Figure 3:** Impressions of the defective and normal ear. (I) Plaster backing. (JK) Final casts.



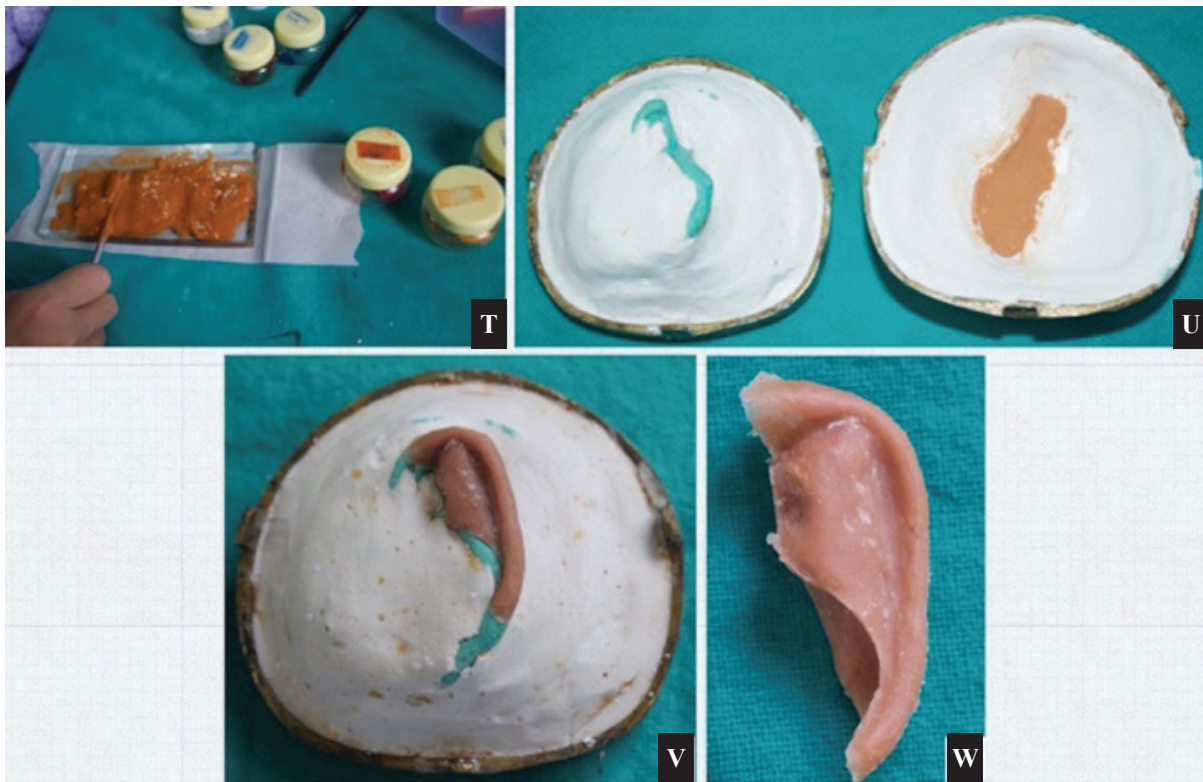
**Figure 4:** (L) Sculpting of wax pattern. (M,N,O) Try-in.



**Figure 5:** (P) Sealing of the wax pattern and blocking of undercuts. (Q) Application of separating medium. (R,S) Mold formation after dewaxing.



**Figure 6:** Medical-grade silicon, intrinsic and extrinsic colors.



**Figure 7:** (T) Identifying and mixing base colors. (U) Packing of silicon material in the mold. (V) Prosthesis after deflasking. (W) Final prosthesis.



**Figure 8:** (X,Y,Z) Partial-auricular prosthesis retained with adhesive.

### Discussion

Congenital deformity of ears account for three in every 10,1000 births. This kind of deformity affects the patient's mental, social, and psychological well-being.<sup>1</sup> The replacement of missing anatomical parts is art and science in its truest form. One should keep in mind that

the prosthesis form, coloration, and the texture must be as indistinguishable as possible from the surrounding natural tissue.<sup>2</sup> While fabricating an ear prosthesis, simulating a naturally proportioned prosthesis is quite challenging due to the presence of severe undercuts and pronounced convolutions of the ear surface.<sup>3</sup>

Various materials such as vinyl chloride polymer, acrylic resin, medical-grade silicone, or polyurethane are used for fabrication of prosthesis for auricular defects.<sup>4</sup> Apart from its ability to match any skin color using the intrinsic and extrinsic color system, medical-grade silicone maxillofacial prosthetic material is color stable, has rubbery consistency which matches the elasticity of skin, and is biocompatible.<sup>1</sup> The disadvantage of silicone prosthesis is the necessity of fastening the prosthesis to the skin, and removing it every day.<sup>4</sup>

There are various techniques for the fabrication of ear prosthesis like conventional technique,



shaper/tracer technique, photocopying technique, computerized tomography scanning, magnetic resonance imaging, 3-D laser scanning, computer numerically controlled milling, rapid prototyping, and stereolithography. The prosthesis prepared by 'computer-aided design and computer-aided manufacturing' (CAD/CAM) technique is costly, but better than the ones fabricated by conventional methods.<sup>1,5</sup> The osseointegrated ear implants offer effective retention and improved aesthetics. However, it requires sufficient healthy bone at the defect site for implant placement, surgical intervention, and immediate delivery of the prosthesis is not possible.<sup>1,5</sup> Sculpting technique is a conventional technique in which the pattern of the prosthesis is sculpted by carving the wax taking guidance from the normal ear.<sup>1</sup> In this technique the fabrication process is quicker, cost-effective and less chairside time is required. Need for sophisticated equipment and surgical intervention is avoided in this technique. Due to these advantages, the authors opted for fabrication of prosthesis via sculpting technique.

Retention, whether anatomic, adhesives, and mechanical, plays a key role in the success of the maxillofacial prosthesis. Adhesive-retained prosthesis is cost-effective, does not require surgery, and it can be placed immediately on a healthy tissue bed. However, adhesives may cause skin allergies in some patients after using for long time.<sup>4</sup>

## Conclusion

An auricular defect is a rare finding in pediatric patients. Rehabilitation of such defects enhances esthetics and helps to build-up confidence in the growing child. In the present case also, the patient was concerned about his appearance and eager to have a prosthesis. After the delivery of the prosthesis, the patient was very happy and confident.

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## References

1. Chinnasamy A, Gopinath V, Jain AR. Ear Prosthesis for Postburn Deformity. Case Rep in Otolaryngol. 2018;1-6.
2. Prasad DK, Swaminathan AA, Prasad AD. Fabrication of a Silicone Auricular Prosthesis- A Case Report. Nitte University Journal of Health Science. 2016;6(1):91-7.
3. Brown KE. Fabrication of ear prosthesis. J Pros Dent. 1969;21(6):670-6.
4. Singh T, Mathema SRB, Manandhar P. Conventional Approach for Fabrication of Orbital Prosthesis: A Case Report. Birat J Health Sci. 2018;3(2):495-9.
5. Chakravarthy AK, Sharif KY, Mallikarjun M, Babu KM, Gautham P, Prasad BV. Implant retained auricular prosthesis: A clinical report. J NTR Univ Health Sci 2017;6(4):262-6.