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Case Study

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AURICULAR PROSTHESIS: A BEACON OF HOPE

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ABSTRACT

Facial tissue loss presents with multiple functional and psychological problems. Its rehabilitation can improve the physical, mental and social well being of the patient. This can be corrected surgically, prosthetically or through a combination of these approaches, however the choice of treatment depends on patient. An alternative to surgical reconstruction is the creation of a silicone auricular prosthesis. Prosthetic rehabilitation of auricular defects is often a demanding procedure due to broad variety of clinical approaches and a wide array of treatment options. These prostheses provide a cost-effective and an acceptable means of camouflage for patients. Auricular prostheses have been retained by methods including implants, adhesives and spectacle frames. However the selection ultimately depends on patient factors, amount of soft tissue loss, and replacement of auricular defect. This case report describes the procedure for fabricating an auricular prosthesis for a patient with unilateral auricular deformity.

KEYWORDS: Auricular prosthesis, silicon prosthesis, adhesives.

INTRODUCTION

Maxillofacial prosthodontics deals with prosthetic reconstruction of missing head and neck tissue.[1] An auricular prosthesis is an artificial substitute for the auricle.[2] Auricular anomalies can be categorised into either congenital or acquired defects. Congenital anomalies are because of the flaws in embryogenesis or due to of intrauterine events which affect fetal growth leading to deformations. These deformations can be corrected prosthetically which can be aesthetically pleasing and satisfying for the patients.[3]

Auricular prostheses act as a cost-effective and cosmetically acceptable mask for patients for a better quality of social life. Surgical reconstruction of the defective ear is usually not opted by the patient considering the cost factor, procedures involved and post-operative pain.[3] The various treatment choice present now-a-days include traditional mechanically retained prosthesis, bio adhesive retained prosthesis, implant retained and the recently developed rapid prototyping and computer aided designing - computer aided machining (CAD-CAM) developed prosthesis.[4]

Virtually all available materials, i.e., porcelain, wax and rubber, have been tried in the fabrication of craniofacial prostheses. A major step forward was the introduction of methyl methacrylate. Its disadvantage, however, was its hardness.[2]

The breakthrough for auricular prostheses came with the introduction of the modern silicones and their colorings.[2] The greatest advantage of silicone prosthetic ear is that it allows the defective ear to look as life-like as possible, even though it requires daily care. Silicone prosthetic ear can be easily adapted to the tissue bed using adhesives which are acceptable and easy for the patients. Adhesives act as good retentive aids and are supplied in various forms as pastes, liquids, emulsions, sprays and double sided tapes.[3] This paper presents a case rehabilitated with silicone auricular prosthesis retained with the adhesive.

CASE REPORT

A 60 year-old female patient reported to the Department of Prosthodontics, with chief complaint of missing ear on the left side. On examination she was found to have a normal ear on right side with normal hearing (Figure 2). A small remnant of ear was present on left side with no auditory canal opening (Figure 1). Patient gave a history of surgery on the left ear due to infection. Patient claimed to have lost the hearing capacity of the left ear. The treatment of choice was adhesive retained silicone auricular prosthesis.

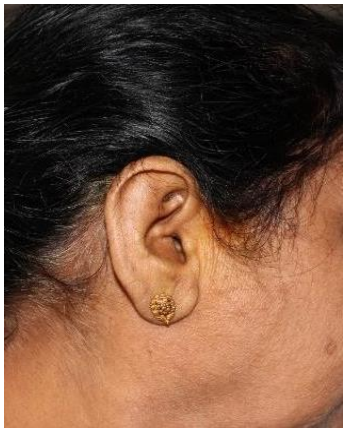

Figure 2: Normal ear on the right side.

Figure 1: Preoperative.

Patient education and counselling regarding the nature function and limitation of the prosthesis was carefully carried out prior to any procedures. Pre-operative photography was performed for assessment and evaluation.

Procedure

To make an impression of the normal ear, the patient's head was tilted with the auricular area as horizontal as possible. Petroleum jelly was applied to the hair surrounding the area and the external auditory meatus was blocked with a cotton pellet. Three orientation lines were marked on the normal side and was transferred to the defective side for impression making (Figure 3).

Figure 3: orientation lines on the normal and the defective side.

The impression compound was softened and molded into a form of cylinder which was used as a tray to fit the patients ear on the right side and remnant ear on the left side (Figure 4). A fluid mix of alginate was made and placed under the helix, so as to provide support for the helix when full amount of alginate was added. Remaining material was loaded and the impression compound mold was held in position against the patient's ear. Care should be taken so as not to compress the ear.

Figure 4: Preparation for impression.

Figure 5: Impression of normal ear.

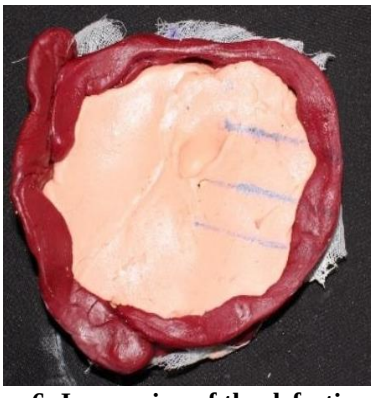

Figure 6: Impression of the defective side.

Figure 8: Cast of the defective side.

Figure 7: Cast of the normal ear.

A wet gauge was placed over it and dental plaster poured over the set alginate, to add support for the alginate in the tray. To make impression on the defective side procedures same as that of normal ear were followed. The impressions were inspected. There should not be any voids or bubbles on the impression. Type IV dental stone was mixed according to the manufacturer's instruction and the impressions were poured (Figure 5 and 6). The casts obtained were trimmed and wax pattern was fabricated (Figure 7 and 8).

Wax pattern try-in was done (Figure 9). During the try-in procedure the fit of the prosthesis on the tissue, the correct horizontal alignment with the natural ear, the projection of the ear in relation to the side of the head and the integrity of the margins were checked. Minor corrections in the wax pattern were made (Figure 10).

Figure 9: Wax pattern try-in.

Figure 10: Corrected wax pattern.

The corrected wax pattern was sent to the laboratory for silicon processing. Shade selection was done using intrinsic coloration procedures. Nearest possible simulation was attempted to be achieved by performing shade selection under different light sources, which included incandescent and natural sun light sources.

Intrinsically stained silicon prosthesis was obtained from the laboratory. The fit of the prosthesis was checked (Figure 11). Extrinsic stains were applied on the prosthesis. The normal ear was used as guide to do the extrinsic staining. This is done to disguise the appearance of a seam along the helix and to blend the margins to the surrounding tissues. After the application of stains, a layer of glossy liquid and matt powder was applied to set for 24hours (Figure 12).

Figure 11: Silicon auricular prosthesis.

Figure 12: Extrinsic staining of the auricular prosthesis.

The final prosthesis was delivered to the patient. Retention of the prosthesis was achieved by applying adhesive. Using a cotton bud a uniform coat of adhesive was applied on the intaglio surface of the prosthesis upto 15mm from the margins. After 1-2mins the white coat will dry clear and will become tacky to touch. Then the prosthesis was carefully placed on the tissue bed and gentle pressure was applied along the surface area of the prosthesis (Figure 13).

Figure 13: Final silicon auricular prosthesis.

The patient was advised to use the prosthesis regularly and avoid exposure to direct sunlight due to the limitations of the silicone. She was instructed to regularly clean the prosthesis using a mild sodium lauryl sulphate solution and not to wear the prosthesis while sleeping as accidental pressure would result in distortion or tearing of the prosthesis. A regular follow-up and evaluation of the patient and the prosthesis was undertaken to ensure that proper maintenance of the prosthesis was being carried out.

DISCUSSION

Patients with auricular deformity or absence of auricle endures psychological affliction. The aim of maxillofacial rehabilitation is to provide a suitable prosthesis for patients with facial defects so that they can be confident enough to face the society and accept the challenges of life.[5] The choice between surgical and prosthetic rehabilitation of large defects is a complex decision depending on size and etiology of the defect as well as on wishes of the patient.[6]

Auricular defect can be repaired or reconstructed with autogenous tissue, however this might not be feasible for personal or medical reasons. A better alternative is to develop an auricular prosthesis with a suitable material. Hence, silicone is the material for choice for facial prosthesis.[7] Silicone elastomeric maxillofacial materials are more frequently used, as they provide better constancy and more life-like appearance, which meets patient's aesthetic and cosmetic needs. These materials possess excellent physical, mechanical and chemical properties and soft tissue like consistency which provide an added advantage in restoring the defects of movable soft tissues. Silicone materials are available in various shades to exactly resemble the skin texture and complexion. The drawback of the silicone prosthesis is that, over a while, the material deteriorates and change when get exposed to different environmental temperatures, moisture, UV light, and sunlight, thus creating a need for replacement by a new prosthesis. To overcome these shortcomings, various newer materials like polyphosphazenes, silicon block polymers, methacryloxypropyl terminated polydimethylsiloxane have been introduced with enhanced physical, mechanical and chemical properties.[8]

The difficulties faced during fabrication of custom made prosthesis are; obtaining accurate impression of the defect without any compression or distortion of tissue, orientation of ear in harmony with the contra lateral ear, sculpturing the exact anatomy and position of the prosthesis, obtaining a satisfactory shade exactly matching to the skin complexion of contra lateral side of the face.[6]

The retention and stability of the prosthesis is an important factor for the prosthesis. For retention of the prosthesis adhesive was used.[5] The prosthesis retained with skin adhesives, anatomical and soft tissue undercuts are more successful due to their ease of application and are comparatively less expensive than implant supported prosthesis.[9]

Fabricating unilateral prosthesis remains a difficult task as compared to a bilateral auricular prosthesis as this presents a similar comparison with a natural counterpart. Whenever feasible implant retained prosthesis should be given prime consideration, which has improved retention, stability and comfort of the patient.[7]

Recent advances in techniques, including a new generation of computed tomography scanner and three dimensional systems facilitate the production of mirror image of auricular prosthesis with a high accuracy.[5] Development in the field of tissue engineering has resulted in the formation of new tissue equivalents of bone and cartilage which will augment the result of prosthodontics rehabilitation in the future.[10]

CONCLUSION

Maxillofacial defects can be emotionally traumatizing and many a times cause a social stigma due to a distorted physical appearance. The progress made in the development of the silicones allows rehabilitation with an inconspicuous auricular prosthesis. Communication and education is the key factor for the acceptance of the prosthesis. Patient acceptance, aesthetics, compatibility, durability and prosthetic considerations like availability of materials, ease of processing, ease of duplication lead to success of treatment.

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