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Case Report

Orbital Prosthesis – A Case Report

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Abstract

Purpose: An orbital prosthesis is a good alternative to surgical reconstruction for cosmetic and psychological rehabilitation of the patient. It should be aesthetic, durable, light weight, economical, and most importantly retentive. A ocular prosthesis fabrication has been done for a patient with ocular defect in left eye.

Case Report: For a patient of 42 years with the left eye with that had been resected *en bloc* due to trauma and subsequent persistent infection 2 years ago, preliminary impression was made using irreversible hydrocolloid alginate. A custom tray was fabricated from the molds obtained from the preliminary impression. A final impression was made using light body and addition silicone from which then master model was obtained. Iris positioning done using Graph-grid method and the wax trial was done. Processing was done using silicone material to match the patient's contralateral eye shade and esthetics.

Conclusion: Orbital prosthesis allows better esthetic and functional results to the patient and boosts the psychological and mental state of the patient.

Key words: Case report, Graph-grid, Maxillofacial prosthesis, Ocular defect, Orbital exenteration, Prosthetic eye

INTRODUCTION

Sympathetic ophthalmia, congenital defects, irreversible damage, severe blindness, and the requirement for histologic confirmation of a suspected disease can all lead to the loss or absence of an eye.[1,2] Integrated or non-integrated orbital implants can be used to replace the orbital volume lost when the globe is removed.[3,4] Conjunctival fornices are kept in their natural shape, changes in socket size are reduced, and scar contractures are avoided as tissue heals thanks to the conformer implantation.[5,6] After recovering from an eye enucleation treatment, the patient must have the lost eye replaced as quickly as possible to increase social acceptance and encourage both physical and psychological rehabilitation. Therefore, immediately after tissue healing is complete, the conformer is replaced by a permanent ocular prosthesis. It takes a multidisciplinary team approach and management to give the patient precise and efficient follow-up treatment and rehabilitation.[7] This article outlines a streamlined process for creating an orbital prosthesis made of silicone.

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CASE REPORT

A 42-year-old male patient, a resident of Hingoli referred to the Department of Prosthodontics, Hedgewar Smruti Rugna Sewa Mandals Dental College and Hospital Hingoli, came for the rehabilitation of his left eye which had been resected *en bloc* due to trauma and subsequent persistent infection 2 years ago. Examination showed a completely healed ocular socket. There was no pain or discomfort in the defect region. Definite bony undercuts were found on the superior and inferior borders of the socket which ultimately aided in retention of the prosthesis [Figure 1].

Step-by-step Procedure

After thorough inspection of the anophthalmic socket, the iris and pupil diameters on the unimpaired side were measured using a pair of Vernier calipers. A master impression of the defect and non-defect side was made once the patient was relaxed and sitting comfortably in an

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upright position. The impression extended 3 cm beyond the desired eventual prosthesis borders, which were defined before making the impression. Petroleum jelly was used as a lubricant for the eyebrows and surrounding areas to facilitate removal of the impression. An impression was made according to Mathew's classification. The impression material used was irreversible hydrocolloid along with reinforcement by dental plaster type III. Dental stone type IV was used to pour the cast [Figure 2]. The mold fabricated on the cast for final impression, the final impression made with the putty and light body silicon impression material, and master cast is poured [Figure 3]. The mold space obtained between the two halves of the master cast was then filled with molten wax to fabricate a wax pattern. When satisfied with the contour and fit of the wax pattern, iris positioning was done. For this, the iris was selected by shade matching from a set of stock eyes. The selected stock eye was grounded to just obtain the iris portion. The iris positioning was done using the graph-grid method [Figure 4]. To verify the proper fit and contouring of wax blank, try in of the wax pattern after iris positioning was done in patient's eye [Figures 5 and 6]. The wax pattern sealed with the master cast is then invested. Dewaxing is done and was residues removed using hot water. The mold was dried completely to prevent tacky texture of silicon prosthesis. Room temperature vulcanization silicone (A2186, Factor II incorporated) with intrinsic stains was used and shade was matched in accordance with same and contralateral side [Figure 7]. Then, silicone material was poured and packed with color rayon flocks to simulate microvasculature. Bench curing was done for 24 h different intrinsic and extrinsic stains were used to match the shade with natural eye of patient and obtain an appropriate result of prosthesis [Figure 8]. The final prosthesis was then delivered to the patient [Figure 9].

Figure 1: Patient with the left eye defect

Figure 2: A preliminary impression was made using irreversible hydrocolloid material alginate

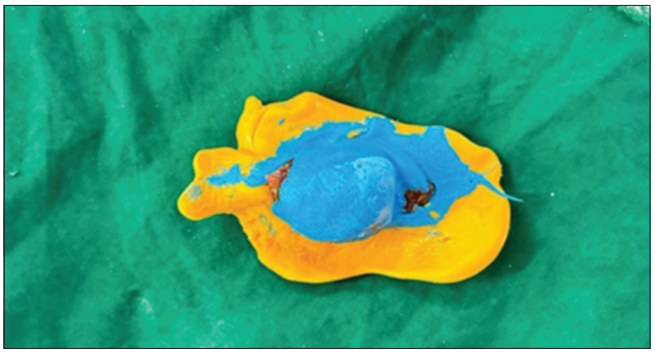

Figure 3: Final impression

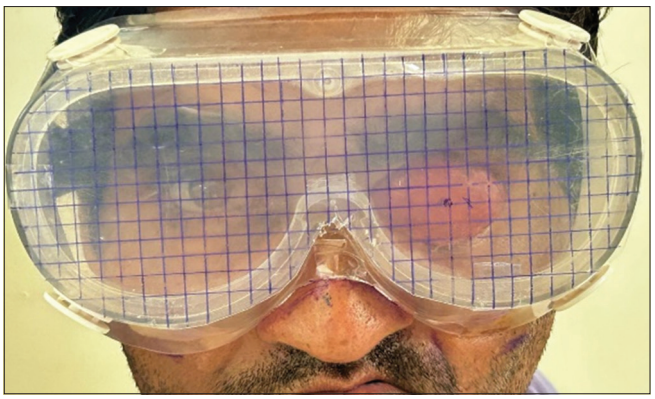

Figure 4: Iris positioning was done using the graph-grid method

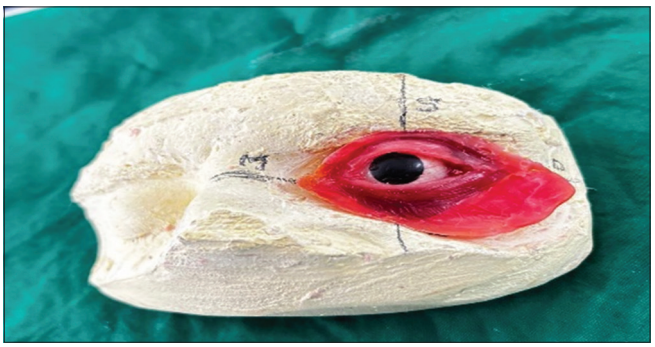

Figure 5: Wax pattern on final cast after iris positioning

Figure 6: Wax pattern trial of eye

Figure 7: Dewaxing

Figure 8: Medical grade silicone material mixing with required shade/color

Patient and guardian was taught how to insert and remove the prosthesis and it's home care protocol which includes (Ahmad *et al*., 2009; Deshmukh *et al*., 2016):

- Prosthesis should be handled with care and with clean hands
- Removal of acrylic prosthesis during night is ideal and it must be stored in water.

It must be rinsed everyday with commercially available antiseptic solution and water.

Routine polishing of prosthesis should be done every year to prevent deposition of protein and bacteria.

Figure 9: Final orbital prosthesis

DISCUSSION

The aesthetics of creating an orbital prosthesis are crucial since even a small alteration to the prosthesis's color and position can have a profound effect on the patient's psychological state and social functioning. A maxillofacial prosthesis should look natural since poorly made prostheses, especially in those with orbital defects, might cause the patient to experience further psychological stress. Therefore, when esthetic and functional profiles are high, orbital prosthesis creation is a viable option to other local reconstructive treatments.[8] A precise impression that replicates the specifics of the impairment is the primary requirement for a successful prosthesis. The dimensional stability of irreversible hydrocolloid imprint material may be impacted by delayed pouring, but it offers good detail replication for replication.[9]

Furthermore, silicones have superior dimensional stability and surface repeatability. Baseplate wax was chosen due to its affordability, reusability, and availability. Enough cooling time should be allowed for the material to release its inherent stresses to prevent distortion. Before packing silicone, it is advised to scientifically try the wax pattern to confirm the form and make any necessary adjustments. Many maxillofacial materials have been used to create prostheses, but medical-grade silicone is still preferred over other maxillofacial prosthetic materials due to its advantageous material qualities, which include ease of molding, flexibility, biocompatibility, and the capacity to accept both intrinsic and extrinsic colorants. The patient's quality of life is greatly enhanced by the creation of silicone prostheses.[10,11] Thorough knowledge of the materials and laboratory skills are required to obtain the ideal results. It is necessary to use a retention technique to keep an orbital prosthesis in its correct location while preventing tissue irritation and discomfort.[10] An osseointegrated implant,

mechanical devices, chemical adhesives, and the anatomical undercut of the defect can all be used to keep the orbital prosthesis in place. The overall result and long-term success rates for orbital prostheses have improved with the introduction of osseointegrated implants.[9] Nonetheless, there are a few things to think about when using implant-retained orbital prostheses. These variables include the implant's load-bearing capacity in bone and the thickness of the bone, while implant-retained prostheses provide better retention and overall satisfaction with therapy.[12] An affordable and non-invasive therapy option is an adhesive-retained prosthesis. However, one of the biggest issues with silicone prosthesis is the need for prosthesis maintenance and aftercare. With adhesive-retained prostheses, discoloration and rupture of the margins after usage are frequently seen.[11] This may require the prosthesis to be refabricated to maintain its overall retention and aesthetic appeal. However, the simple adhesives can be utilized to successfully hold an orbital prosthesis if the prosthesis is manufactured correctly and the patient is motivated to take care of the underlying and supporting tissue through cleanliness.

CONCLUSION

Each individual would experience psychological pain from having their face disfigured or losing a sense organ. It is laborious and time-consuming to rehabilitate these individuals on an emotional, prosthetic, and cosmetic level. To recreate a fair outcome, much care must be taken to pay attention to every last detail. The modest and straightforward design of the prosthesis in this case report can be seen as a step toward increasing the social acceptability of patients with orbital defects and ensuring that they have a satisfactory quality of life economically, quickly, and predictably after rehabilitation.

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