

Prosthetic Rehabilitation of Orbital Defect in a Burn Patient – A Case Report

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Abstract

Eye is a part of the face that can express one’s emotions. Any defect to eye mostly arises from trauma, surgical resection of tumor or developmental disorder. This orbital defect can affect the individual’s social as well as psychological well-being. The rehabilitation requires a prosthesis that will provide the optimum cosmetic and functional result. The mode of rehabilitation varies based on the type of defect and surgical approach being adopted. A multidisciplinary management and team approach is essential in providing esthetics and to regain the confidence. Follow-up care for the patient is mandatory. This case report of a patient who lost his right eye due to trauma was prosthodontically rehabilitated with adhesive retained silicone prosthesis.

Introduction

“FACE IS THE INDEX OF MIND”. Any damage or mutilation to the face can lead to psychological and social problems. Defects can be due to trauma, tumor, congenital causes that attribute to the loss of an eye, and subsequent deformity. Orbital defects include periorbital tissue whereas ocular defects involve only the eyeball. [1]

Peyman et al classified the surgical procedures for the removal of an eye into three general categories: Evisceration (removal of intraocular contents of the globe), enucleation (removal of the globe by severing all muscles, nerves, and blood vessels attached to it from the orbit) or exenteration (removal of the entire orbital contents, primarily for eradication of malignant orbital tumors)[2]. The lost orbital volume following trauma or surgical resection can be replaced either by soft tissue reconstruction or prosthetic rehabilitation by an orbital

prosthesis. The prosthesis can be retained by natural undercut of the lids, medical grade adhesives, or osseointegrated extraoral implants [3]. Silicone elastomers are the most widely used material for prosthesis fabrication due to their acceptable color integration and texture [4]. However, they have to be refabricated every 1.5–2 years due to the damaging effects of weathering and regular wear and tear [5].

This article describes the prosthodontic rehabilitation of patient with orbital defect caused by exenteration using adhesive retained silicone prosthesis.

Case Report

A 45 year old male patient reported to Department of Prosthodontics with an orbital defect. He was a victim of burn injury, underwent exenteration of right eye before 15 years. The defect area was large, involving the right orbital area with massive scars and contracture extending onto the whole right half of the face, including the nose, lips, forehead with loss of eyebrow on right side. Skin color was light to dark brown, patchy on the affected side (fig1). After proper examination and assessment, patient was explained about the various possible treatment options. Due to economic constraints, patient preferred adhesive retained silicone orbital prosthesis over implant retained.

Prosthodontic Phase

Orientation marks were marked on the supra orbital rim passing through the nasal midline, medial canthus area, iris, lateral canthus in the horizontal plane, the interpupillary line over nasal bridge. These lines will be imprinted and transferred on to the cast by impression which will provide an orientation for the wax sculpt. The impression of the defect was made with alginate supported by impression compound

(fig2). The facial mouldage made from die stone used for wax pattern fabrication.

The wax pattern is sculpted simulating the contralateral eye. The palpebral fissure was recontoured to attain a smooth convex surface. Wax pattern is made thin at the edges to merge with the remnant surrounding soft tissue. A stock eye shell matching with the shade of the contralateral eye was selected. The landmarks were determined to position the iris by making the patient look straight (fig3). During the try in, the wax pattern with iris was placed into the patient's socket and modified as that of the contralateral eye. The wax pattern was verified in frontal, coronal and profile view. After verification of try in, the cast was trimmed at margins to ensure positive adaptation of prosthesis.

The wax pattern sealed with the master cast is then invested. The eye shell is secured at position using wooden stick. Dewaxing is done and the wax residues removed using hot water. The mould 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. Then silicone material was poured and packed with color rayon flocks to simulate microvasculature. Bench curing was done for 24 hours (fig 4). After curing, prosthesis was retrieved, followed by attachment of artificial eyelashes and eyebrows using patient's own hair (fig 5). The extraoral silicone prosthesis was delivered to the patient after finishing (fig 6a and b). The retention of prosthesis was achieved using **technovent probond** adhesive (Factor II incorporated) (fig7).

Maintenance of the Prosthesis

The patient was instructed regarding the maintenance and use of adhesives. Home care protocol includes handling the prosthesis with clean hands and

cleaning the defect area properly to avoid any infection. The prosthesis to be removed during night. Recall visits were advised biannually for routine assessment of Prosthesis and defect Area.



Fig 1– Pre Operative Image Showing Orbital Defect on Right Side



Fig 2 – Impression of Defect Area



Fig 3 – Wax Pattern Try-In



Fig 4 – After Bench Curing



Fig 5 – Finished Silicone Prosthesis with Eyebrows and Eyelashes Attached



Fig 6 – A and B – Adhesive Retained Silicone Prosthesis



Fig 7 – Maxillofacial Adhesive

Discussion

The prime aspect of orbital prosthesis fabrication is the esthetics involved in the process, because even the slightest change in the position of the eye and the color of the prosthesis will reflect on the social performance and psychology of the patient. The maxillofacial prosthesis should have a natural appearance, or it may end up with the patient undergoing further psychological trauma over poor prostheses, particularly in orbital defect patients. Hence, orbital prosthesis fabrication is a feasible alternative to the other local reconstructive treatments when esthetic and functional profiles are high [6].

An accurate impression reproducing the details of the defect is the prime requisite for a successful prosthesis. Irreversible hydrocolloid impression material provides good reproduction of the details for duplication but delayed pouring may affect its dimensional stability [10]. Addition silicones have better surface reproducibility and dimensional stability. Baseplate wax was used because of its availability, reusability and low cost. To prevent its distortion, adequate cooling time should be given for the material

to release the internal stresses. It is recommended that the wax pattern be clinically tried to reconfirm the form and marginal adaptation before silicone is packed.

Various maxillofacial materials were used for making prosthesis, but medical grade silicone remains superior to other maxillofacial prosthetic materials due to their desirable material properties including flexibility, biocompatibility and ability to accept intrinsic and extrinsic colorants, chemical and physical inertness, and ease to mould [7]. The fabrication of silicone prosthesis has a significant positive impact on the patient's quality of life [8,9]. Thorough knowledge of the materials and laboratory skills are required to obtain the ideal results.

The method of retention to secure an orbital prosthesis to its proper place without discomfort and irritation to the tissue is required [11]. The orbital prosthesis can be retained by anatomical undercut of the defect, mechanical device, chemical adhesives and an osseointegrated implant. The use of osseointegrated implant have

improved overall outcome and long term success rates for orbital prosthesis [10]. However, several factors should be considered for implant retained orbital prostheses. These factors include the thickness of bone and the load-bearing capacity of the implant in bone.

Though implant retained prosthesis offers greater retention and overall treatment satisfaction [7], an adhesive retained prosthesis is economical and noninvasive treatment option. However, prosthesis maintenance and aftercare is one of the major drawbacks associated with silicone prosthesis. Discolouration and rupture of the margins following use is commonly observed with adhesive retained prosthesis [9]. This can affect the overall retention and esthetics of the prosthesis, necessitating their refabrication.

However, if the prosthesis is properly fabricated and the patient is motivated to care for the underlying and supporting tissue by hygiene, the simple adhesives can be used successfully to retain a orbital prosthesis.

Conclusion

The major goal of the maxillofacial prosthetic treatment is to restore the patient with a life like prosthesis with greater comfort and satisfaction. The facial disfigurement resulting from loss of an eye can affect psychological as well as social well-being of the individual. However, with the advancement in prosthetic materials and technique, patient can be rehabilitated very effectively. It is the duty of the maxillo-facial prosthodontist to provide best possible prosthetic treatment, considering psychological and financial aspects of the treatment.

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