

Orbital prosthesis- An innovative approach

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ABSTRACT

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 clinical report explaining the prosthetic rehabilitation of post surgical case of orbital trauma that was followed by orbital exenteration has been described. The aim of the orbital prosthesis was to reinstate the esthetics and boost the psychological and mental state of the patient. The techniques employed along with incorporation of the patient's own hair in eyelashes greatly improved the esthetics.

Keywords: Orbital, eye prosthesis, prosthetic eye, maxillofacial prosthesis, orbital exenteration

Introduction

“People fear those that differ from what is considered normal, and in a small town the idea of normal can be as narrow as the streets.”

— Elizabeth Chandler.

The eyes are the main organ for sight. They also hold a principal role in facial expression.^[1] Many a times the surgeon carries out radical procedures like orbital exenteration for treating malignancies or chronic progressive conditions not responsive to any kind of conservative therapy.^[2]

An orbital prosthesis is a potentially economic and conservative alternative to surgical reconstruction for aesthetic and emotional

rehabilitation of the patient as well as protection of the orbital cavity.^[3] The treatment planning for the choice of treatment depends upon the patient's condition post- surgically as well as social and economic factors.^[4]

An orbital prosthesis should be cosmetically pleasing, long- lasting, light weight, inexpensive, and very importantly retentive. The material used for fabrication and the type of retention depend on patient's cosmetic demands, size and extent of defect, type of lifestyle, economical condition etc.^[2] Recent materials include polysiloxane, RTV silicones, HTV silicones, silphenylenes, chlorinated polyethylene, polyvinyl chloride, and polyurethane. The most commonly used materials are the RTV silicones.^[5]

Case Report

A female patient of age 69 years presented to the Prosthodontics and Crown and Bridge Department for the rehabilitation of her left eye which had been resected enbloc because of trauma and subsequent persistent infection two years ago.

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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]

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 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.

A permanent scleral blank was created using heat cure acrylic resin. Slight yellow tinting was done and an illusion of arteries was made using red colored nylon threads. The patient's iris, pupil and limbus diameter was measured and reproduced on the scleral blank. Then, acrylic-based pigments were used to paint the iris, pupil and limbus on a paper disk. The painted disk was compared with the natural eye. Since these pigments diffuse on contact with methyl methacrylate, a layer of cyanoacrylate was applied onto it and it was left to dry. Then it was placed on the fabricated heat cure acrylic scleral blank and a layer of clear autopolymerizing acrylic was added on top of it. This was then finished and polished.

The orbital portion was carved in modeling wax surrounding the ocular portion on the cast. The lids were given final shape with the help of plasticine clay as it gave better texture and could incorporate eyelashes easily. The patient's natural hair were rolled carefully in the clay for the superior and inferior eyelids and details, such as the medial and lateral canthi, eyebrow hair wrinkles, skin folds, and facial contours, were incorporated [Figure 2]. The non-defect side is the ideal guide for reproduction of these features. The pupil color, size, placement and amount of scleral visibility as compared to the contralateral eye was checked by trying in the wax pattern on the patient's face. Modifications were done and the shade of silicone was selected.

After trial, the marginal area was thinned and adjustment was done to apply gentle pressure on the margins of the defect area. The prosthesis was thus able to conceal some normal functional tissue movement at the corners of the defect.

Flasking was done with Type II and Type III dental plaster after application of lubricant to the eyelashes. Dewaxing

and removal of plasticine clay was done. The scleral blank was positioned back and secured with cyanoacrylate adhesive. Appropriate dry earth pigments were mixed in the clear RTV silicone elastomer to form the correct shade and packing was done. After polymerization, deflasking, retrieval and finishing was done [Figure 3]. The final prosthesis was placed in the



Figure 1: Pretreatment picture

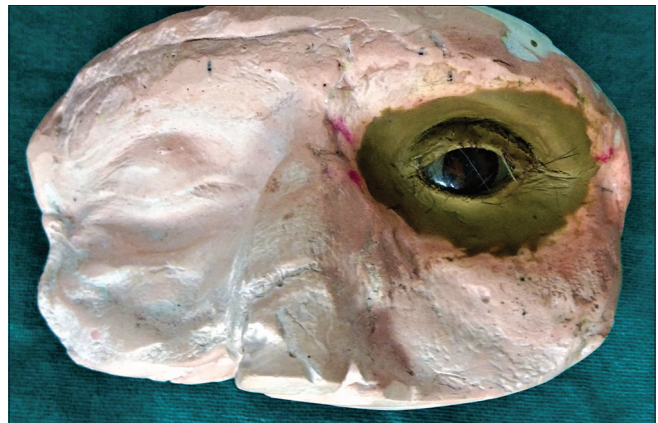


Figure 2: Final wax-up and carving



Figure 3: Finished orbital prosthesis



Figure 4: Posttreatment picture

patient's orbital defect region and the margins blended with the help of a cue tip dipped in acetone [Figure 4]. An appropriate eyeglass frame was selected to mask the margins of the prosthesis. Home care instructions were given. The patient was instructed home care of the prosthesis, cleaning with soap and warm water once per day. Removing the prosthesis during sleep and keeping it in a refrigerator at night to prolong the life span of the silicone should be advised. The patient was asked to report on a six monthly to yearly basis for evaluation of the prosthesis condition.

Discussion and Conclusion

Disfigurement of the face and loss of a sense organ is a psychologically traumatic ordeal for any person. Rehabilitating these patients, emotionally, prosthetically and esthetically is a tedious and time consuming task. Considerable attention

to minute details is required at every step to reproduce a fair outcome.

This clinical case reports the fabrication of an orbital prosthesis using a novel approach:

- Use of plasticine clay for a better texture of the skin surface as well as incorporation of eyelashes at the wax- up stage.
- Incorporation of the patient's own hair in eyelashes and eyebrows (simulating the color and texture of his/her natural hair) thereby, greatly improving esthetics.

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Conflicts of interest

There are no conflicts of interest.

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