

**Prosthetic Rehabilitation of Ocular Defect- A Case Report.**

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**Abstract**

Ocular defects with total loss of eyeball cannot be satisfactorily repaired by reconstructive surgery. Prosthetic replacement is one of the best treatment of choice for an ocular defect to restore not only the esthetics but also psychological well being of an individual. In the literature, many methods have been suggested for making ocular prosthesis. This paper describes two variants for the fabrication of ocular prosthesis with characterization to improve esthetics of the patient as well.

**Keywords:** Ocular Defect, Stock Prosthesis, Customised.

**Introduction**

Patients requiring treatment with ocular prostheses are those who lost ocular structures through orbital evisceration or enucleation. A fundamental objective when restoring an ophthalmic socket with an ocular prosthesis is to enable the patient to cope better with the difficult process of rehabilitation.<sup>1,2</sup> In an evisceration procedure wherein only the intraocular contents of the globe are removed, and minimal prosthetic treatment is required. Patients should be counselled regarding expected results.<sup>3</sup> Among the various modes of replacement of the artificial prostheses, the two techniques include custom

made and stock eye prosthesis and both the variants have been described in the following case reports.

**Case Report 1**

A 59 year old male patient was referred to the department of prosthodontics with the complaint of facial disfigurement due to loss of the left eye. The enucleated eye was lost due to trauma 8 months back. [Figure.1]. Surgical reconstruction was not possible because of loss of muscle attachment and degeneration of nerves and vessels. Compromised eye muscles was did not allow for the placement of buried or semi buried implants.

An optimum prosthetic treatment plan was formulated for this patient. The technique for the fabrication of custom made ocular prosthesis has been described below:

**A) Impression and Wax Pattern Fabrication:**

The defect area was anaesthetized with 0.5% tetracaine hydrochloride ophthalmic solution topical anaesthetic to increase comfort during the impression procedure. One or two drops of the solution was placed onto the conjunctiva of the defect and allowed to take effect for about 15 minutes.<sup>2,3</sup> The external plastic tray was selected as per size of the socket. Impression was made with addition silicone initially and later it was relined with light body impression material. The material was allowed to set

while the patient maintains a neutral gaze. Once set, the impression was removed by having the patient wiggle the face to break the seal [Figure.2]. The impression was removed from the lower shallower sulcus first, and then rotated out of the deeper, upper sulcus. The impression was poured in dental plaster to get the appropriate size mould.<sup>2,3</sup> [Figure.3].

### **B) Custom made Ocular Prosthesis**

The mould was reassembled and the defect site filled with heat cure clear acrylic. Once the acrylic has solidified after polymerization, the mould can be separated. Finishing of the artificial acrylic eye was done for trial purpose. The fit of the scleral acrylic eye is observed by gently lifting the lids and observing the extension into the fornices. The support and contour afforded by the scleral acrylic eye may be compared visually with the patient's natural eye by opening and closing eyes as well as by bimanual palpation.

### **C) Fabrication of custom ocular prosthesis**

The paper iris disk technique utilizes readily available materials and techniques familiar to the dental office and allows almost limitless adjustment of coloration.

### **D) Paper Iris Disk Technique**

When processed heat cure acrylic resin trial was finished and polished with pumice then it was tried in and the middle of the pupil was marked while the patient gazes directly at the clinician. The outline of iris was then marked on the scleral blank using Carmen red ink. This ink will transfer to the investing stone, facilitating the appropriate placement of readymade iris.

Taking considerations of natural eye, a readymade iris was selected as per the skin colour, hair colour and morphology of the face. The iris was positioned in its desired location on the artificial acrylic eye. Then with the help of external heat cure acrylic pigments characterization of the artificial eye was done [Figure.4].

After polymerization, the prosthesis was trimmed and polished using pumice and acrylic resin polish.

### **E) Placement of the Custom Ocular Prosthesis**

The prosthesis should be inspected for scratches or deposition. If any are noted, the patient should return to have the prosthesis repolished.<sup>5,6</sup> The patient should return at every about 3 month intervals to have the defect and prosthesis evaluated and adjusted as necessary [Figure.5].

### **Case Report 2**

A 32 years old male reported at the Department of Prosthodontics, with a complain of missing left eye due to trauma [Figure 6,7]. Examination revealed enucleated left eye socket. Examination of the socket revealed healthy conjunctival lining and absence of infection. History revealed surgical removal of the eye ball after a traumatic injury (bull gore). A modified stock ocular prosthesis was planned for the patient. Rehabilitation team included a prosthodontist, and an ophthalmologist.

Artificial eye was selected by the clinician and the patient. The stem was approximately 1 cm long and 3 to 4 mm wide and was attached with autopolymerizing resin and in the superior-inferior and medial-lateral axes. The posterior and lateral borders of the eye were reduced to allow freedom from impingement on the tissue bed when the surrounding structures are at rest. Polyvinyl siloxane was injected into all regions of the ocular defect and the modified eye is placed into the defect [Figure 8] . The patient was instructed to close the eyes to allow excess impression material to extrude to pull the prosthesis deeper into the socket. The patient was then asked to open the eyes immediately stare straight ahead at a preselected object in the distance [Figure. 9].

The orientation and relative depth of the eye was evaluated quickly and adjusted as needed before the impression material set. When the siloxane is thoroughly set, lightly retract the lids and remove the impression

[figure 10]. On removal from the eye socket, the impression was invested in a two-piece mold with dental stone. After the mould is cleaned, heat-cured clear acrylic resin was trial packed. To obtain transparency without porosity, resin was cured for 10 hours at 70° to 80° C in a dry oven. After the flask cooled down, the eye was removed from the investment and polished. The polished prosthesis must be free of roughness that could irritate the eye socket and encourage secretions to accumulate for additional irritation. Prior to inserting the polished prosthesis, it was disinfected in a solution of 0.5% chlorhexidine and 70% isopropyl alcohol for 5 minutes. After disinfection, the prosthesis was rinsed in a sterile saline solution to avoid chemical irritation. After 10 minutes, discrepancies in location was be adjusted by grinding the posterior and peripheral surfaces of the prosthesis. The ocular hygiene is reviewed and insertion and removal of the prosthesis with oral and written instructions was given to the patient prior to dismissal with the new prosthesis [Figures. 11,12,13].The Post operative follow up was done after two days

### **Discussion**

A simple procedure for the fabrication of an ocular prosthesis with two different variants has been presented. The advantages of this method of fabrication are its cost-effectiveness, tissue tolerance, esthetics, comfort for use and wear.

*Ow and Amrith* suggested that the custom-made acrylic resin ocular prosthesis achieves intimate contact between prosthesis and tissue bed. The close adaptation of custom made prosthesis tends to distribute pressure more equally than does stock eye prosthesis. This helps reduce the incidence of conjunctival abrasion or ulceration. It also enhances tissue health by reducing potential stagnation spaces at the prosthetic tissue interface. Fluid collection in

the space could cause tissue irritation and increase bacterial growth.<sup>4,5</sup>

Thus Prosthodontist plays a crucial role in successful rehabilitation of a patient having ocular defect with ocular prosthesis.

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### **Case: Rehabilitation of the ocular defect**



**Fig. 1: The pre operative extra and intra ocular defect**



Fig. 2: The silicone impression



Fig. 3: The casts, and the wax pattern



Fig. 4: The pre operative extra and intra ocular defect



Fig. 5: The scleral wax pattern



Fig. 6: The flasking of the mold and the processed prosthesis



Fig. 7: The post operative extra oral frontal view and view in the right lateral direction.