

## Simplified Approach for Prosthetic Rehabilitation of an Enucleated Ophthalmic Socket

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**Abstract** Physical defects that compromise appearance or function, prevents an individual from leading a normal life, prompt the individual to seek treatment that will reinstate an acceptable normalcy. The disfigurement associated with loss of an eye can cause significant physical and emotional problems. The role of maxillofacial prosthodontists in fabricating an ocular prosthesis with acceptable esthetics and restoring normal appearance is essential. This article presents simplified impression technique and fabrication of ocular prosthesis.

**Keywords** Enucleation · Ocular prosthesis · Ocular defect

### Introduction

The eye is a vital organ and an important component of facial expression. Loss of an eye has a crippling effect on the psychology of the patient. The aetiologies of eye loss include malignancy, infection and trauma [1]. Depending on the severity of the condition, the surgical management may include one of the three approaches: evisceration, enucleation and exenteration [2]. Evisceration and enucleation causes constriction of the tissues around the ocular cavity. Various treatment modalities are available for retention of the prosthesis out of which one is implants. Although implant prosthesis has a superior outcome it may not be advisable in all patients due to economic factors.

The fabrication of definite ocular prosthesis should begin as soon as the socket is healed. The fabrication of ocular prosthesis with stock tray could lead to poor adaption of the underlying tissue discrepancies and are not used regularly. The custom made ocular prosthesis achieves intimate contact between the prosthesis and tissue bed. Therefore, a custom made ocular prosthesis is an excellent alternative.

### Clinical Report

A 23-year-old-male patient was referred to the Department of Prosthodontics from the Department of Ophthalmology for the replacement of his missing left eye (Fig. 1). History reveals surgical excision of ocular content damaged in motor vehicle accident one and half month back. On examination, a bare fibrosed enucleated socket with slight atrophy, lower eyelid was lax and insufficient sulcus depth was noted. Patient was referred to the department of ophthalmology for socket reconstruction procedure to increase the socket depth and width (Fig. 2). Conformer placed immediately to maintain the fornices [4]. Prosthetic rehabilitation of ocular defect started 2 weeks after the surgery [5].

### Fabrication Technique

Additional silicone (medium body) impression material (Aquasil monophase, DENTSPLY) was loaded in syringe and injected directly into the socket. The impression is removed with syringe. Additional silicone (light body) impression material (Aquasil LV, DENTSPLY) is applied over the impression surface to get the fine anatomical details (Fig. 3). Accurate recording of posterior wall, the

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**Fig. 1** A case of enucleated left eye



**Fig. 2** View of enucleated socket after socket reconstruction

position of the palpebral in relation to posterior wall, and the greatest extent of the superior and inferior fornices of the palpebrae denotes precise impression [3]. The impression is invested in type III dental gypsum product (Orthokal, Kalabhai, Mumbai) to obtain a positive cast. The wax sclera was fabricated in wax (mixture of 75 % of sticky wax and 25 % of paraffin wax), carved and shaped in an empirical form to suit the anatomy of the socket.

Try in of the wax sclera was performed in the patient's anophthalmic socket and evaluated for esthetics, comfort, eye lid opening and closing when compared with contralateral eye. To mark the iris position on the wax sclera, patient was instructed to gaze straight at an object kept four feet away [6]. The custom made ocular prosthesis which has iris button that closely resembles the color, size, shape of the contralateral iris was selected and cut (Iris alone) and stabilized in the previously marked position. Later the final try-in was done esthetics is compared with the contralateral eye. After the try-in is complete, an acrylic resin stem is positioned in the center of the iris button. This is to maintain iris button in the same position during the de-waxing procedure. The prosthesis is processed using tooth



**Fig. 3** Impression of ocular socket



**Fig. 4** Flaked prosthesis before characterization



**Fig. 5** Finished and polished prosthesis

colored heat cure acrylic resin (DPI Mumbai, India). After processing, the flask is cooled and ocular prosthesis is removed from the mould, care should be taken not to break the counter portion of the flask (Fig. 4). The superior portion of the shell and also the inner contour of the flask is reduced to 0.5 mm without the changing the contour and polished. Red silk fibers are used to replicate the veins, and sclera is recoated with monopoly [7]. After characterization, acrylic sclera was repositioned in flask, clear acrylic resin (heat cure) was packed and processing was completed. The prosthesis was retrieved from the flask. The obtained ocular prosthesis was finished and polished (Fig. 5).

The highly polished prosthesis was washed with mild soap water and placed in the socket (Fig. 6). The fit of the prosthesis and lid configurations of both eyes were evaluated and adjustments were made as necessary [8]. Since patient was comfortable, post insertion instructions were given. The patient reviewed after 24 h, 1 week and 1 month [9]. In 24 h review, patient complained of slight irritation in certain areas which were relieved and adjusted to the comfort of the patient. After 1 week review patient informed about the drooping of the prosthetic eye, the patient was explained about the drooping is due to compromised socket preparation. To overcome this limitation the patient was instructed to wear spectacles. After



**Fig. 6** Finished prosthesis after insertion

1 month review, the patient informed that he is comfortable with the prosthesis. The patient was instructed to report after 6 months for polishing, evaluation of the prosthesis and adjustment if necessary [9].

## Discussion

Eyes are generally the first features of the face to be noted [10]. The deformity associated with eye loss can cause major physical and emotional disturbance [11]. The custom-made acrylic resin ocular prosthesis achieves intimate contact with the tissue bed [12]. Numerous ocular impression materials and techniques have been described by many authors and some authors have advocated more than one technique, depending on the situation. Sykes describes making a functional impression by means of polyvinyl siloxane material on intaglio surface [13]. The impression procedure in an enucleated socket varies entirely from that of an evisceration impression procedure. In an enucleated socket where there is complete absence of the eyeball, socket constriction takes place. In this patient, both medium and light consistency of polyvinyl siloxane material is used; medium body is used to record the details and it acts as an impression tray, light body is used to record the minute details. This technique eliminates the fabrication of the ocular tray and it is used only for enucleated cases. Wax sclera was fabricated utilizing 75 % of sticky wax and 25 % paraffin wax. This combination improved workability and strength of the sclera pattern during the try-in procedure. Using an iris button from stock ocular prosthesis presences several advantages compared to the conventional oil paint and monopoly iris painting technique. This technique provides acceptable esthetics; it eliminates time consumption, artistic skills and cost. The digital imaging also one of the techniques in the fabrication of ocular prosthesis even though it eliminates the artistic skills, it requires digital photography equipment and settings, as well as computer software that allows for image adjustments, are required [7, 14]. Optimal esthetics is achieved with adequate socket reconstruction. Mild intricacies in the final prosthesis when compared to the contra-

lateral natural eye were camouflaged by wearing spectacles.

## Conclusion

The use of custom made ocular prosthesis has been a boon to an average patient who cannot afford the expensive treatment options available. The esthetic and functional outcome is superior to the stock ocular prosthesis. Patients are quite satisfied with the treatment outcome of the custom made ocular prosthesis. Advantages of this type of prosthesis include improved adaptation to the underlying tissues, improved facial contours and enhanced esthetics. So a custom made ocular prosthesis is an excellent alternative to other types of ocular prosthesis present, which is relatively inexpensive and easy to fabricate.

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