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## Prosthetic rehabilitation of a patient with an ocular defect using a simplified approach: A case report

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### Abstract

The disfigurement associated with eye loss can cause significant physical and emotional disturbance. Cosmetic rehabilitation with custom made prosthesis gives such individuals professional and social acceptance and alleviates problems. A case of a custom-made ocular acrylic prosthesis is presented here, which had acceptable fit, retention and esthetics.

**Keywords:** Ocular defect, rehabilitation, graph grid, custom ocular prosthesis

### Introduction

Loss of any facial tissue or organ can have a significant physical, physiological, social, and psychosomatic impact on the affected individual and can arise as a result of a congenital defect, disease, accidental trauma, or surgical intervention<sup>[1]</sup>. The eye is a vital organ not only in terms of vision but also being an important component of facial expression. Loss of eye has a crippling effect on the psychology of the patient. The surgical procedures in the removal of an eye are classified into three categories evisceration, enucleation, and exenteration. In evisceration where the contents of the globe are removed leaving the sclera intact, in enucleation the entire eyeball is removed after severing the muscles and the optic nerve, finally exenteration in which surgical removal of the orbit including the eyelids and the surrounding tissues are done<sup>[2]</sup>. An ocular prosthesis is an artificial substitute for an enucleated eye ball. A prosthesis which adapts well improves the psychological state of the patient and also increases the patient's confidence level and the esthetic value. The ocular prosthesis is generally made four to six weeks after surgery in order to allow the socket tissues to heal adequately. Prior to that time, a thin plastic plate, called a conformer, is sometimes worn in place of the prosthesis. This prevents shrinkage of the tissue and helps to prepare the socket for ocular placement. An ocular prosthesis can be done either with stock eye prosthesis (prefabricated) or custom made ocular prosthesis<sup>[2, 3]</sup>. This article describes a simple method of fabricating an ocular prosthesis by combination of custom and stock ocular prosthesis technique for precise fit and improved treatment outcome of ocular prosthesis.

### Case Report

A 47 year-old male patient reported to department of prosthodontics, Govt Dental College Trivandrum with a defect in the left eye (fig 1). The patient revealed a history of trauma to the left eye leading to enucleation as a part of treatment. On examination the ocular defect was healed properly with good mobility of the posterior wall of the ocular defect during full excursive movement. The palpebral fissure was examined in both open and closed position to rule out any anatomical as well as physiological abnormality. Conjunctiva, depth of fornices, and presence of cul de sac was also examined. It was planned to rehabilitate the patient with an ocular prosthesis fabricated by combination of custom and stock ocular prosthesis.

### Procedure

Treatment was planned after careful examination of the area of the defect. Patient was explained about the procedure and its limitations.



**Fig 1:** Pre treatment

### **Fabrication of the Prosthesis**

Custom tray fabrication was done by modifying a pre-fabricated (stock) eye for acceptable fit to socket and its iris and pupil closely matched with that of the natural eye. This was duplicated using self-cure acrylic with numerous perforations for escape of the impression material. A two side opened syringe cap was attached to the special tray through a perforation made at the centre of it.

First, petroleum jelly was applied to the eyebrows for the easy

removal for the impression material when its sets. Impression was recorded using polyvinyl siloxane light Viscosity material. The impression material was slowly injected into the socket taking care to avoid any air bubbles. The patient was instructed to make various eye movements so as to get functional impression of the eye (fig 2). After the material had set, impression was retrieved from the socket and checked to ensure that all the surfaces were recorded and poured with dental stone.

Next, the wax pattern was fabricated by pouring the molten wax into the impression. The wax was properly counterered and carved to give it a simulation of lost eye. Try in of the wax pattern was done. Petroleum jelly may be applied in the tissue surface of the wax pattern to avoid irritation to the tissues. The wax pattern was tried in patient's socket and checked for size, comfort, support, fullness, retention and eyelid coverage by performing the functional movements. Iris part of the acrylic stock eye, whose shade matched with the contra lateral eye, was separated and was incorporated into the wax pattern. The position of iris was determined with help of landmarks making on the transparent graph grid making the patient look straight (fig3).



**Fig 2:** Impression of the ocular defect



**Fig 3:** Grid with iris positioning

### **Technique of Iris Disc Placement**

- Transparent graph grid was used to attach iris disc.
- Certain guidelines were marked on patients face.
- The facial markings were transferred to grid by placing it on patients' face

### **Transparent Graph Grid**

Markings were made on grid template on X-axis from A to H starting from midline and on left side from A' to H'. Similarly from 1 to 7 on Y-axis and 1' to 7' on left side. The distance between each marking was 1cm on both X and Y axes.

### **Guidelines on Patient's Face**

A vertical midline was marked passing through the forehead crease, glabella, tip of the nose and chin. The distance from the right eye medial canthus to the midline and left eye medial canthus to the midline was measured. This distance standardized the midline marking and was used to reposition the grid template each time during the try-in visit.

### **Evaluation with grid placed**

The patient was asked to gaze straight at an object kept 4 feet away. The operator then marked the vertical lines coinciding

with the with the medial and distal extremities of the iris of the natural eye. Similarly the horizontal lines referring to the centre, inferior and superior limits of the iris were marked. The facial markings were transferred to the grid template by placing it on the patients face. These markings were transported to the side of the defect. These markings were transferred to the sculptured wax pattern and the iris button attached to it<sup>[4]</sup>.

Later the final try in was done keeping the iris in its defined position (fig 4).Then shade of the sclera portion was selected using the tooth coloured acrylic shade guide. The finished pattern was invested in a small two piece brass flask (fig 5). The wax pattern with iris button was then dewaxed (fig 6), and packed with tooth colored heat cure acrylic. Curing and polishing of scleral with iris botton was done. Fine red resin threads were placed on the sclera to mimic the blood vessels of the patient's natural eye.

The entire scleral portion is then coated with monomer polymer syrup to keep the blood-vessel fibers in place and allowed to set. After curing, the prosthesis was finished and polished and was inserted in patient's eye (fig 7, 8). The patient was instructed on the aspects of insertion, removal and maintenance of the prosthesis.



Fig 4: Wax trial



Fig 5: Invested wax pattern

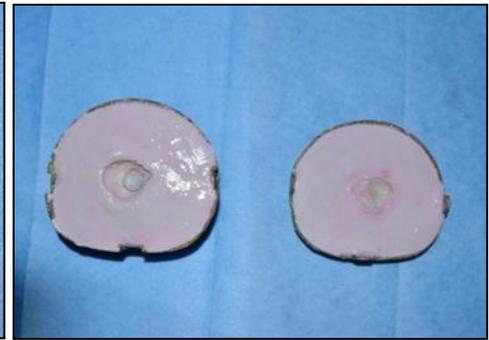


Fig 6: Dewaxing

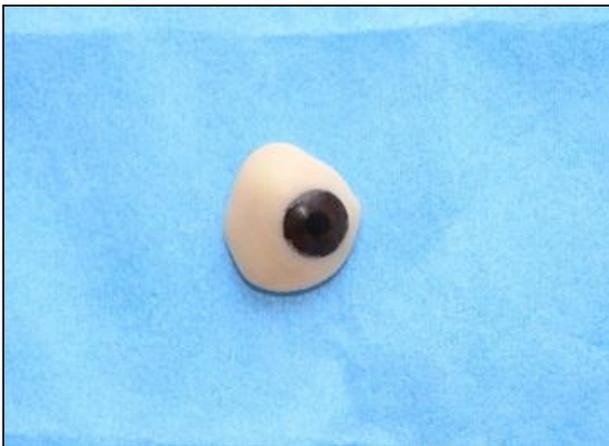


Fig 7: Final Ocular prosthesis

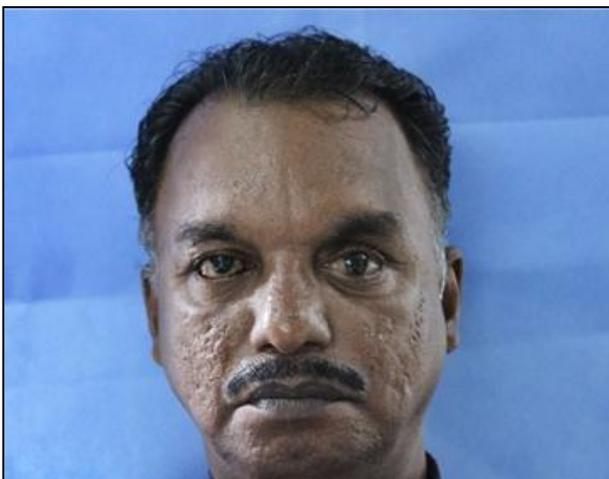


Fig 8: Post treatment

- Prevents collapse of the lids.
- Provides proper muscular activity of the lids.
- Prevents accumulation of fluid in the cavity.
- Maintains palpebral opening similar to natural eye.
- Has a gaze similar to natural eye
- Mimics coloration and proportions of natural eye.
- Conversational gaze can be achieved by maintaining precise interpupillary distance

The technique of fabrication used here was very simple with minimal equipment and cost effective.

### Conclusion

The aesthetic outcome of the custom-made ocular prosthesis was far better than the stock ocular prosthesis. The technique described here represents a straight forward, simple and cost-effective method and results in a more aesthetically pleasing and accurate prosthetic outcome and will enhance self-confidence of the patient.

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### Discussion

The rehabilitation of the orbital defect is a complex task. The rehabilitation of a missing eyeball with an ocular prosthesis is a technique that has a significant place in the field of oral and maxillofacial prosthetics. A custom ocular prosthesis is a good option when reconstruction by plastic surgery or the use of osseointegrated implants is not possible or not desired. Systemic conditions and financial constraints may limit their use. A well-made and properly planned ocular prosthesis maintains its orientation when patient performs various movements. With the development of newer materials the socket can be finely recorded on which custom made ocular acrylic prosthesis can be fabricated with exact fit and esthetics.

### Advantages of A Custom Ocular Prosthesis Are [5].

- Retains the shape of the socket.