

## Custom ocular prosthesis for different clinical situations: A series of 4 cases

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### Abstract

Beauty lies in the eye of the beholder. Therefore loss of eye has a ruined effect on the life of a patient. Rehabilitation by ocular prosthesis helps in elevating the life of the patient by removing esthetic limitations and providing social confidence, mental peace and physical restoration. Patient came to the department of Prosthodontics for fabrication of prosthetic eye and following is a case series of patients who reported with retinoblastoma, phthisical eye, ocular trauma, ptosis and details the steps in fabrication of a custom ocular prosthesis.

**Keywords:** Custom ocular prosthesis, Phthisis bulbi, Ptosis, Trauma, Retinoblastoma

### Introduction

Eye loss could be due to congenital defects and acquired defects such as trauma, tumour, and surgical complications. Rehabilitation of such defects can be done with help of stock or customised ocular prosthesis. Delayed rehabilitation of ocular defects can result in deranged iris level, ptosis, socket shrinkage and loss of fornix depth which ultimately leads to facial disfigurement which compromises patient's social, psychological, mental and physical well being.

Beauty and precise adaptation with addition to functional stimulation of the socket is provided by prosthesis which is of prime importance especially in children.

Removal of eyes by surgical procedure can be classified as: evisceration (it is removal of eye's content, leaving the scleral shell and extra ocular muscles intact), enucleation (it is the removal of eye that leaves the eye muscles and remaining orbital content intact) and exenteration (it involves removal of the entire globe and its surrounding structures including muscles, fat, nerves, and eyelids).<sup>(1,2)</sup>

### Case Reports

**Case 1:** 10-year-old male child came to the Department of Ophthalmology with chief complaint of white spot on the right eye accompanied by squint, and pain on movements. He was diagnosed with retinoblastoma and an enucleation surgery was performed. After that patient was advice for fabrication of prosthetic eye and send to the Department of Prosthodontics for the fabrication of an eye prosthesis.(Fig. 1)



**Fig. 1: Pre and Post operative view**

**Case 2:** A 62-year-old female reported to the Department of Ophthalmology of the institute with chief complaint of blurry vision and was diagnosed with cataract in right eye. Following which patient underwent cataract surgery but due to surgical complications the eye was subsequently enucleated and patient developed phthisis bulbi. Then patient was advice for prosthetic eye and send to the Department of Prosthodontics for the fabrication of an ocular prosthesis. (Fig. 2)





**Fig. 2: Pre and Post operative view**

**Case 3:** A 28-year-old male reported to the Department of Ophthalmology with history of ocular trauma of right eye by iron rod followed by enucleation of it. The patient was sent to the Department of Prosthodontics for the fabrication of an ocular prosthesis. (Fig. 3)



**Fig. 3: Pre and Post operative view**

**Case 4:** A 7-year-old male child reported to the Department of Ophthalmology with complaint of painful left red eye. He was diagnosed with retinoblastoma of left eye and an enucleation surgery was done. After that patient was sent to the Department of Prosthodontics for the fabrication of eye prosthesis. (Fig. 4)



**Fig. 4: Pre and Post operative view**

### Clinical Procedure

Careful examination of the area of the defect was done followed by appropriate treatment procedure. The

procedure was explained to the patient/guardian and a written consent was taken from the patient.

A perforated plastic tray is chosen according to the size of the eye and used along with syringe for taking the impression (Fig. 5). Perforated tray is placed in patient eye socket and a thin mix of alginate (Algitex, DPI) is inserted to the syringe and injected into the eye socket. The patient was asked to move his/her normal eye in all directions to allow the alginate to flow into all areas of the enucleated socket, and onto the outer surface of tray to record lid movements. A stone model of the impression (Fig. 6) is obtained by the 2-pour technique in which the impression is boxed and poured in the dental stone- type III up to the height of contour of the impression followed by the application of a separating agent and placement of orientation grooves after which the remainder of the impression is poured in the dental stone.



**Fig. 5: Perforated plastic tray with syringe**



**Fig. 6: Alginate Impressions**

The set cast (Fig. 7) is retrieved and prepared for the fabrication of wax pattern. Separating media is applied to the cast and molten wax is poured into the cast. The wax pattern is then carved to achieve an arbitrary contour of eye and adjusted to match the contra lateral eye of the patient. (Fig. 8)



**Fig. 7: Stone cast**



**Fig. 8**



**Fig. 9**

**Fig. 8, 9: Wax pattern**

The location of iris is marked on the wax pattern while the patient has fixed the gaze on a distant object. Then the color matched Iris is retrieved from stock ocular prosthesis and incorporated in the wax pattern and the contour of wax pattern is readjusted. (Fig. 9)

A stump made of clear self cure PMMA is attached to iris so as to maintain iris orientation during processing. The prepared wax pattern is invested in a special ocular flask and dewaxed followed by application of separating media (Fig. 10, 11). Red nylon fibers can be used for characterization of vessels on the scleral surface. (Fig. 12)



**Fig. 10**



**Fig. 11**

**Fig. 10, 11: Investing and Dewaxing**



**Fig. 12: Red nylon fibre**

Heat cured tooth colored PMMA (SC 10, Pyrax, Roorkee, India) of an appropriate shade is mixed and packed into the dewaxed mold cavity.(Fig. 13)



**Fig. 13: PMMA packed into dewaxed mold**

The flask is packed and cured. The cured pattern is retrieved from the flask and finished. Minor adjustments were made at the time of delivery as per the patient's comfort and esthetics. Necessary instructions for placement and removal of the prosthesis were given and the need for regular recall appointments was described.

### Discussion

Despite different ocular defect etiologies successful ocular rehabilitation can be achieved if done promptly in a proper sequenced method. The custom made ocular prosthesis fabricated for these patients successfully restored the patient's aesthetics and improved their social acceptance thereby, improving their quality of life.

It accurately fit to the socket as the prosthesis fabrication is based on the existing anatomy of the patient, thus giving benefits of increased fit, movement of the eye ball, and the exact match of the iris position as that of the adjacent natural eye.<sup>(3,4)</sup>

### Conclusion

A technique for fabrication of a custom-made ocular prosthesis for different clinical situations has been described. A properly fabricated custom-made prosthesis enhances the patient's comfort, confidence and esthetics by increased adaptiveness, natural appearance, and functional stimulation.<sup>(5)</sup> Thus Custom ocular prosthesis helps in achieving psychological rehabilitation in different situations where loss of vision is permanent.

### References

1. Fernandes AU, Goiato MC, Batista MA, Santos DM. Color alteration of the paint used for iris painting in ocular prostheses. *Braz Oral Res.* 2009; 23:386-392.
2. Cain JR. Custom ocular prosthesis. *J Prosthet Dent* 1982; 48:690-4.
3. Breo. Surgical and prosthetic considerations in the management of orbital tumours' *Prosthet Dent.*1992; 67:106-12.
4. Ow RK. Ocular prosthetics: Use of a tissue conditioner material to modify a stock ocular prosthesis' *Prosthet Dent.*1997;78:218-22.
5. J. Beumer and I. Restoration of facial defects – *Prosthodontics and surgical consideration*, J. Beumer, Ed, pp 350-364.