# A Simplified Approach for Ocular Rehabilitation - A Case Report

Manandhar P[1], Mathema SRB[2]
[1]Lecturer, Department of Prosthodontics and Maxillofacial Prosthetics, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal
[2]Professor and HOD, Department of Prosthodontics and Maxillofacial Prosthetics, People's Dental College and Hospital, Kathmandu, Nepal

## Abstract

Loss of an eye or any body part has an intimidating and crippling effect on the psychosocial well-being of the patient. Although the artificial prosthesis cannot restore the function but it can highly improve the patient's esthetics and help them regain their psychological confidence. Literature has advocated various rehabilitation modalities including: empirical use of stock shell, modifying stock eye, custom-made ocular prosthesis, ocular implants, etc. Custom-made ocular prosthesis, among all the techniques, shows improved adaptation to tissue bed, distributes uniform pressure, provides a more esthetic and precise result and is relatively cost-effective. This case-report explores a relatively comprehensive method of custom ocular prosthesis fabrication for an ocular defect with a satisfactory outcome.

**Key words:** Custom made; Ocular defect; Ocular prosthesis; Prosthetic rehabilitation.

## Introduction

Eye is considered to be one of the vital components of face which not only helps in vision but also in communication and facial expression. The reasons for loss of eye could be due to irrepairable trauma, tumour or congenital defects.[1] Surgical interventions for such conditions include: evisceration, enucleation or exenteration. Evisceration is a minimal surgical procedure where contents of globe are removed, leaving sclera intact. Enucleation is a more invasive procedure where the entire eyeball is severed from muscles and optic nerve. Exenteration, the most radical of all, involves en bloc removal of the orbital contents.[2]

***Corresponding Author***
*Dr. Pratik Manandhar, Lecturer*
*Department of Prosthodontics and Maxillofacial Prosthetics*
*Gandaki Medical College Teaching Hospital & Research Center (Pvt.) Ltd.*
*Pokhara Lekhnath-27, Nepal.*
*E-mail: pratikmanandhar27@gmail.com*

Loss of an eye leads to disfigurement of face which causes physical disability and significant psychological disturbances to patient.[3] Therefore, timely provision of artificial prosthesis improves the patient's esthetics and helps them regain their psychological confidence. Ocular prosthesis commended for rehabilitation of defects caused due to evisceration or enucleation can be either readymade stock shell, tailoring the stock eye or custom-made prosthesis.[1,4] Custom-made ocular prosthesis shows improved adaptation to tissue bed, distributes uniform pressure and provides a more esthetic and precise result.[5]

Hence, this case report explores a relatively comprehensive method of custom ocular prosthesis fabrication for an ocular defect. It can be considered as a feasible and better alternative for contriving an eye prosthesis when reconstruction by plastic surgery or ocular implants is not possible or desired.

## Case Presentation

A 56-year old female reported to the Department of Prosthodontics and Maxillofacial Prosthetics,

Peoples' Dental College and Hospital with the complaint of missing left eye. The patient gave a history of trauma to the left eye around 50 years back for which she did not undergo any kind of treatment and consequently the eye had shrunken leaving an ocular defect in her left eye (Figure 1). On clinical examination, the intraocular tissue bed was healthy with adequate depth beneath the upper and lower fornices (Figure 2). Fabrication of custom-made ocular prosthesis was planned to replace her left missing eye. Entire procedure was explained to the patient and written consent was obtained.

## Clinical and Laboratory Procedure

Primary impression of the ocular defect was made with alginate (Zelgan, DentsplyInt) using 5 ml disposable syringe and custom ocular tray was fabricated with self-cure acrylic resin (DPI RR Cold Cure) (Figure 3 and 4). The tray was connected to a 5 ml disposable syringe to provide the channel for flow of impression material and final impression was made by injecting light body consistency polyvinyl siloxane elastomer (Reprosil, DentsplyInt) into the eye socket (Figure 5). The patient was seated erect and asked to move her adjacent eye in all directions to allow the material to flow into the areas of the socket and record the anatomical details precisely. The patient was requested to stare at a distant spot, and instructed to hold her gaze in a forward position with eyes open while the impression was being made.

After the material was set, final impression was retrieved from the socket and evaluated for any defects. The impression was invested in alginate and the alginate mold was partially split after setting, for retrieving the impression of socket (Figure 6). Molten baseplate wax (Modelling wax, DPI) was poured into the mold to fabricate a scleral wax pattern. The wax pattern was then polished and checked for the proper fit and adjusted to obtain the satisfactory contours of eyelids (Figure 7).

The adjacent working eye was taken as a reference to mark the iris position on the wax pattern. An iris disk approximately 0.5 mm smaller than the actual measurement was selected, to compensate the magnification of iris by clear acrylic which provides three dimensional effects. The iris disk was placed in the marked area after scooping out the wax. The wax pattern was then polished and trial was done to evaluate its position and gaze (Figure 8). Shade selection of sclera of the natural eye was done. After dewaxing, it was processed in the two piece flask using heat polymerizing acrylic resin (DPI-Heat cure, DPI). Thus, the obtained scleral blank was tried in and the supraorbital folds, eyelid margins and iris plane were compared with the contralateral eye. The scleral blank was then painted with acrylic colors (W&N Artists' Acrylic) so as to match with the color of natural eye. The iris portion was colored in a layering fashion to mimic the colored striations of patient's iris. A black dark spot was painted at the center of iris in order to represent pupil. Further characterization was done by adding red rayon fibers in the scleral region to simulate vasculature (Figure 9). Lastly, the characterized scleral blank was replaced into flask and clear acrylic heat cure resin was used to pack into the mold space. After acrylization, the final obtained prosthesis was finished and polished in order to give a high shine and natural appearance (Figure 10).

The outcome of the prosthesis was ascertained from the satisfied look on the patient's face and from the follow up after one day, a week later and every six months. The patient was given proper instructions on insertion, removal and hygiene of the prosthesis.

*Figure 1: Clinical presentation*

*Figure 2: Examination of the socket*

*Figure 3: Primary ocular impression*

*Figure 4: Custom ocular tray*

*Figure 5: Custom ocular tray final impression*

*Figure 6: Final impression along with partially split alginate mold*

*Figure 7: Scleral wax pattern try in*

*Figure 8: Iris orientation on scleral wax pattern*

*Figure 9. Scleral blank painting & characterization*

*Figure 10: Final insertion of ocular prosthesis*

## Discussion

Rehabilitation of ocular defect is a challenging task and requires individualized tailoring of the technique for each patient. Studies have suggested various techniques for fabrication of ocular prosthesis including empirical fitting of a stock eye, adjusting a stock eye and the custom-made eye technique.[1,6] The method of choice is largely governed by the type of defect, operator skills and availability of material and equipment.

Stock eye prosthesis was largely advocated by Laney and Gardner[7] but the limitations like poor fit, constant tissue irritations, accumulation of fluid in tissue prosthesis interface, bacterial growth and compromised esthetic outcome exist. Hence, relining a stock eye shell[8] can improve the adaptation of the prosthesis to tissue bed, but the contour of sclera and iris position would still be questionable. Customized ocular prosthesis on the other hand eliminates the above mentioned demerits and provides good fit, enhanced esthetics, better eye movement, proper eyelid fullness, accurate sclera contour and iris color match and positioning.[9–11] The technique described in this article is a comprehensive and undemanding method tailored for rehabilitation of an ocular defect. The outcome of the prosthesis could be ascertained by the improved esthetics and ultimate patient satisfaction.

## Conclusion

Custom ocular prosthesis fabrication that closely mimics the adjacent natural eye is a challenging task. Although the prosthesis cannot restore the vision, but it improves patients' appearance, mitigates their psychological trauma, boosts up the lost confidence and helps to lead a better life.

### References


1. Patil SB, Meshramkar R, Naveen BH, Patil NP. Ocular prosthesis: a brief review and fabrication of an ocular prosthesis for a geriatric patient. Gerodontology. 2008;25(1):57–62.
2. Perman KI, Baylis HI. Evisceration, enucleation, and exenteration. Otolaryngol Clin North Am. 1988;21(1):171–82.
3. Beumer J, Curtis T, Marunick M. Maxillo Facial Rehabilitation: Prosthodontic and surgical consideration. In: Maxillo Facial Rehabilitation: Prosthodontic and surgical consideration: Second Edition. IshiyakuEuroAmerica, Inc.; 1996.
4. Guttal SS, Patil NP, Vernekar N, Porwal A. A Simple Method of Positioning the Iris Disk on a Custom-Made Ocular Prosthesis. A Clinical Report. J Prosthodont. 2008 Apr;17(3):223–7.
5. Ow R, Amrith S. Ocular prosthetics: Use of a tissue conditioner material to modify a stock ocular prosthesis. J Prosthet Dent. 1997;78(2):218–22.
6. Bartlett SO, Moore DJ. Ocular prosthesis: a physiologic system. J Prosthet Dent. 1973;29(4):450–9.
7. Lanay W. Maxillofacial prosthetics. In: 2nd ed. Littleton: PSG Publishing; 1979. p. 279–306.
8. Smith RM. Relining an Ocular Prosthesis: A Case Report. J Prosthodont. 1995;4(3):160–3.
9. Bhochhibhoya A, Mathema S, Maskey B. Prosthetic Rehabilitation of a Patient with an Ocular Defect with Custom-made Ocular Prosthesis: A Case Report. Phys Med Rehabil Int. 2016;3(4):1093.
10. Soni S, Singh PR, Singh A, Srivastava S, Shekhar A, Gupta H. Ocular Prosthesis: Simplified Custom Made Technique- A Case Report. Int J Oral Health Med Res. 2016;3(1):4.
11. Choubisa D. A simplified approach to rehabilitate an ocular defect: Ocular prosthesis. J Indian Prosthodont Soc. 2017;17:89–94.