



Prosthetic rehabilitation of an ocular defect – A case report

Priyanka Naresh Khungar[✉], **Rohit Ashok Mistry**, **Sweta Kale Pisulkar**, **Trupti M. Dahane**, **Anjali Bhojar Borle**, **Surekha Dubey Godbole**

Department of Prosthodontics and Crown & Bridge, Sharad Pawar Dental College (DMIMS) Sawangi, Wardha, Maharashtra, India

[✉]Corresponding author

Department of Prosthodontics and Crown & Bridge,
Sharad Pawar Dental College (DMIMS) Sawangi, Wardha,
Maharashtra, India
Email: khungarpriyanka1@gmail.com

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General Note

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ABSTRACT

Purpose: Custom-made ocular prosthesis, compared to stock prosthesis, provides better fit to the eye socket, better cosmetic results, and less discomfort to the patient. A custom-made ocular prosthesis fabrication has been done for a child patient with ocular defect in right eye. *Case report:* For a child patient of 12 years with anophthalmic right eye, preliminary impression was made using putty consistency addition polysilicone. A custom tray was fabricated from the moulds obtained from preliminary impression. A final impression was made using light body addition silicone from which then master model was obtained. Iris positioning done using Graph-grid method and the wax trial was done. Processing was done using acrylic resin to match patient's contralateral eye shade

and esthetics. *Conclusion:* Custom-made prosthesis allows better esthetic and functional results to the patient in comparison to stock prosthesis. Further follow-up is necessary to check condition and fit of the ocular prosthesis in patients.

Keywords: Ocular Defect, Custom-Made Ocular Prosthesis, Case Report, Graph-grid, addition polysilicone.

1. INTRODUCTION

They are the organ of vision, centre of facial expressions and an epitome of cosmetic appearance in human beings as well as play a very important role in nonverbal communication. Any unexpected trauma, pathology or congenital deformity of the eye may necessitate a surgical intervention leading to the loss of eyeball. The surgical management to cure any of the above mentioned condition may involve one of the approaches depending on the severity of situation (Beumer et al., 1996). The procedure of Evisceration - where the contents of the globe are removed, leaving the sclera intact. A more invasive procedure is Enucleation - where the entire eyeball is severed from the muscles and optic nerve. Exenteration, the most radical, involves removal of the contents of the orbit including the eyelids and the surrounding tissues being removed (Kaur et al., 2010).

Ocular defect created post surgery makes an individual functionally and aesthetically challenged. Rehabilitation of ocular defect with a custom-made ocular prosthesis improves social acceptance, psychology, and self-confidence in the individual (Lanzara et al., 2019). Reproduction of natural colour, size, contour, and orientation of an ocular prosthesis that gives a life like appearance is a challenge to a Prosthodontist (Lanzara et al., 2019). The ocular prosthesis may be either readymade (stock eye) or custom made with latter providing the better fit and comfort to the patient compared to the stock eye (Sethi et al., 2014). This article presents a simple yet effective method of fabrication of custom ocular prosthesis that is well fitting, with the characterization of the sclera to provide an esthetically pleasing result.

2. CASE REPORT

A 12 years old male patient, resident of Gadchiroli, referred from the department of ophthalmology to the Department of Prosthodontics, Sharad Pawar Dental College, Sawangi, Wardha (DMIMS) for placement of ocular prosthesis following enucleation of right eye. The patient's father gave history of a traumatic injury to patient's right eye with broken shard of glass. The vestigial non functional eye was hence advised to be surgically excised [enucleation] by the ophthalmologist. Patient reported to the Department of Prosthodontics, 8 days post-surgery for prosthetic rehabilitation of the ocular defect. On examination, the patient showed asymmetrical facial form due to presence of peri-orbital oedema on right side. Sutures were present with healthy non-suppurative primary closure. The condition was identified as Acquired Unilateral Anophthalmia (Fig.1).



Figure 1 Pre-Treatment Presentation

3. STEP BY STEP PROCEDURE

Prosthetic rehabilitation of ocular defect was planned for the patient's right eye. Preliminary impression was made using putty consistency addition silicone [Reprosil, Dentsply Pvt Ltd, India] (Fig. 2).



Figure 2 Preliminary impression with addition silicone (putty consistency) and poured cast.

The custom tray was made by adapting self cure resin over the wax pattern which was obtained from the primary impression moulds. An extension of cold cure acrylic was made on syringe to record final impression (Fig. 3).



Figure 3 Custom Tray

The final impression of the defect was made using vinyl polysiloxane impression material (Reprosil, Dentsply Pvt Ltd, India) recording the functional movements of the ocular muscles (Fig. 4).



Figure 4 Final Impression

The master cast was poured using two-pour technique for the ease of fabrication of wax pattern (Fig. 5).

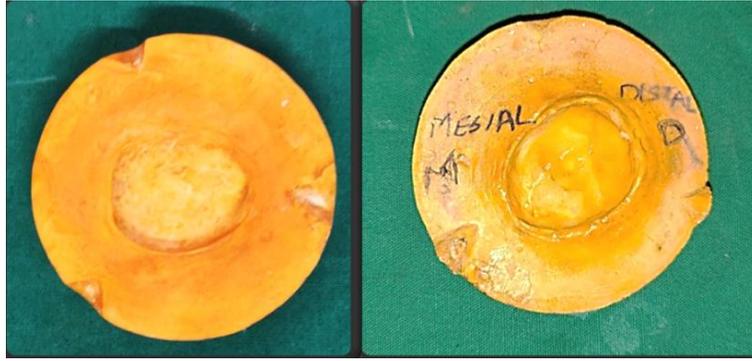


Figure 5 Master Model

The mould space obtained between the two halves of the master cast was then filled with molten wax to fabricate a wax pattern. When satisfied with the contour and fit of the wax pattern, iris positioning was done. For this, the iris was selected by shade matching from a set of stock eyes. The selected stock eye was grounded to just obtain the iris portion. The iris positioning was done using the graph-grid method (Fig. 6).



Figure 6 Iris Positioning By Graph Grid Method

To verify the proper fit and contouring of wax blank, try in of the wax pattern after iris positioning was done in patient's eye (Fig. 7).



Figure 7 Wax Pattern Trial

Processing of the trial wax pattern was done to obtain an acrylicized custom made ocular prosthesis (Fig. 8).



Figure 8 processing of wax pattern

Different intrinsic and extrinsic stains were used to match the shade with natural eye of patient and obtain an appropriate result of prosthesis. The final prosthesis was then delivered to the patient (Fig. 9).



Figure 9 Final Ocular Prosthesis

Patient and guardian was taught how to insert and remove the prosthesis and it's home care protocol which includes (Ahmad et al., 2009; Deshmukh et al., 2016) :

- Prosthesis should be handled with care and with clean hands.
- Removal of Acrylic prosthesis during night is ideal and it must be stored in water.
- It must be rinsed everyday with commercially available antiseptic solution and water.
- Routine polishing of prosthesis should be done every year to prevent deposition of protein and bacteria.

4. DISCUSSION

"Love of life is next to the love of our own face thus the mutilated cry out for help" (- Sushruta). Eyes are the most precious gift given to human. Loss of eye is a misfortune to a person because, as it is one of the most important sensory organs. This sensory loss not only alters facial appearance, but also results in emotional and psychological trauma to a sufferer (Beumer et al., 1996; Tripuraneni et al., 2015). Rehabilitation of ocular defect is thus necessary. To rehabilitate means 'To restore to good condition or to restore to former privilege'. The aim of rehabilitation of such ocular defect should be to restore and mask the disfigurement and to give a normal aesthetic appearance.

This article describes a technique in which prosthetic rehabilitation of a young male child with missing eye was carried out with a custom made ocular prosthesis. The rationale for giving this prosthesis in young patient is that the patient is in his growing age and persistent anophthalmia in such situation will lead to shrinkage of the soft tissue resulting in difficulty for future restoration. Also, the custom-made ocular prosthesis conforms accurately to the socket as the prosthesis fabrication is based on the existing anatomy of

the patient, thus giving benefits of increased adaptation, movement of eye ball, and the exact match of the iris position as that of the adjacent natural eye (Gunaseelaraj et al., 2012).

The case report involves the use of addition polysilicone (putty consistency) for making preliminary impression. Sykes in 1996 and Taicher in 1985 advocated the use of addition silicones and techniques for recording impressions, however other materials like ophthalmic alginate, combination of modelling wax and mouth temperature waxes were used, tissue conditioners were also used (Kamalakanth and P. Venkat, 2007). Different methods have been suggested to determine the size and position of the iris by visual judgment, using pupillometer, or other callipers. In this case, a transparent graph template was used to accurately locate and position the iris rather than counting on visual assessment alone, which can introduce inter-observer variability because of binocular vision and parallax errors. The method described here is straightforward and can be carried out in any clinical setup (John et al., 2016). Acrylic resin is used to fabricate the definitive prosthesis as it is most common material used because of its biocompatibility, esthetic and durability in terms of colour, cost and availability. A custom ocular prosthesis is a good option when reconstruction by plastic surgery or use of osseo-integrated implants is not possible or desired.

5. CONCLUSION

Defects of the eye may follow removal of a part of or the entire orbit. This results in the patient becoming visually, esthetically and psychologically handicapped. Restoring the defect with a custom made prosthesis not only restores esthetics but also gives back the lost confidence to the patient.

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REFERENCE

1. Ahmad N, Bhandari AJ, Pai U, Gangadhar SA. Prosthetic Management of a patient with an Ocular Defect. *Pravara Med Rev* 2009; 4(2).
2. Curtis TA, Marunick MT. *BJ. Maxillofacial Rehabilitation: Prosthodontic and Surgical Considerations*. St Louis: Ishiyaku Euro America; 1996; 417-31.
3. Deshmukh DA, Godbole DSR. Prosthetic Management of Patient with an Ocular Defect. *International Journal of Innovative Research and Advanced Studies (IJIRAS)*. 2016;3(12):3.
4. Gunaseelaraj R, Karthikeyan S, Kumar M, Balamurugan T, Jagadeeshwaran A. Custom-made ocular prosthesis. *J Pharm Bioallied Sci*. 2012;4(6):177.
5. John A, Anilkumar S, Rajesh C, Raghavan S. A novel technique of custom ocular prosthesis fabrication. *J Oral Res Rev*. 2016;8(2):82.
6. Kaur A, Pavaiya A, Singh S, Singh R, Chand P. A simplified approach to fabrication of an ocular prosthesis: A case series. *Indian J Dent Res*. 2010;21(4):615.
7. Lanzara R, Thakur A, Viswambaran M, Khattak A. Fabrication of ocular prosthesis with a digital customization technique – A case report. *J Fam Med Prim Care*. 2019;8(3):1239.
8. P. Venkat Ratna Nag KKS. Ocular impressions: An overview. *The Journal of Indian Prosthodontic Society*. 2007; 7(1).
9. Sethi T, Harianawala H, Haylock C, Kheur M. Fabrication of a custom ocular prosthesis. *Middle East Afr J Ophthalmol*. 2014;21(3):271.
10. Tripuraneni S, Vadapalli S, Ravikiran P, Nirupama N. An innovative impression technique for fabrication of a custom made ocular prosthesis. *Indian J Ophthalmol*. 2015;63(6):545.