

Prosthetic Rehabilitation of Ocular Defect: A Case Report

¹Dr. Ravikiran Asabe, ²Dr. Manali Bhansali

¹MDS, ²BDS(Intern),

¹Prosthodontics and Crown & Bridge,

^{1,2}Bharati Vidyapeeth Dental College and Hospital, Pune, India.

Abstract: An eye for an eye is what the old saying goes as it has varied functions like from vision to expression. The loss of an eye has a crippling effect on the psychology of the patient. Maxillofacial prosthetics includes all the artificial prosthesis that restores and replaces stomatognathic and associated facial structures improving the patient aesthetics, consequently provide physical and mental well-being. It also increases the patient's quality of life and encourages them to build up their self-confidence to return back to their social life. This case report describes the rehabilitation of an ocular defect by ocular prosthesis to achieve ideal fit and aesthetics in a cost effective manner.

Keywords: Ocular defect, Ocular prosthesis, Maxillofacial prosthesis, Prosthetic rehabilitation.

INTRODUCTION

An eye is a vital organ which not only aids in vision but also is an important component of facial expression [1]. The loss or absence of an eye may be caused due to congenital defect, irreparable trauma, tumour, painful blind eye, sympathetic ophthalmia or the need for histological confirmation of a suspected diagnosis [2]. Surgical procedures in the removal of an eye can be broadly classified as: evisceration (where the contents of the globe are removed leaving the sclera intact), enucleation (most common, where the entire eyeball is removed after severing the muscles and the optic nerve) and exenteration (where the entire contents of the orbit including the eyelids and the surrounding tissues are removed) [3]. After enucleation, a plastic conformer is left in place for 4-6 weeks to reduce edema and maintain the socket contours for a prosthetic eye. Once surgical site is healed and dimensionally stable, fabrication of an ocular prosthesis can be done [4]. The disfigurement associated with the loss of an eye can cause significant physical, psychological and emotional problems and hence, replacement of the lost eye is necessary to promote physical and psychological healing for the patient and to improve social acceptance [5,2].

The art of making artificial eyes has been practiced since ancient times dating back to the Forth Dynasty in Egypt [1613- 2494B.C.]. Ambroise Pare, a French Surgeon dentist, is considered to be the pioneer of modern artificial eyes who fabricated artificial eyes made of glass as well as porcelain. In 1944, a Naval dental school fabricated custom- fitted ocular prosthesis using acrylic resin which was easy to fit and adjust, unbreakable, aesthetically pleasing, longer lasting and easier to fabricate [6].

This case report describes successful prosthetic rehabilitation of a patient with ocular prosthesis.

CASE REPORT

A 62-year-old male patient reported to my clinic with a chief complaint of difference in colour and impinging present artificial eye [Fig. I]. He had lost his right eye due to trauma at the age of 51 years. He had his first prosthesis made at the age of 55 years. On examination of the defective eye socket it was found that she had a defect with a shrunken orbit and intact tissue bed. Treatment plan included fabrication of custom made ocular prosthesis.



Fig. I: Photograph showing patient with previous prosthesis

I. Impression Procedure

The eyebrow and eyelashes were lightly lubricated using Vaseline. The direct impression or external impression technique was used with low viscosity alginate with the help of 5 ml syringe [Fig.II (a)]. The impression was then evaluated for proper extension and smooth surfaces. Primary cast was poured using dental plaster [Fig.II (b)].

A spacer was adapted and customized impression tray was fabricated from the autopolymerizing acrylic resin [Fig.II (c)]. The approximate pupil location on the resin tray was assessed and a perforation of 3–4 mm diameter was made. A 5-ml disposable syringe cap was used to carry the final impression material as well as for supporting the tray. For final impression, extent of special tray was examined and additional silicone light bodied impression material was mixed homogeneously and injected into the socket followed by putty consistency material so that it gets engaged in the holes of special tray. The patient was instructed to sit erect and asked to stare at a distant spot and instructed to hold his gaze in a straight forward position with eyes open and was then asked to move his eye to the right then to the left, then up and down and finally in a circular motion, so that the functional impression of the defect could be obtained. After setting the material, it was carefully removed from the socket and evaluated for proper border extension [Fig.II (d)]. A two-piece dental stone mold was planned. First, the lower part of impression was poured in Type 4 dental stone. After the stone had set, four sided indexing was done followed by separating medium application and a second layer of Type 4 dental stone was added over it [Fig.II (e)].

II. Fabrication of the Sclera Wax Pattern

The wax pattern was fabricated by pouring the molten ivory wax into the cast and the wax was contoured and carved to give it a simulation of the lost eye. The position of the iris was located using a millimeter grid which was placed on the patient's face and the patient was instructed to see at an object at least 3 feet in front and at eye level [Fig.III (a)]. The selection of size, shape and configuration of the iris was done by trimming and modifying a commercially available stock eye having close resemblance with the unaffected, contralateral eye. That iris portion of the stock eye was then carefully fixed on the wax pattern according to the transferred markings. Shade selection for the sclera was done using natural eye as guide.

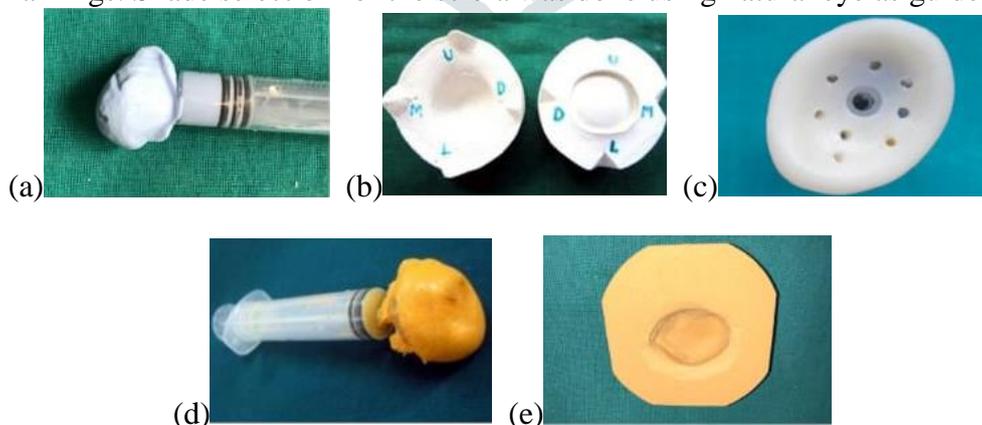


Fig. II. (a) Primary impression, (b) Primary mold fabrication, (c) Special tray, (d) Final impression, (e) Final mold fabrication.

III. Wax pattern trial

Try-in of the wax pattern was done [Fig.III (c)]. The fullness of the both palpebrae and the eye socket was checked along with its extensions which was confirmed by asking the patient to close his eyes. The patient was also inspected from the profile view. Also his eye movements were checked for symmetry and function,

and it was found that the wax try-in moved and synchronized with the patient's natural eye movements giving a realistic feeling to the patient.

IV. Flasking

Small stick of autopolymerizing resin was attached to the iris so as to prevent the displacement of the iris during dewaxing [Fig.III (d)]. Flasking was done taking care that the iris was secured to one counter of the flask and remaining part in the other portion of the flask. Then the dewaxing was done after the final set, taking care so that there was complete wax elimination from the mold space. Packing was done with the customized heat cure tooth colored acrylic, matching with the colour of the sclera of normal eye of the patient and a long curing cycle (9 h at 165°F) was carried out for acrylization [Fig.III (e)].

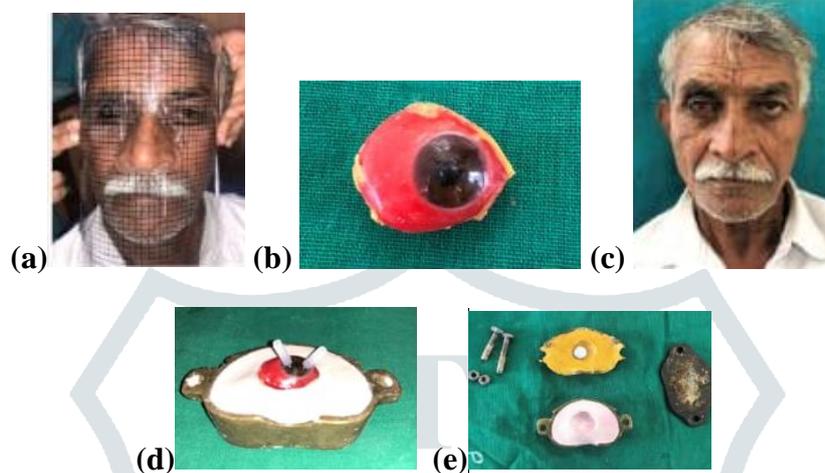


Fig.III. (a)Iris positioning using grids, (b)Wax blank with iris, (c)Wax trial with iris, (d)Flasking, (e)Dewaxing and packing.

V. Characterization of the Prosthesis

After processing, preserving the split mold, prosthesis was recovered. Then, 0.5–1mm of the surface layer of scleral portion was trimmed. Nylon fibrils separated from denture acrylic resin polymer were used to mimic veins and was covered with clear heat cured acrylic resin. It was then processed and cured in the same mold which was preserved after acrylization. The characterization is done so as to achieve the vitality necessary to give it a life like appearance and blend with the patient's natural appearance and cosmetics [Fig.IV (b)].

VI. Final Finishing and Polishing of the Prosthesis

The prosthesis was finished and polished with the help of pumice. Finished prosthesis requires a highly polished surface having a glass like finish to provide maximum adaptation and overall success of the prosthesis.

VII. Insertion

Prosthesis was inserted into the socket, and checked for any areas requiring adjustment. Esthetics and comfort of the patient were evaluated. The patient was educated to insert and remove the prosthesis. The home care protocol of the prosthesis is given below:

- Prosthesis should be handled with care and with clean hands.
- Removal of Acrylic prosthesis during night is ideal.
- It should be soaked in an antibacterial solution to kill the surface bacteria.
- Routine polishing of prosthesis should be done every year to prevent deposition of protein and bacteria.



Fig. IV. (a) Prosthesis without characterization, (b) Prosthesis after characterization, (c) Pre-operative and post-operative photograph of the patient

DISCUSSION

The importance of an ocular prosthesis with acceptable aesthetics and reasonable mobility in restoring normal appearance in patients with anophthalmia has long been recognized and fulfils psychological requirements of the patients. A correctly placed prosthesis should restore the normal opening of the eye, support the eyelid, restore a degree movement, adequately retained and aesthetically pleasing. The ocular prostheses are either ready-made or custom-made. We planned a custom made prosthesis as it has several advantages as it is made to fit a particular patient and the exact color match of the iris and sclera can be achieved with the adjacent eye providing better results functionally as well as aesthetically.

CONCLUSION

Prosthetic rehabilitation of the patient with a custom made ocular prosthesis not only satisfy aesthetic requirement of the patient but also enhances the patient's rehabilitation to a normal lifestyle. Although the patient cannot see with the ocular prosthesis however, it has definitely restored patient's self-esteem and confidence too.

REFERENCES

1. Renu Gupta, Abhishek, Bhavya Aggarwal. Prosthetic management of Ocular Defect- Case Report. *Journal of Advanced Medical and Dental Sciences Research*, 2019, Vol. 7(5), 129–131.
2. Nafij Bin Jamayet, Theerathavaj Srithavaj, Mohammad Khursheed Alam. A Complete Procedure of Ocular Prosthesis: A Case Report. *International Medical Journal*, 2013, Vol. 20, No. 6, P729 – 730.
3. Mallikarjuna Ragher. Ocular Prosthesis- A Simplified Technique. *Austin J Clin Case Rep*, 2014, Volume 1(13),1–3.
4. Ali Hafezeqoran, Rodabeh Koodaryan. A Technique for Fabrication of an Orbital Prosthesis: A Case Report. *JODDD*, 2010, Vol. 4(2), 69–73.
5. Kirti Somkuwar, Robin Mathai, Panambily Jose. Ocular prosthesis: Patient rehabilitation - A Case Report. *People's Journal of Scientific Research*, 2009, Vol.2(2), 21–26.
6. Garg P, Garg S, Bansal D, Suresh S. Prosthetic rehabilitation of a patient with enucleated eye - a case report. *Nepal J Ophthalmol*, 2012, Vol. 4(8), 312-314.