

Restoring Psychological Sight with Ocular Prosthesis: A Case Report

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ABSTRACT

Background: Loss of an eye is a traumatic event which has a crippling effect on the psychology of the patient. Several ocular and orbital disorders require surgical intervention that may result in ocular defects. An ocular prosthesis is fabricated to restore lost form and appearance created by such defects. Although implant retained eye prosthesis has a superior outcome, it may not be a feasible option for all patients. Alternatively, a good custom-made ocular prosthesis can well restore the lost appearance and psychological comfort of the patient. This case report describes treatment for a patient with an enucleated eye by fabricating a custom ocular prosthesis which improved his psychological, physical, social, functional and emotional needs.

Keywords: Ocular Prosthesis, Scleral blank, custom made, enucleation.

INTRODUCTION

Eyes are generally the first feature of the face to be noticed. 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 physical, social and psychological effect on the patient. So the prosthesis should be provided as soon as possible for the overall wellbeing of the patient.¹ Removal of an eye is indicated in cases of a severe trauma, congenital abnormality, or pathological condition(s) that damages the eye. Surgical procedures adopted for the removal of an eye are classified by **Peyman, Saunders and Goldberg (1987)**² into three general categories:

- **Evisceration** – removal of the iris, cornea, and internal eye contents, but with the sclera and attached extraocular muscles left behind.
- **Enucleation** - removal of the eyeball, but with the eyelids and adjacent structures of the eye socket remaining.

- **Exenteration** – removal of the contents of the eye socket, including the eyeball, fat, muscles and other adjacent structures of the eye.

An ocular prosthesis can be either ready-made (stock) or custom-made. Stock prosthesis comes in standard sizes, shapes, and colour. They can be used for postoperative and interim purposes. Custom eyes have several advantages including better eyelid movements; even distribution of pressure due to equal movement thereby reducing the incidence of ulceration, improved fit, comfort, adaptation, improved facial contours and enhanced aesthetics gained from the control over the size of the iris, pupil and colour of the iris and sclera³. An ocular prosthesis does not provide vision; but give psychological support and cosmetic effect and encourage the patients to build up their self confidence to return back to their social life.⁴

CASE REPORT

A 50 year old male reported to the Department of Prosthodontics, Regional Dental

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Fig 1: Preoperative view.



Fig 2: Examination of enucleated socket.

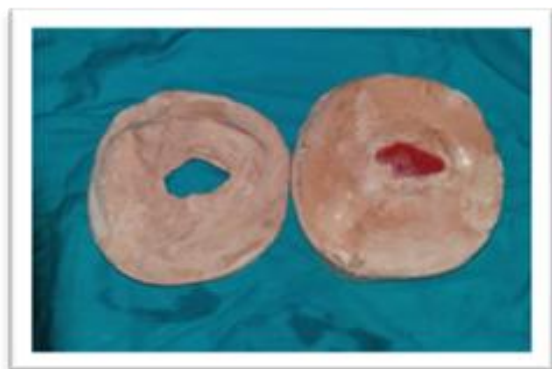


Fig 3: Sectional primary cast.

College, Guwahati, Assam with enucleation of the left eye due to panophthalmitis(Fig.1). History revealed that the patient was diagnosed with high blood sugar level 1 month back which led to diabetic neuropathy and panophthalmitis. On examination it was found that defect was well healed and there was no sign of inflammation. Aesthetic limitation due to the high inferior fornix



Fig 4: Wax pattern with iris positioning.



Fig 5: Final prosthesis.

attachment in the lower eyelid was thoroughly discussed with the patient and suggested for surgical modification which was not agreed by him (Fig.2). So a custom made ocular prosthesis was planned for restoring lost form and natural appearance as much as possible.

A primary impression was made from alginate (Tropicalgin, ZHERMACK, Italy) which was injected in the defect area and supported by syringe tip and plaster of Paris (type II dental stone). Beading of the impression was done with pumice and plaster of Paris and boxing was done with modelling wax (DPI, Dental Products of India, Mumbai, Maharashtra, India). A sectional cast was made from this primary impression (Fig.3).

A custom tray from self cure acrylic (DPI, Dental Products of India, Mumbai; Maharashtra, India) was fabricated on the primary cast which was then adjusted according to the contour of the defect and a channel for injecting the alginate was provided on it. Final impression of the defect was

made with alginate (Tropicalgin, ZHERMACK, Italy) which was injected by syringe through the channel created in the tray. During impression making patient was asked to look straight and to perform all possible movements such as medial, lateral and rotational movements. Movements helped in recording of cavity in functional form. A putty index (3M ESPE) was made from this impression and molten modelling wax (DPI, Dental Products of India, Mumbai, Maharashtra, India) was poured in index to obtain a wax pattern. It was carved to conform to the contours of the socket.

Wax pattern was then evaluated for the proper size, contour, retention, eyelid support and comfort of the patient. A suitable iris portion from a stock eye shell, resembling the patient's right natural eye was selected and trimmed. Its position was marked and confirmed on wax pattern using facial measurements with the help of adobe Photoshop 7 computer software and ruler tools (Fig 4). The wax pattern after removal of the iris shell was then invested in plaster of Paris (type II dental stone). Dewaxing was done and mould was packed with tooth coloured acrylic (DPI, Dental Products of India, Mumbai, Maharashtra, India) of suitable shade. Curing was done and scleral blank was obtained from it. After adequate finishing and polishing, the iris shell was placed in position and the prosthesis was tried in socket for the fit and contour.

The position of iris was again verified using adobe Photoshop 7 computer software and it was packed in placed same heat cure tooth colour acrylic resin. A thin layer of acrylic was then removed from the surface layer of the scleral blank. The scleral blank was again positioned on the same place in the mould. Surface characterization was done using acrylic pigments, oil colours and acrylic veins to simulate his natural eye. The mould is again packed with heat cure clear acrylic (DPI, Dental Products of India, Mumbai, Maharashtra, India) and cured. After final finishing and polishing, the prosthesis was inserted and checked for final comfort, contour and function (Fig 5).

Necessary instructions for cleaning, placement and removal of the prosthesis were given and the need for regular recall appointments was emphasized.

DISCUSSION

Although stock ocular prostheses are available they often require elaborate and time consuming adjustments. They also lack close fit and cannot stimulate natural eye movement. Colour of the iris and sclera more often do not match to the skin colour of patient. Therefore, custom made prosthesis is prescribed for predictable restoration of form and appearance of the individual patient. Custom-made prosthetic eye fabrication involves complex painting procedures in various stages that are quite difficult and based purely on the painting skills of the operator. Another technique to fabricate ocular prosthesis modifies pre-fabricated eye prosthesis to a custom-made. This helps to overcome the disadvantages of poor fit, aesthetics and movement of a prefabricated prosthesis and complex painting procedure and technique involved in making a custom-made ocular prosthesis.³

Over the years, several authors have described various impression techniques along with different materials. Allen and Webster gave the "modified impression method." In this technique, the stock ocular tray has a hollow stem fastened in the middle through which a runny mix of ophthalmic alginate is injected⁵. In cases where an ophthalmic socket was highly irregular or stock trays are not available, use of a custom ocular tray was suggested by Miller⁶.

In this case report, we have prepared an internal custom impression tray on the primary cast according to the contour of the defect to record the borders accurately. A putty index was made from the final impression and wax blank was directly obtained from it, thus saving time and eliminating the need for the secondary cast. Custom made ocular prosthesis was fabricated using iris portion from a stock ocular prosthesis and the scleral blank was customised. Adobe Photoshop 7 computer software was used to finalise the position of the iris in respect to the other eye. This custom made ocular prosthesis has close adaptation to the tissue in the socket, controlled movement of the extraocular muscles, thus exercising them and preventing disuse atrophy. Characterization of the prosthesis with extrinsic stains and vein like fibres helped in giving lifelike appearance to the prosthesis but due

to high inferior fornix attachment in the lower eye lid, exact simulation was difficult to achieve.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

CONCLUSION

Custom made ocular prosthesis can provide the optimum cosmetic and aesthetic outcome thereby enhancing the confidence of the patient. However, best results can be obtained if a multidisciplinary approach is practiced by ophthalmologist, surgeon and prosthodontist collectively.

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