

Case Report

[A semi-customized ocular Prosthesis for a patient with ocular defect](#)

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ABSTRACT

In human being severe physical and psychological distress occurs due to disfigurement caused by loss of eye. Ocular prosthesis is the only available mode of rehabilitation for the missing eye. Different materials and techniques are used for the fabrication of the missing eye. Resin is proved to be better among the available materials. Stock eye or customized ocular prosthesis has their own advantages and disadvantages. In our clinical report, we have fabricated a semi-customized ocular prosthesis with stock iris and customized sclera.

Keywords: Enucleation ocular prosthesis, rehabilitation, semi-customized.

Introduction :

Loss or absence of a part of the face especially eye can cause severe physical and emotional problems.¹ Loss of eye

could be because of malignancies, congenital defect, irreparable trauma, painful blind eye or sympathetic ophthalmia.² Depending on the severity of

the involvement, the surgical management may include one of three approaches: evisceration, enucleation or exenteration.

Evisceration is the surgical procedure involving the excision of the intraocular contents of the globe, leaving the sclera, and sometimes the cornea. **Enucleation** is the surgical removal of the entire globe and a portion of the optic nerve from the orbit.

Exenteration is the en-bloc removal of the entire contents of the orbit including the extraocular muscles.³

A **prosthesis** (came from Ancient Greek word prosthesis which means "addition, application, attachment") or **prosthetic implant** is an artificial device that replaces a missing body part, which may be lost through trauma, disease, or a condition present at birth (congenital disorder). Any prosthesis is intended to restore the normal functions of the missing body part.

Psychological distress associated with the loss of eye can be significantly improved by an ocular prosthesis, simulating the natural eye. First evidence for the replacement of missing eye was obtained from the Egypt dynasty, who used precious stones, earthenware, copper, and gold. Materials such as vulcanite and celluloid were used during 19th century. In the early part of 20th century, Muller-Uri family fabricated glass eye using sand with a low iron oxide content. In 1944, by the combined efforts of the individuals of the armed forces of the

United States, methyl-methacrylate resin was successfully used for the fabrication of the ocular prosthesis. Since then usage of resin gained popularity because of its light weight, translucency, better fracture resistance, ease of fabrication, easy adjustability, and its capability for intrinsic and extrinsic coloring.⁶

There are several techniques in the literature for fitting and fabrication of the artificial eye. Fitting a stock eye, modifying a stock eye on the positive replica of the ocular defect and the fabrication of the custom eye prosthesis comes under it. In custom made ocular prosthesis, both sclera and iris are custom made. First two techniques are less time-consuming but often have the disadvantages like compromised esthetics and unreliable fit. Custom ocular prosthesis provides improved esthetics, and fit but usually more time-consuming and complicated.⁴⁻⁸ This clinical report demonstrates a technique for fabricating ocular prosthesis with stock iris and custom made sclera to provide functionally and esthetically satisfactory result.

Case Report

A 62-year-old female patient reported to the Department of Prosthodontics, Sardar Patel Post graduate Institute of Dental Sciences, Lucknow, UP, India with a chief complaint of facial disfigurement because

of a missing left eye since her 3 month of age (Figure 1).



Pre-operative view showing ocular

The history revealed conjunctivitis to the left eye at the age of 3 months followed by the enucleation of the same at the age of 62 years due to infection.

Examination of the eye socket revealed a healthy conjunctiva with no signs of infection or inflammation covering the posterior wall of the anophthalmic socket and showing synchronous movements. According to the treatment based classification system given by Himanshi et al., the patient was categorized under Class 3 phthisis bulbi, i.e moderate enophthalmos with disfigured sclera⁹.

In this case a semi-customized ocular prosthesis was planned with stock iris and custom made sclera, and the treatment procedure was explained to the patient before the commencement of the treatment.

Ocular impression-

In this case the conformer given by the ophthalmologist at the time of surgery was

used as custom tray for taking the final impression (figure 2).



Conformer

A technique described by Taicher et al. was performed.

Light body addition silicon impression material (Aquasil, Dentsply, Detrey GmbH, Germany) was used for taking impression. After making retentive holes in conformer a plastic hollow cylinder was attached to the conformer in center (figure 3).



Conformer Attached to hollow Cylinder

The conformer was placed in ophthalmic socket (figure 4).



Placement of Conformer in socket

Then light body impression material was pushed through plastic hollow cylinder. After inserting sufficient impression material, the patient was asked to perform various eye movements with her head upright (figure 5).



Conformer filled with impression material

After setting of impression material, the impression was removed from the ophthalmic socket. Impression was poured with die stone (figure 6).



- Impression, base formation, and final

Wax conformer or the scleral try-in-

Modeling wax was used for wax up of sclera on the mould (figure 7).



Wax up for sclera cast

It was retrieved from the mold and inserted in the ocular cavity and checked for stability and esthetics. Necessary sculpting of the anterior surface of the conformer was done to mimic the features of the contra-lateral natural eye and fullness of eyelid (figure 8).



wax up trial

This altered wax up was used to fabricate the final acrylic resin ocular prosthesis.

Selecting and positioning iris-

The size, shade, and configuration of the iris were selected by taking the contralateral natural eye as a guide. Most closely matching iris was selected from the stock eyes. This stock iris was positioned on the scleral wax pattern, and the border was sealed using a hot instrument. The position of the iris was finalized in accordance with the contralateral eye using graph grid method.10 Shade selection for the sclera was done using the natural eye as a guide (figure 9).



Shade selection and positioning of iris

Fabrication of resin sclera-

Scleral wax pattern with the stock iris positioned over it was removed from the socket. It was washed under tap water. To stabilize the stock iris within the mold, an auto polymerizing acrylic resin (DPI-Self cure, Dental products of India Ltd.) extension of a diameter of around 4mm and length of around 6 mm was attached over its center. Flasking and dewaxing were done in a conventional manner. Selected shade of the heat cure acrylic resin (DPI-Heat cure, Dental Products of India Ltd.) was manipulated and packed into the prepared mould. Acrylization was done by following a long curing cycle.



Final wax up trial with iris

Acrylic resin sclera with the iris attached over it was obtained after deflasking. Acrylic resin extension from the iris was trimmed off using an acrylic trimmer, followed by finishing and polishing was done. Uncharacterized prosthesis was inserted into the socket. Stability of the prosthesis, contour of the sclera, and the position of the iris was reconfirmed.

Acrylic resin sclera was trimmed uniformly to a depth of around 1 mm. Over the reduced surface of the sclera painting was done using the soft color tones of brown, pink, to match the sclera of the contralateral natural eye. Red nylon fibers were placed along the outer periphery to simulate the blood vessels. Once the characterization was satisfactory, all the colors and nylon fibers were stabilized by applying a thin layer of cyanoacrylate adhesive over it. Trimmed sclera part was replaced by clear heat polymerizing acrylic resin, followed by curing, deflasking, finishing, and polishing of the prosthesis (figure 11).



Acrylized prosthesis

Final ocular prosthesis was inserted into the socket and evaluated for fit, esthetics,

and the coordinated movements with the contralateral eye (figure 12).



Final Prosthesis placement

Post insertion instructions were given to the patient, regarding the usage, limitation, and the maintenance of the prosthesis.¹¹

Discussion:

Customized ocular prosthesis has the advantages over stock eyes like, better contouring, color matching, and coordinated movements with the contralateral eye.^{4,8} Customizing the iris demands extra skill and time from the operator.^{12,13} Customizing iris can be avoided if stock iris matching with the contralateral natural eye is available. Semi-customize prosthesis with the stock iris and customized sclera has advantages of both stock and custom prosthesis. This technique is not advised when the color, contour, and configuration of the stock iris is not satisfactorily matching with the contralateral natural eye of the patient.

Conclusion:

Success of the ocular prosthesis largely depends on the precise laboratory procedure and artistic skills of the operator. Through this technique, the demand for the artistic skill and consumption of time are reduced by the use of precisely selected stock iris, yet esthetic and functional requirements are met by the customized sclera.

Clinical significance-

Semi-customized ocular prosthesis is of use for masking the compromised artistic skill of the operator. This technique reduces the laboratory and clinical time and provides a satisfactory result in indicated patients.

Footnotes

Conflicts of Interest: None

Source of Support: Nil

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