



PROSTHETIC REHABILITATION OF PATIENT WITH OCULAR DEFECT USING CUSTOM MADE OCULAR PROSTHESIS :A CASE REPORT

Prosthodontics

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ABSTRACT

Physical appearance plays a pivotal role in an individual's life. Any physical defect hampering esthetics or function prevent an individual to lead a healthy life. The loss of eye is a facial defect undermining the patient's confidence. Prosthetic rehabilitation of ocular defect gives physical as well as psychological healing and restore the appearance of the lost eye. Defects of eye may be due to enucleation, evisceration and exenteration. This case report describes the fabrication of ocular prosthesis with detailed explanation of use of Trubyte tooth indicator for iris positioning and Leudde's exophthalmometer for easier measurements.

KEYWORDS

Prosthetic, Trubyte tooth indicator, Leudde's exophthalmometer

INTRODUCTION:

"You never get a second chance to make a first impression."

Andrew Grant Nevertheless, our first impression is usually based on outward appearance. Loss of any structure in human body pertaining to ailments, accidents, trauma can be mentally, physically and socially exhausting. Many a times, patients walk into prosthetic operator not just for the replacement of missing teeth but also missing facial structures like eyes, ears etc. sometimes that are congenitally missing or lost as a direct or indirect consequence of trauma, sympathetic ophthalmia and malignancies.

Management of such cases poses a challenge to prosthodontists worldwide. In accord with the degree of severity of involvement, surgical management may include complex surgical modalities like evisceration, enucleation and exenteration(1) A multidisciplinary approach incorporating the expertise of a Prosthodontist, an ophthalmologist, a surgeon and a maxillofacial prosthodontist is crucial for successful outcome with uneventful healing post surgery.

The very first evidence of artificial eye was seen from Egypt Dynasties who used precious stones and bronze. Romans used silver eye. In 1943, United States army and navy developed acrylic eyes(2)

There are several types of ocular prosthesis, based on its fitting procedures i.e. Stock Shell, Scleral Shell and Custom made prosthesis(3). The first two types are prefabricated and less time consuming but have disadvantages like compromised esthetics and unreliable fit. Custom made ocular prosthesis provides improved form, function and esthetics but usually more time consuming.

This clinical report describes the fabrication of semi-customized ocular prosthesis to provide functionally and esthetically satisfactory outcome.

CASE REPORT:

A 53-year old female patient reported to the Department of Prosthodontics, Subharti Dental College, Meerut, India with facial defect in her right eye thirty years back in an accident (Figure 1).

Patient was already wearing prefabricated ocular shell. On examination of eye socket, signs of infection and inflammation were absent. Muscle function of both upper and lower eyelid was normal and eyelids were also intact. Treatment procedure was explained to

patient and signed informed consent was taken from her.



Figure 1. Preoperative view showing ocular defect in right eye

TECHNIQUE OF FABRICATION OF OCULAR PROSTHESIS: Following seven steps are incorporated for fabrication of ocular prosthesis:

1. Fabrication of modified custom tray
2. Evaluation of bulge of normal eye and ocular defects
3. Wax conformer or scleral shell try-in
4. Selecting and positioning Iris
5. Scleral shade selection
6. Fabrication of resin sclera
7. Painting the resin sclera and fabrication of final prosthesis

1. Fabrication of modified custom tray

Two-piece putty index of prefabricated scleral shell which the patient was wearing, is made (Figure 2).

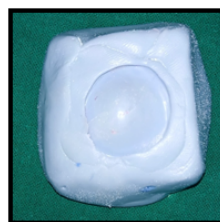


Figure 2. Putty index of sclera shell

Using this putty index, customized ocular impression tray is fabricated using tooth colored autopolymerizing resin (Figure 3).



Figure 3. Custom made impression tray

The customized tray is used to make ocular impression by method given by Allen and Webster(4). Before impression making, petroleum jelly was applied into socket and adjacent structures. Either thin mix of irreversible hydrocolloid or medium body elastomeric impression material was injected into the socket through the hollow stem of impression tray and patient was instructed to make various eye movements to obtain functional impression(Figure 4).



Figure 4. Impression of ocular defect made using light body impression material

Impression was checked and poured with dental stone in two sections to obtain two-piece mold(Figure 5).

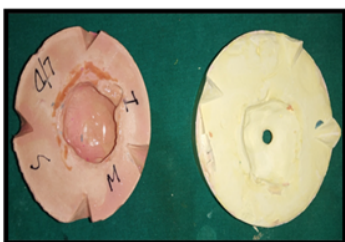


Figure 5. Two-piece mold

2. Evaluation of bulge of normal eye and ocular defects

Measurement of degree of exophthalmos was done using Leudde's exophthalmometer⁽⁵⁾.

Procedure: The curved end of the Luedde was placed to fit the apex of the deepest angle of the lateral orbital notch. Patient was asked to gaze at a fixation target straight ahead of her. The operator then moved to the patient's side in order to look through the Luedde at a 90degree angle of operator's gaze and used the scale to measure the corneal apex in millimeters.

It was used to access the bulge of both the eyes with the base of transparent ruler placed against the external orbit canthus and patient looking forwards. The difference in the bulge between the defect eye and normal eye bed was 4mm which was used as the thickness of the wax pattern fabricated.

3. Wax conformer or scleral shell try-in

Wax conformer was made by using molten baseplate wax (Modelling Wax, Dental Products of India Ltd.) on two-piece mold (Figure 6). It was retrieved from the mold and inserted into the ocular cavity and

checked for its extensions, esthetics and stability and then, necessary sculpting was made to mimic features of contralateral natural eye.

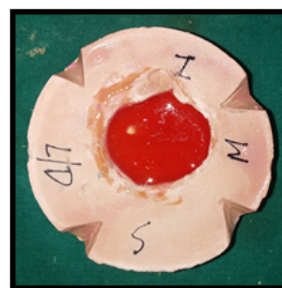


Figure 6. Fabrication of wax pattern using molten baseplate wax

To further improve its esthetics and stability, a technique described by Taicher et al was performed using medium viscosity polyvinyl siloxane impression material (Aquasil, Dentsply, Detrey GmbH, Germany)(6). Corneal prominence was checked by standing behind the patient and retracting her eyelids and ask her to look downward.

4. Selecting and positioning Iris

Size, Shade and configuration of Iris was selected using digital photograph of contralateral natural eye as guide, which was taken using digital camera (Canon EOS Digital Rebel; Canon Inc, Tokyo, Japan) with a macrolens (Canon Macro Lens EF 100 MM F/2.8 USM; Canon Inc) and a ring flash (Canon Macro Ring Lite Flash MR-14EX; Canon Inc) attached. Most closely matching iris was selected from stock eyes (American optical Corp., Southbridge, Mass).

Iris part is trimmed from selected stock eye using acrylic trimmer and positioned on the final contoured scleral wax pattern(Figure 7).



Figure 7. Stock iris is positioned on scleral wax pattern

Iris position and gaze was determined in accordance with natural companion live eye using Trubyte Tooth Indicator(Figure 8).



Figure 8. Iris positioning using Trubyte tooth indicator

Upper eyelid covers a portion of upper half of iris, whereas the lower border of the iris rests at or slightly above the lower lid(3).

5. Scleral shade selection

It is done in same manner as Iris shade selection i.e. with use of digital photograph made.

6. Fabrication of resin sclera

Stabilization of stock iris within mold was done using autopolymerizing resin extension of diameter of around 4mm and length of around 6mm. Flasking and dewaxing was done in conventional manner. After dewaxing selected shade of heat cure acrylic resin was manipulated and packed into the prepared cavity and

acrylization was done. Finished uncharacterized prosthesis was removed and finishing and polishing was done and checked for stability and contour.

7. Painting the resin sclera and fabrication of final prosthesis

First acrylic resin forming the sclera was trimmed uniformly to a depth of around 1mm and painting of sclera was done using oil colors mixed with mono-poly solution. Main colors used were yellow, blue (superiorly and inferiorly to iris), red (added to corners to simulate caruncle). Red nylon fibres were used to simulate blood vessels. After characterization was completed, a coat of mono-poly solution is applied over it. Trimmed sclera was replaced by packing clear heat polymerizing acrylic resin followed by curing, finishing and polishing (Figure 9).



Figure 9. Finished and polished ocular prosthesis.

Final ocular prosthesis was checked for fit, esthetics, stability and coordinated movement with contralateral eye and delivered to patient along with post-delivery instructions (7).

DISCUSSION:

Customized ocular prosthesis has the advantages over stock eyes like, better contouring, color matching, and coordinated movements with the contralateral eye⁽⁸⁾. Customizing the iris demands extra skill and time from the operator^(9,10). This can be avoided if stock iris matching with the contralateral natural eye is available.

Semi-customizing the prosthesis using the stock iris and customized sclera will have 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. An ocular prosthesis should maintain its orientation when the patient is looking straight ahead. It should restore the normal opening of the eye, support the eyelids, restore a degree of movement, must be adequately retained and esthetically pleasing.

A properly fitted and acceptable custom ocular prosthesis has the following characteristics⁽¹¹⁾:

- Retains the shape of the residual socket.
- Prevents collapse or loss of shape of the lids.
- Provides proper muscular action of the lids.
- Prevents the accumulation of fluid in the cavity.
- Maintains palpebral opening similar to the natural eye.
- Mimics the colorations and proportions of the natural eye.
- Has a gaze similar to the natural eye.

CONCLUSION

The goal of any prosthetic treatment is to return the patient to society with a normal appearance and reasonable motility of the prosthetic eye. The disfigurement resulting from loss of eye can cause significant psychological, as well as social consequences. However with the advancement in ophthalmic surgery and ocular prosthesis, patient can be rehabilitated very effectively.

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