



Case Report

Rehabilitation of an Ocular Defect- A Clinical Report

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ABSTRACT

Rehabilitation of facial defects is a complex task, requiring an individualized design of the technique for each patient. The disfigurement associated with the loss of an eye may result in significant physical and emotional problems.

Patients requiring treatment with custom ocular prosthesis are those who have lost ocular structures through orbital evisceration or orbital enucleation which was necessary as a surgical intervention for a congenital defect, pathology or an accident.

Aim: The primary purpose of an ocular prosthesis is to maintain the volume of eye socket and create the illusion of a healthy eye and surrounding tissue.

Method: A custom ocular prosthesis is a good option when reconstruction by plastic surgery or the use of Osseo-integrated implants is not possible or not desired. Prosthetic rehabilitation of a patient with missing eye with custom made ocular prosthesis was described.

Result: Normal appearance of the anophthalmic eye was restored.

Conclusion: Patient's esthetic appearance was improved and his self confidence was back.

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Introduction

The nature's most beautiful gift is a glance of an eye. The eye is a vital organ not only in terms of vision but it is an important component of facial expression. Loss of an eye has a crippling effect on the psychology of the patient.

The loss or absence of an eye may result due to:

- Congenital defect
- Irreparable trauma
- Painful blind eye
- Sympathetic ophthalmia
- Injury
- Glaucoma
- Need for histologic confirmation of a suspected diagnosis.

The rehabilitation of such defects necessitates the replacement with an Orbital/Ocular Prosthesis.³

Ambroise pare-a French man was the first to make glass and porcelain eye. Germany became the leading producer of glass eyes, but when the world war broke out, Germany stopped the supply of glass eye to the rest of the world. United States undertook a research to find an alternative and the result was an acrylic eye.¹

Prosthetic rehabilitation of an ocular defect can be successfully achieved with stock eye by using well-fitting ocular tray and proper impression technique. Ocular prostheses are either readymade (stock) or custom made. The tissue adaptation of stock eye prostheses can be improved by making an accurate impression of anophthalmic socket using modified custom ocular tray¹.

This paper is a methodical approach for fabrication of artificial eye called ocular prosthesis. The custom made ocular prostheses are very comfortable and help one to improve their appearances, which in turn, encourages them to build up their self-confidence to return back to their social life.

Case Report

A 60 year old patient was referred to the Department of Prosthodontics, Subharti Dental College, Meerut, for complete dentures. Patient was also convinced for ocular prosthesis as there was missing patient's right eye (fig. 1).

Primary impression (fig. 2)

Preliminary impression was made using alginate impression material (irreversible hydrocolloid) Before making the impression, a thin layer of petroleum jelly was applied on the eyelashes and around the eye socket to prevent the impression material from sticking to the eyelashes.

Preparation of special tray and final impression

A layer of wax was placed as a spacer (wax, Hindustan Dental Products Ltd.) and the undercuts were blocked. Special tray was prepared using auto polymerizing resin (DPI) with escape holes (fig. 4). Spacer was removed. The impression of the socket was made with a light viscosity polyvinyl siloxane impression material, with an auto-mixing device (Contrast, Voco, Germany). Before making the impression, a thin layer of petroleum jelly was applied on the eyelashes and around the eye socket to prevent the impression material from sticking to the eyelashes. The material was then injected slowly into the socket and as well as to the special tray and the patient was asked to perform various eye and eyelid movements to facilitate the flow of the impression material into all aspects of the socket. The impression was carefully removed from the socket once the material had set². (fig. 5)

Fabrication of cast, wax up, flasking and curing

The impression were poured initially till the height of contour with the type IV dental stone (kalastone, kalabhai Pvt. Ltd, India). After the setting of the stone, keyholes were made and boxed. Then a layer was poured with type III dental stone (kalastone, Pvt. Ltd. Mumbai, India) to obtain a two piece cast for the orientation of the ocular prosthesis. Then the two halves of the cast were separated (fig. 6). Wax pattern was obtained through sprue channel created on the top of the cast by using modelling wax (Y-Dent, MDM Corporation New Delhi) (fig. 7).

Then the wax pattern try-in was done. The height of convexity of the wax pattern was centred over the pupil and palpebral opening was kept same as that of the lateral eye. To transfer marking, the distance was measured from the midline to the centre of the pupil of the natural eye and the same distance to the right side was measured and engraved into the wax pattern (fig. 8).

Acrylization

Flasking and dewaxing was carried out in usual manner. Heat polymerizing tooth coloured acrylic resin (Stellon, Dental Products of India Ltd.) of appropriate shade was used after the final closure, the processing was done by a slow curing cycle. After recovering the blank sclera it was polished to get a smooth and shiny surface. (See figure 9&10.)

The scleral blank was tried in, with patient sitting erect and viewing an object kept at least 3 feet in front and at eye level of natural eye. The supraorbital folds, margins of the lower eyelids and iris plane were evaluated, all of which resembles the natural eye.

Patient's eye movement were checked for symmetry and function and it was checked

that the scleral blank moved and synchronised in harmony with the patient's natural eye movements (fig. 11).

Colours and stains used for final prosthesis

The final painting was done with a variety of colours.

The choice of colours being:

- Titanium white
- Ivory black
- Yellow ochre
- Burnt umber
- Crimson Red
- Cerulean Blue

The normal eye was studied, under natural light and painting was started from the periphery of the iris.

Five basic parts of iris and scleral painting are

- Pupil
- Base colour
- Detail
- Collarette
- limbus

(See figure 12.)

Different painting zones are¹

Zone 1: Colour within the limbus and is called the background.

Zone 2: Zone around the pupil which is immediately next to zone 1

Zone 3: Radiating delicate structures of the iris-see normal eye with torch.

Zone 4: Immediately surrounds the pupil looks like halo of the pupil.

Zone 5: scleral painting. (See figure 13.)

The painted eye was compared with natural eye under normal light (fig. 14). Further scleral painting was carried out and the final prosthesis was obtained.

Discussion

Loss, absence or disfigurement of an eye is a cosmetic blemish, which not only

leads to loss of function of the organ but also causes emotional problems in the patient as well as in the observer who looks at the patient.

Lost eyes have been replaced with prostheses for many years in the form of stock or custom ocular prosthesis. Often, however, a custom-made ocular prosthesis which provides a more precise and satisfactory esthetic appearance is indicated, especially for those who have lost ocular structures through orbital evisceration or orbital enucleation. In the treatment of a patient requiring a custom ocular prosthesis many successful techniques are available to the practitioner. Although implant-retained ocular prostheses play an important role in the success of treatment, conventionally retained orbital prostheses are practical, trouble-free, cost-effective, and successful.

Some of the advantages of customized artificial eye are

- Less or no discharge
- Matching with natural eye
- More movements
- Extended wearing period
- Modifications possible

Instructions to the patients¹

The patient should be instructed well regarding handling and care.

a) During insertion, the patient must look at himself in a mirror and evert the lower eyelid and insert the lower part the prosthesis well in to the fornices.

b) Holding the prosthesis, patient should be instructed to lift the upper eyelid and complete insertion of prosthesis. The patient is instructed to blink gently to ensure complete seating.

c) Sometimes the eyes may become dry and this may result in irritation. The patient is asked to use the artificial tears-refresh tears-prior to insertion of prosthesis.

The prosthesis should be removed everything the lower lid first.

d) A great deal of subtractive adjustments is contra indicated for the first few days after placement unless obvious irritation are detected.

e) The patient should return in 1 day, 3 days and one week for follow up.

f) The prosthesis should be inspected for scratches or deposits, if any are noted the patient should return to have the prosthesis repolished.

g) The patient should return at about six month's interval to have the defect and the prosthesis evaluated and adjusted if necessary.

Maintenance and cleaning of prosthesis⁴

- To clean the prosthesis use an anti-bacterial soap followed by rinsing with water.
- Never clean or soak artificial eye in alcohol because it will crack the plastic and destroy the ocular prosthesis.
- Remove the ocular prosthesis as necessary
- Yearly follow up and repolishing of the prosthesis is advisable.
- If the artificial eye is removed and not worn for any period of time, it should be immersed in water.

Conclusion

Rehabilitation of patients who have suffered the psychological trauma of an ocular loss require a prosthesis that will provide the optimum cosmetic and functional result as early in life as possible. Numerous techniques have been developed to create ocular and orbital prostheses that serve the purpose of restoring esthetics and improve patient confidence. The described technique allows for the predictable and easy fabrication of an aesthetically appropriate ocular prosthesis.

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Figure 1. Pre-treatment photograph



Figure 2. Primary impression



Figure 3. Primary cast



Figure 4. Custom tray



Figure 5. Final impression



Figure 6. Two piece cast (split cast)



Figure 7. Cast showing sprue channel



Figure 8. Wax pattern try-in



Figure 9. After curing



Figure 10. Scleral blank



Figure 11. Scleral blank try-in

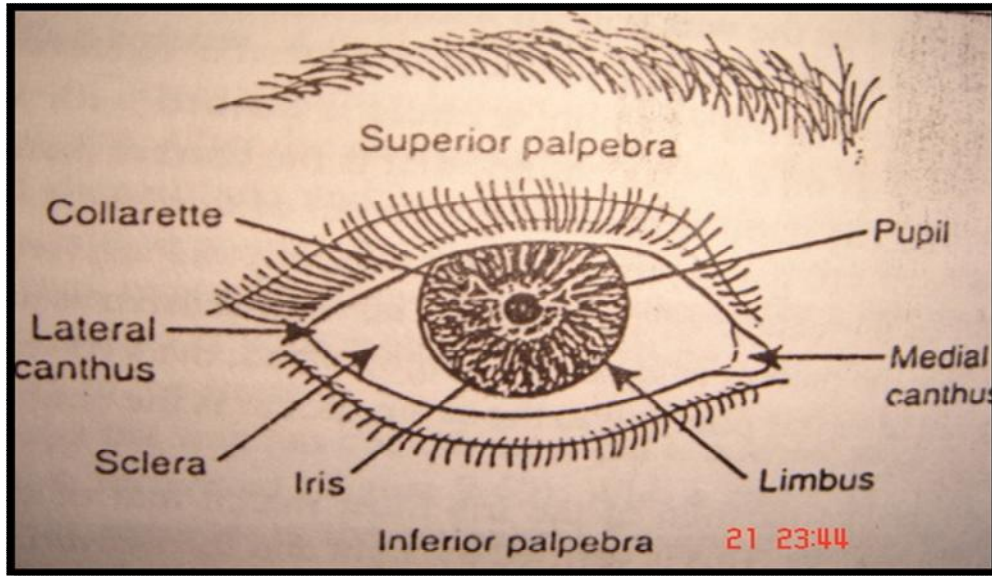


Figure 12. Basic parts of iris and scleral paintings⁶

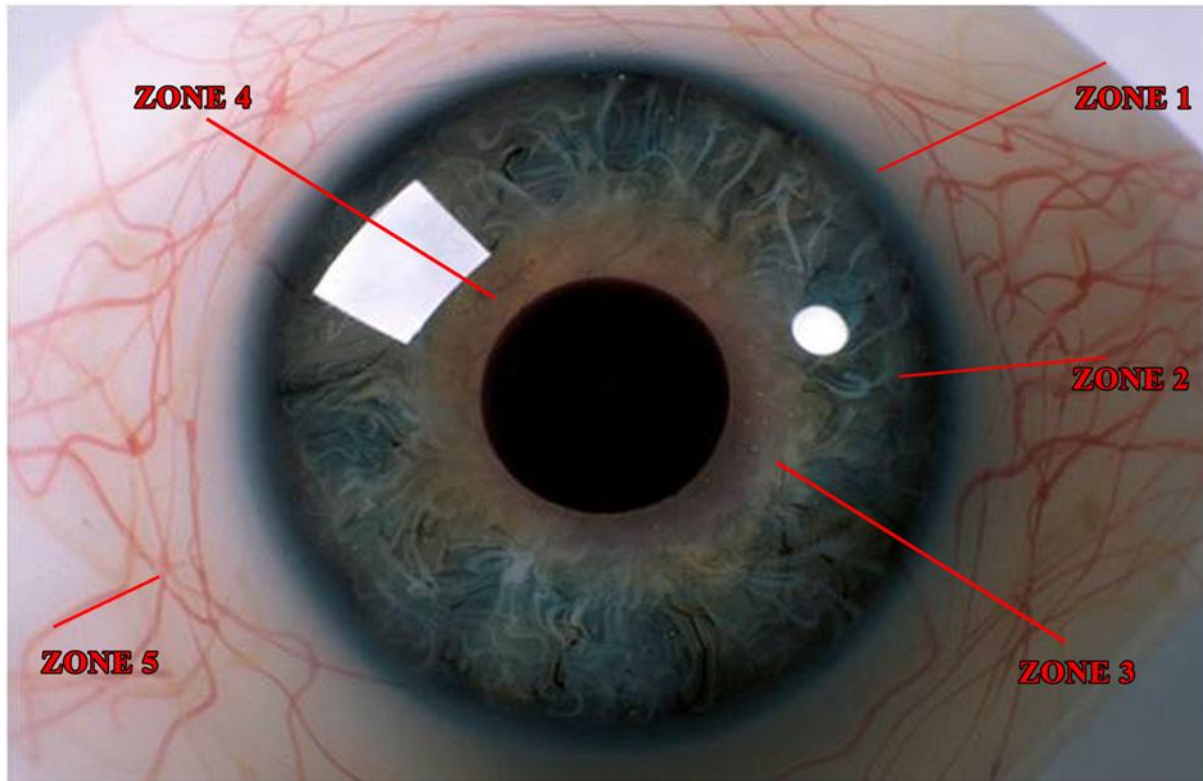


Figure 13. Painting zones¹



Figure 14. Final prosthesis with color and stains



Figure 15. Post treatment