

## Rehabilitation of Ocular Defect Using a Custom-Made Ocular Prosthesis- A Case Report

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### Abstract

Facial mutilation owing to congenital or acquired ocular defect imposes a heavy impact on the self-image and personality of an individual. An ocular prosthesis improves the appearance and enhances social acceptance. Various techniques are mentioned in the literature for fabrication of ocular prosthesis ranging from stock to custom made. This article outlines a simplified approach to fabricate custom made ocular prosthesis in a 35 years old male patient having right ocular defect.

**Key words:** Enucleation, Evisceration, Ocular prosthesis, iris positioning.

### Introduction

Human beings are blessed with two beautiful eyes that not only serve as sense organ of vision but also an important element of facial aesthetics. It performs various facial expressions, especially non- verbal communications, but often we encounter patients with unexpected trauma, pathology or congenital abnormality leading to loss of eye balls. Any kind of ocular disfigurement is a psychological trauma to the victim that drastically reduces his/her quality

of life. Surgical intervention in removal of eye can be categorised as evisceration, enucleation and exenteration. Rehabilitation of such defects requires fabrication of ocular prosthesis to restore a more normal facial appearance.

An ocular prosthesis is of two types- stock ocular prosthesis and custom made<sup>1</sup>. Although stock ocular prosthesis seems to be tempting due to less time consumption in fabrication and cost effectiveness, it has several disadvantages too such as ill fitting of prosthesis, improper shade matching, etc. Custom made ocular prosthesis on the other hand provides improved adaption, comfort and closely resembles iris position of the adjacent natural eye<sup>2,3</sup>. In this article, a simple but effective technique of fabrication custom made ocular prosthesis with characterisation of iris and sclera has been described.

### Case report

A 35 year old male patient visited the Department with a chief complaint of facial disfigurement due to the surgical removal of right eye. Past medical history revealed that the patient had trauma to the right eye 20 years ago, due to

which he gradually lost his vision. Due to recurrent infections in the affected eye, enucleation was done 2 months earlier. On examination, the floor of eye socket was properly healed and sulcus depth was sufficient to retain the restoration (Fig.1). A custom-made ocular prosthesis was planned to fulfil the need of the patient which would impart better aesthetic result as compared to the stock ocular prosthesis along with superior adaptation and comfort.

Petroleum jelly was applied to the skin and eyebrow of the right eye to prevent sticking of the impression material. Primary impression was taken using irreversible hydrocolloid and the cast was poured with die stone (Fig.2). An acrylic conformer was fabricated for making final impression. Multiple holes were prepared in the conformer for mechanical retention of the impression material. A syringe was attached in the perforation at the centre of the conformer (Fig 3). Secondary impression was taken using poly vinyl siloxane light body material. Impression material was injected into the socket and instructions were given to the patient to perform various functional movements of eye like medial, lateral and rotational movements (Fig 4) . After the material had set, impression was removed from the socket and checked for accuracy (Fig 5). The Impression was poured with die stone using two pour technique to obtain a two- piece split cast mold (Fig.6).

Molten wax was poured in the mould and the wax pattern was fabricated (Fig 7). Wax pattern was inserted into the eye socket and evaluated for proper size, shape, retention, eyelid support and comfort of the patient (Fig 8). Once the try in was done, the wax pattern was flaked, dewaxed and packed with heat cure tooth colour acrylic after matching the shade with the contra lateral natural eye sclera. Curing, finishing and polishing of the scleral shell was done (Fig 9). Iris positioning was in two steps- first by

making the appropriate markings on the face on contra lateral side with natural eye and then transferring these markings on the defect side using a transparent graph grid (Fig. 10). Iris for the prosthesis was obtained from a printed high quality photograph of the contra lateral eye. Iris was placed in the desirable position over the scleral shell with the help of the grid template and secured with a thin layer of acrylic. Characterization was done using red silk threads to simulate blood vessels (Fig. 11). Final finishing and polishing was done and the prosthesis was cleaned before placing in the eye socket. Post insertion instructions were given regarding insertion, removal and maintenance of the prosthesis (Fig12).

### **Discussion**

Face is the only exposed part of the body that is scrutinized by others. So, any kind of disfigurement due to ocular defect, adversely affects the patient's self-esteem as well as his psychosocial life. Prosthodontists play an important role in providing the patient with an artificial eye to overcome the social embarrassment.

History of ocular rehabilitation started in the era of Egyptian and roman civilization when noble metals and precious stones were used to fabricate artificial eyes<sup>4,5</sup>. In the 18<sup>th</sup> century, stock glass eyes were a popular option but due to shortage of glass during Second World War, dental acrylic became a suitable alternative.

A custom-made ocular prosthesis has distinct advantages over readymade or stock ocular prosthesis. It simulates natural orientation, colour, contour and size of the pupil and iris of contra lateral eye, thereby improving the symmetry of face. According to Beumer et al., intimate contact between ocular prosthesis and tissue bed of the socket is necessary to distribute even pressure; hence, a prefabricated prosthesis is less desirable<sup>6</sup>. Moreover, dead space between stock eye and tissue bed leads to debris accumulation and subsequent inflammation.

Various methods have been advocated in the literatures for customization of iris such as conventional painting, reverse painting with prefabricated caps, hard copy images of patient's contra lateral eye and most recently digital technique using computer software<sup>7,8,9</sup>. Similarly for determining the size and position of the iris, visual judgement, pupilometer, digital callipers are being used. As positioning of iris is technique sensitive, a combination of two methods are preferred. In this case we used a transparent graph template in order to avoid inter-observer variability because of binocular vision and parallax error. It is quite obvious that we cannot fabricate ocular prosthesis in every patient due to the varying nature of the defect. In such instances, surgical intervention may be taken into consideration. With the advent of tissue engineering, hard and soft tissue grafting along with placement of implant indicate a promising future in the field of ocular rehabilitation<sup>10</sup>.

### Conclusion

Rehabilitation of ocular defect not only prevents supporting tissue changes, but also boosts the moral of the patient to a great extent. Prosthodontists should encompass an artistic skill along with clear knowledge of regional anatomy and current development in the field, to render a successful prosthesis. Low fabrication cost and superior compliance makes custom made ocular prosthesis a boon for economically weaker patients. Although this prosthesis cannot bring the vision back to the patient, it can definitely uplift the self-confidence of the patient to face the society with dignity.

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### Legends Figure



Fig.1: Pre operative view



Fig.2: Primary impression



Fig.3: Acrylic conformer



Fig.4: Secondary impression procedure



Fig. 5: Secondary impression



Fig.6: Two piece mould



Fig.7: Wax pattern



Fig.8: Try in of wax pattern



Fig.11: Characterization of The scleral shell



Fig. 9 Curing of packed acrylic into mthe flasked mould



Fig.12: Post operative view



Fig.10: Iris positioning withtransparent graph template

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