

Case report:

Custom made ocular prosthesis for acquired eye defect: A definitive option of rehabilitation

Taseef Hasan Farook¹, Ahmed Mushfiqur Rahman², Md Minhaz Ul Islam Nizami³, Mehedi Amin⁴, Nafij Bin Jamayet⁵, Mohammad Khursheed Alam⁶

Abstract:

Objective: This case report describes the rehabilitation process of a case of acquired eye defect with patient specific or custom made ocular prosthesis for a patient who had her left eye surgically enucleated as a treatment step for retinoblastoma. **Method:** After primary evaluations, an intra-orbital impression was taken while reproducing natural eye movements to ensure accuracy of the impression. The impression was cast and a transparent acrylic conformer was made from the mould in the cast. The conformer was adjusted as required and Iris position determined. The conformer was then used to cast the final custom ocular prosthesis. The patient was then instructed on its usage and maintenance. **Result:** A custom made ocular prosthesis was provided to the patient and it was to her satisfaction. **Conclusion:** Custom made ocular prosthesis is highly recommended in rehabilitation of facial defects of a co-operative patient as it does not have most of the limitations which a stock ocular prosthesis does.

Keywords: Ocular prosthesis; acquired defect; conformer

Bangladesh Journal of Medical Science Vol. 18 No. 04 October '19. Page : 823-826
DOI: <https://doi.org/10.3329/bjms.v18i4.42913>

Introduction:

The psychological and physiological impact due to loss of an eye cannot be overestimated in day to day life; It greatly affects self-esteem and confidence which significantly contributes to one's social life and daily activities. Tumours and trauma are usually managed by surgical intervention such as enucleation, evisceration and exenteration of the eye¹. Enucleation leads to removal of the entire globe and leaves the muscles and orbital contents intact. Evisceration involves removal of the contents of the eye leaving the sclera and the surrounding structures intact. Exenteration is rather more invasive in that it involves removal of the entire orbital contents including the muscles, nerves, eyelids and the surrounding tissues within the orbit.^{1,2} All the aforementioned surgical procedures lead to tissue resorption and contraction within the

enucleated orbit. Tissue constriction and the integrity of the underlying orbital structures can be maintained by the placement of a plastic conformer soon after enucleation of the eye is carried out. Usually after the surgery, surgeons place a temporary prefabricated stock conformer or prosthesis in to the empty eye socket and advise the patient to continue treatment and receive a patient specific prosthesis for long term rehabilitation. The process of fabrication of a custom made ocular prosthesis should begin as soon healing has occurred in the eye socket and conformer rehabilitation stage finished.² Although readymade ocular prostheses are available, the benefits of a custom made/ patient specific ocular prostheses outweigh the stock ocular prosthesis in that the later has better tissue adaptability and good color matching among other benefits. Therefore, a stock ocular prosthesis should only be considered as short term

1. Taseef Hasan Farook
2. Ahmed Mushfiqur Rahman
3. Md Minhaz Ul Islam Nizami
4. Mehedi Amin
5. Nafij Bin Jamayet
Senior Lecturer, Maxillofacial Prosthetic, School of Dental Sciences, Universiti Sains Malaysia.
6. Mohammad Khursheed Alam, Associate Professor, Orthodontics Department, College of Dentistry, Jouf University, Sakaka, KSA.

Correspondence to: Dr Nafij Bin Jamayet, Grad Dip ClinSc OMFP, M.Sc.DentClinSc OMFP, Senior lecturer, Maxillofacial Prosthetics, School of Dental Sciences, Universiti Sains Malaysia. E-Mail: dr.nafij@gmail.com

solution where time and finances dictate the process³. The loss of orbital volume, a consequence of the removal of the globe, can be replaced by integrated or non integrated orbital implants. Placement of these implants in the tissue bed enhances greater movement hence simulating the natural eye movements^{4, 5}. Sadly, the cost implications limit the number of patients actually availing the implant treatment. This case report describes the rehabilitation process of a case of acquired eye defect with patient specific or custom made ocular prosthesis.



Fig 1: Acquired left eye defect

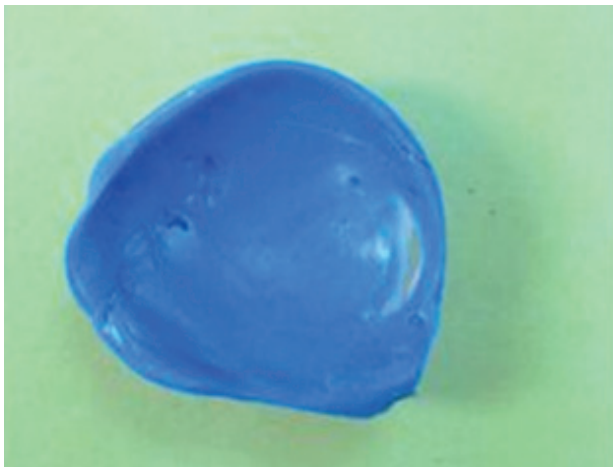


Fig 2: Impression taken by regular body Polyvinyl Siloxane (PVS).

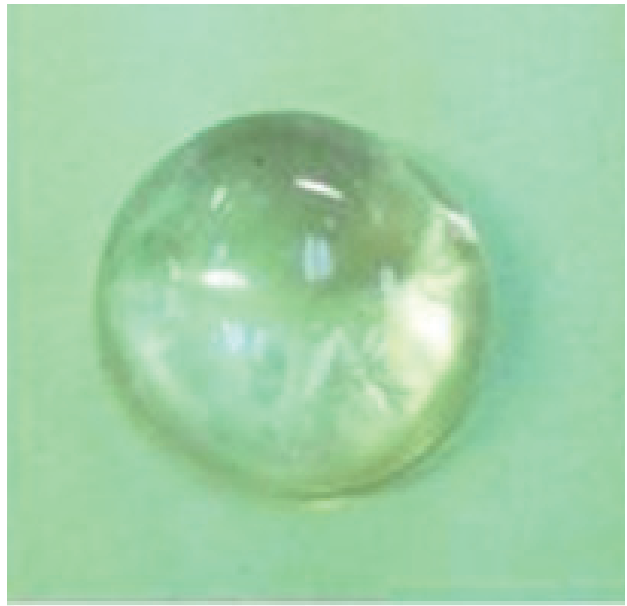
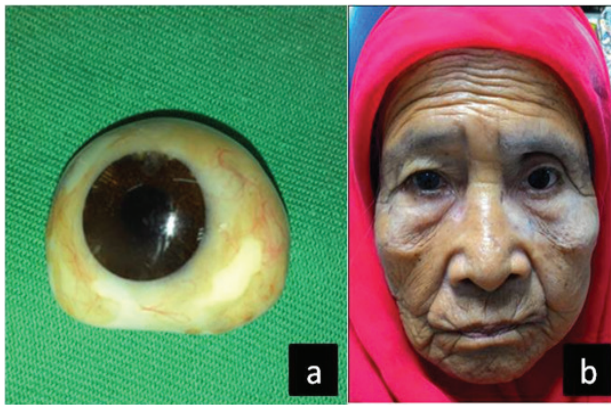


Fig 3: Conformer.



Fig 4: Try in conformer.



Figs 5: (a) Final processed custom made prosthesis (b) Ocular prosthesis insertion.

Methods:

A 65-year-old female patient reported to the Maxillofacial prosthetics department, faculty of dentistry in Universiti Sains Malaysia with the chief complaint of missing left eye and requested for an eye prosthesis. She had acquired her condition as a result of retinoblastoma leading to removal of the left eye at the age of 30 years. Her left eye was enucleated and after surgery, she never wore any ocular prostheses. On examination we found, sufficient socket volume, adequate fornix depth, superior sulcus deepening and presence of upper eyelid ptosis (Figure 1). So, the treatment plan was to fabricate a custom made ocular prosthesis with attention to improvement of sulcus deepening and addressing upper eyelid ptosis.

Impression taking: An ocular tray was selected and tried in the socket. The eyelids and eyelashes were smeared with petroleum jelly. The patient was advised to tilt her head backward, the upper eyelid was retracted and regular body polyvinyl siloxane impression materials (Aquasil ultra Dentsply, USA) was injected into the socket (Figure 2). Once filled the patient was requested to sit upright and move her eyes up, down, right and left and in a circular motion. Finally, the patient was asked to look at a point in the distance with her gaze maintained in a forward direction. These eye movements ensured proper flow of the material and record fine details of the tissue bed. After the impression material set, the eyelids and cheeks were massaged gently to break the seal and detach the tissues from the impression. The set impression was removed carefully with the inferior portion coming out first through rotation of the impression.

Making the cast/mould: The impression was invested using small ocular flask in type iii dental stone (Figure 3). The mould created was filled with clear heat cure acrylic resin (Vertex, Netherlands)

and cured in hot water at 100 degree Celsius for 40 minutes followed by trimming and polishing of the prosthesis. The resultant transparent acrylic object, called conformer, was tried in the socket and adjustments made accordingly (Figure 4).

Positioning the Iris: The size and position of the Iris in the unaffected eye was used as a guide and dimensions were transferred to the conformer so as to provide symmetry to the final prosthesis.

Flasking and curing: The conformer was invested in type iii dental stone to create a split mould. Heat cured resin was used to fabricate the definitive eye prosthesis with high polish to avoid irritation of the tissue bed and the underlying structures.

Insertion: The final ocular prosthesis was disinfected and inserted in the socket. Adjustments and patient's post-insertion complains were addressed to ensure patient adaptability and comfort. The patient was instructed and trained on care, insertion and easy removal of the prosthesis. (Figure 5a,5b)

Discussion:

The science and art of ocular prosthesis fabrication involves time, skill and patient cooperation. Besides that, challenges vary on a case by case basis.⁶ Moreover, a combined effort from a multidisciplinary team involving ophthalmologist, plastic surgeon and maxillofacial prosthodontist is the key discipline that leads to patient satisfaction and ensures that acceptable results achieved.⁶ The optimum functional and aesthetic results obtained from a custom made ocular prosthesis ensures that the patient's eye loss or defects are rehabilitated to help them lead a normal life.^{7,8}

Differences between a custom made and stock or prefabricated ocular prosthesis are quite significant. A custom made prostheses are well fitted, shows more movement and is aesthetically more pleasing as opposed to a stock one. But on the other hand it is expensive and required more clinical steps. Stock or prefabricated ocular prosthesis is often used when there is limited availability of custom made prosthesis.^{9,10}

In this case, patient had used a stock conformer for long period time. A stock conformer is generally advised for usage in short periods. As a result, the socket underwent slight shrinkage and the deformities in the superior sulcus became more prominent. If it is essential to be used for longer periods of time, the stock conformer should be relined appropriately. Therefore, a custom made prosthesis is advised soon after surgery as it plays an important role in correct bone remodelling in a defected bony socket.¹⁰

Conclusion: Rehabilitation of an acquired eye defect by custom made ocular prosthesis was successful. Custom made prosthesis is highly recommended in rehabilitation of facial defect after limited use of prefabricated stock prosthesis.

Ethical approval: Written consent has been taken.

Conflict of interest: The authors declared no conflict of interest

Author Contributions

Conception and design: THF, AMR, MMI, MA, NBJ, MKA

Analysis and interpretation of the data: THF, AMR, MMI, MA, NBJ, MKA

Drafting of the article: THF, AMR, MMI, MA, NBJ, MKA

Critical revision of the article for important intellectual content: THF, AMR, MMI, MA, NBJ, MKA

Final approval of the article: THF, AMR, MMI, MA, NBJ, MKA

Provision of study materials or patients: THF, AMR, MMI, MA, NBJ, MKA

Administrative, technical, or logistic support: THF, AMR, MMI, MA, NBJ, MKA

References:

1. Jamayet NB, Srithavaj T, Alam MK. A complete procedure of ocular prosthesis: Case report. *International Medical Journal*. 2013; **20**(6):729-730.
2. Bartlett SO, Moore DJ. Ocular prosthesis: a physiologic system. *J Prosthet Dent* 1973; **29**: 450-59
3. Raflo GT. Enucleation and evisceration. In Tasman W, Jaeger E (Eds.), *Duane's clinical ophthalmology*, Reviseded, Vol. 5. Philadelphia: Lippincott-Raven, 1995: 20-25.
4. Doshi PJ, Aruna B. Prosthetic management of patient with ocular defect. *J Ind Prosthodont Soc* 2005; **5**: 37-38.
5. Artopoulou II, Montgomery PC, Wesley PJ, Lemon JC. Digital imaging in the fabrication of ocular prosthesis. *J Prosthet Dent* 2006; **95**: 327-30.
6. Erpf SF. Comparative features of plastic and/or glass in artificial-eye construction. *Arch Ophthalmol* 1953; **50**: 737.
7. Ow RKK, Amrith S. Ocular prosthetics: use of a tissue conditioner material to modify a stock ocular prosthesis. *J Prosthet Dent* 1997; **78**: 218-22.
8. Lubkin V, Sloan S. Enucleation and psychic trauma. *Adv Ophthalmic Plast Reconstr Surg* 1990; **8**: 259-62.
9. Cain JR. Custom ocular prosthetics. *J Prosthet Dent* 1982; **48**: 690-94.
10. Jamayet NB, Taweewatchaikul Y, Srithavaj T, Alam MK. A new technique to correct the Iris Shading of Ocular. 2013; **20**(5):621-622.