



## RESEARCH ARTICLE

### FABRICATION OF CUSTOM MADE OCULAR PROSTHESIS – A SIMPLE AND TIME SAVING TECHNIQUE

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#### ABSTRACT

An ocular prosthesis is an artificial substitute of an enucleated eye ball. Defects of the eye can result in removal of a part or the entire orbit. This is accompanied with patient becoming visually, aesthetically and psychologically handicapped. The loss of tissue can be congenital or traumatic, or from malignancy or radical surgery. Restoring the defect with a silicone- or acrylic based prosthesis restores aesthetics and confidence to the patient. It is a challenging endeavour for a prosthodontist to fabricate a maxillofacial prosthesis exhibiting compromised tissue-bed conditions. This case report explains a simple sequence of steps in the construction of an ocular prosthesis and the artistic technique employed in the fabrication of a successful prosthesis.

## INTRODUCTION

An ocular prosthesis is an artificial substitute for an enucleated eye ball. Enucleation is the removal of the entire eyeball after severing the muscles and optic nerve (Bartlett, 1973). Eyes are not only the most important sense organ, but also play an important role in aesthetic appearance and facial expression (Devaraju, 2014). The loss of an eye has a psychological effect on the patient. So an ocular prosthesis should be provided as soon as possible for the psychological wellbeing of the patient. An ocular prosthesis can be either ready-made (stock) or custom-made. Stock prosthesis comes in standard sizes, shapes, and colors. Custom eyes have several advantages including better eyelid movements; even distribution of pressure due to equal movement there by reducing the incidence of ulceration, improved fit, comfort, and adaptation, improved facial contours, and enhanced aesthetics gained from the control over the size of the iris, pupil and color of the iris and sclera (Cain, 1982; Smith, 1995; Brown, 1970; Schneider, 1986). Custom made ocular prosthesis are a better choice when compared to a stock or prefabricated ones because; they are fabricated by recording the exact anatomical defect of the individual. The success of an ocular prosthesis mainly depends on an impression that accurately records the defect (Mathews, 2000).

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#### Case report

A 32 year old female patient reported to the Department of prosthodontics Yenepoya Dental College, Mangalore with a defect in her right eye. The patient was diagnosed with ciliary body adenocarcinoma and the right eye was enucleated in the Department of Ophthalmology, Yenepoya Medical College & Hospital 2 months back. Clinical examination revealed intact muscle function with no inflammation of the surrounding tissues.

#### Procedure

The patient was made to look straight and keep all facial muscles relaxed. A 5 ml disposable syringe without needle was used as an impression tray. A suction tip of size 10 mm was cut and attached to the syringe and modified as an inlet for the impression material. A very fluidly consistency irreversible hydrocolloid-alginate (tropicalgin) was injected into the eye defect through the inlet. The patient was asked to close the eye slowly and to perform all functional movements [Figure 3]. The impression was removed carefully and disinfected. A polyvinyl siloxane putty index [densply aquasil soft patty/regular set] was made of the impression.



Figure 1. Preoperative view



Figure 2. Preoperative close up view of the defective eye



Figure 3. Impression making using alginate

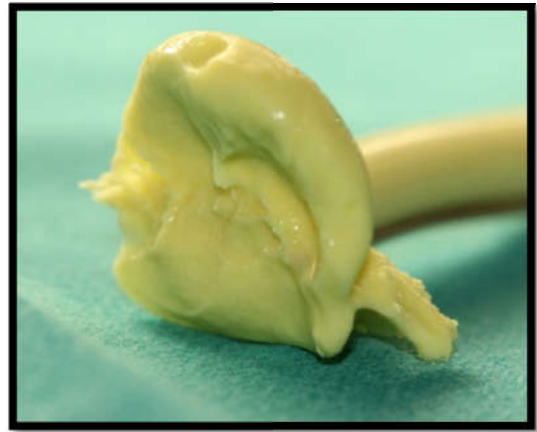


Figure 4. Tissue surface of the impression

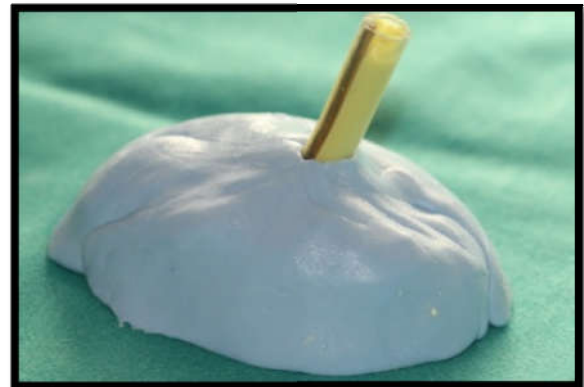


Figure 5. Polyvinyl siloxane putty index of the impression



Figure 6. Putty index after removing the alginate



Figure 7. Index filled with modelling wax



Figure 8. Tryin of the wax pattern to locate the iris center



Figure 10. Post operative view



Figure 9. Wax pattern close-up view



Figure 11. Final prosthesis

Once it sets, it was cut open in a zig zig manner, alginate was removed. Modelling wax (Hindustan modelling wax, no:2) was flown through it. On hardening, the wax pattern was gently retrieved, cooled in cold water and excess material was removed with a carver and smoothed [Figure]. The wax pattern was then tried in the patient's eye. The centre of the iris was located by asking the patient to gaze straight on a far object (figure). The Iris and inter canthal measurements were made on the contra lateral eye using a divider and scale. The iris button was made according to the obtained measurements and attached to the wax pattern. The button was made using cold cure acrylic resin material [PMMA] mixed with black color acrylic paint. The second tryin was done with the modified wax pattern and the corneal prominence was checked for by standing behind the patient, and making her look downward. Necessary modifications were made in the wax pattern according to the retention, comfort, support, bulkiness of the pattern and mobility of the eyelids by performing the functional movements. The wax pattern was flaked, dewaxed and packed with tooth coloured heat cure acrylic resin [dental product of India, Mumbai]. The shade was selected according to the scleral portion of the contralateral eye. Curing of the scleral shell was done.

The acrylic was retrieved and about 2mm of the acrylic surface was trimmed down and the black iris was reduced to mimic the convexity of the iris plane of the natural eye. Iris painting was done using acrylic paint, cyanoacrylate was applied. Red silk threads were incorporated to the scleral portion of the eye using monomer polymer syrup to replicate the natural veins of the eye. A final coat of heat cure clear acrylic resin was packed on the characterised surface of the eye and processed. Finishing and polishing of the prosthesis was done. The final prosthesis was inserted and post insertion instructions were given for regular removal and cleaning of the prosthesis using ophthalmic irrigation solution.

## DISCUSSION

Properly planned and fabricated ocular prosthesis maintains its orientation when patient performs various functional movements. The effectiveness of various impression techniques depends on patient's presentation, equipment, space for prosthesis, operator experience, available materials and patient psychology. The impression technique used has proven to be successful and a time saving method in the rehabilitation of the anophthalmic patients. This technique also helps in achieving a well adapted ocular prosthesis to the remaining substructure which ultimately help in reducing the risk of infections and secretion to be accumulated in the defect.

The use of custom-made ocular prosthesis has been an assuring option for the patients who cannot afford the implant retained replacements. The aesthetics and functional outcome of the custom prosthesis was well acceptable for the patient, and it was a less time consuming and simple technique. Although the visual perception of the patient was not restored with this prosthesis, it has improved her self-esteem and confidence

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