

Empirical Impression - An Efficient Alternative for Ocular Rehabilitation: A Case Report

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Abstract

Ocular prostheses have been used since a very long time ago. Success of ocular prosthesis depends upon its adaptation with anophthalmic socket which is best determined by ocular impressions. Various impression techniques and materials have been described in the literature. This case report highlights the use of empirical impression technique for fabrication of ocular prosthesis of a 65-year old male who had undergone enucleation surgery of left eye. The empirical impression technique involves: first a close visual examination of patient's socket, then a wax shell is designed and modified empirically to a shape that fits the socket; second, an impression is made of the socket, using this wax shell as an impression tray. Reduced treatment time and increased simplicity are the primary advantages of this method. This technique of impression making is not feasible in cases with highly irregular sockets.

Key words: Anophthalmic; custom wax impression tray; empirical; enucleation; ocular prosthesis.

Introduction

Eyes are the most striking and noticeable features of human face. 'The eyes tell more than word could ever say', besides vision eyes also aid in expressing different emotions. Irreparable trauma, tumor, a painful blind eye, sympathetic ophthalmia, or a congenital defect could be the potential reason behind loss of eye.¹ This leads to unaesthetic appearance and has deep impact on psychological status of an individual. Therefore, replacement of lost eye is necessary to promote physical and psychological healing for the patient and to improve social acceptance.²

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Currently, custom made ocular prosthesis are the most widely used options for ocular rehabilitation. They have a better fit to eye socket, better cosmetic results, and less discomfort to patient in long term.³ This case report highlights the use of custom ocular tray made out of baseplate wax for making impression of the anophthalmic socket. This is a relatively simple and time saving method which can be used for almost all cases except those with highly irregular sockets where "reading" the fornices by empirical means may be difficult.

Case Report

A 65-year old male visited the Department of Prosthodontics, College of dental Surgery, BPKIHS, Dharan with chief complaint of missing left eye (Figure.1). According to the reports from ophthalmic surgeon, he had undergone enucleation surgery of eye 6 weeks ago following a complication of herpes zoster infection. On clinical examination, eye socket revealed healthy conjunctival lining and absence

of infection. Tissue bed of anophthalmic socket was regular in architecture with even depth of the upper and lower fornices. We planned to fabricate a custom made ocular prosthesis to replace his missing left eye. Entire procedure was explained to the patient/guardian to gain their co-operation and written consent was obtained to take photographic records.

Clinical and Lab Procedure

Tray fabrication: A wax shell was made using baseplate wax (Modelling wax, DPI). This shell was modified and designed to a shape that fit the eye socket. The entire process was a matter of trial and error: trying the shape in, making modifications, trying it again. This is the “empirical” part of the fitting. Once the desired shape was obtained, a clear plastic tube (Figure.2.a) cut out from needle cap of a syringe was attached. Sticky wax (Pyrex Yellow Dental Sticky Wax) was used to adhere the tube for extra strength.(Figure.2.b). Two escape holes were made on either sides of the tube for flow of extra impression material (Figure.2.c)

Impression making: The eyelashes and eyebrows of defective side were lubricated with petroleum jelly for easy retrieval of impression after it sets. The impression tray was connected to a 5 ml disposable syringe to provide channel for flow of light body consistency polyvinyl elastomeric impression material (Reprosil, DentsplyInt) into the eye socket (Figure.3). Once the socket was filled, patient was seated erect and directed to move his normal eye in all directions to allow the material to flow into all areas of the enucleated socket, as well as onto the outer surface of the tray to record lid movements. The patient was requested to stare at a distant spot, and instructed to hold his gaze in a forward position with eyes open while the impression was being made. After the material was set, final impression was retrieved from the socket and evaluated for any defects.

Moulding the impression into wax scleral pattern: The impression was invested in alginate (Zelgan, DentsplyInt) (Figure.4.a) and retrieved back by partially splitting the mould after complete setting of alginate (Figure.4.b). Molten baseplate wax (Modelling wax, DPI) was poured into the mold through spruehole created by the tube of impression tray (Figure.4.c). Upon cooling, alginate mould was cut into two halves and the wax scleral pattern was retrieved.

Try-in of wax scleral pattern: The sprue was cut-off from wax scleral pattern which was then modified/carved for adequacy of ocular movements, proper palpebral movements, scleral contour and convexity.

Positioning of iris: The adjacent non-defective eye was taken as a reference to mark the iris position on wax pattern. The iris portion of a stock eye was trimmed out to a size approximately 0.5 mm smaller than the actual measurement was selected, to compensate the magnification of iris by clear acrylic. The iris was placed in the marked area after scooping out the wax. The wax pattern was then polished and trial was done to evaluate its position and gaze

Selection of scleral shade: Shade tabs were prepared by mixing and matching different shades and proportions of tooth-colored acrylic (Samit, Semident-SC) till the color of sclera of the other eye was replicated. The entire shade selection process was done under natural light

Flasking, Dewaxing and Curing: The wax pattern was invested in crown/eye flask with dental stone (Kalstone, Kalabhai, Mumbai, India). Before pouring the upper portion a small acrylic tag/strut was placed (Figure.5.a) in the iris portion so that after dewaxing the iris portion will be retained in the upper part of the crown flask. Dewaxing was done then separating medium (Cold mould seal, DPI,

Mumbai, India) was applied on inner mould surface (Figure.5.b).

After the separating media was applied, a clear film of transparent heat cured PMMA (Coltene-Heat cure was applied on dewaxed scleral portion around the iris. Red fibres separated from the polymer of PMMA (DPI-Heat cure, DPI) were then placed over the transparent

layer to mimic the veins (Figure.5.c). Acrylic dough of determined tooth-colored acrylic was packed followed by routine curing process. The prosthesis was finished and polished (Fig. 6) with meticulous care to avoid any sharp areas and was inserted (Fig. 7). Finally instructions for socket hygiene and prosthetic care were given along with the technique of removal and insertion is given to the patient.



Figure 1: Clinical Presentation



Figure 3: Impression tray in position; (inset) final impression

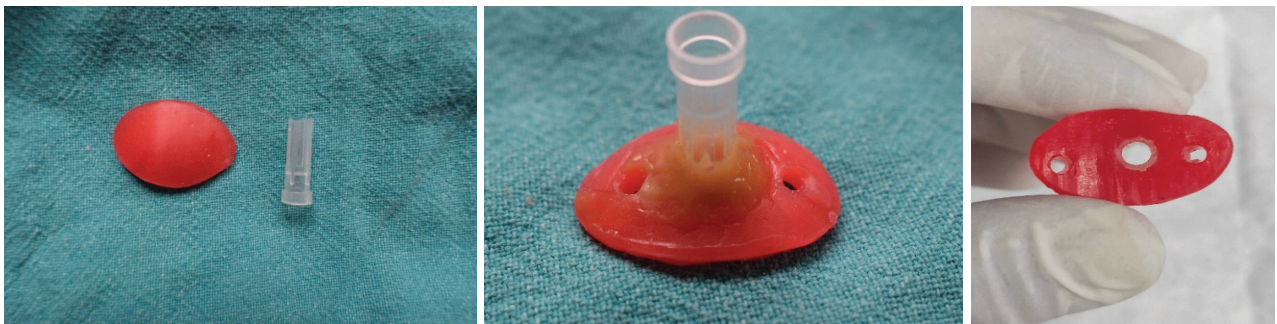


Figure 2: (a) wax shell and plastic tube, (b) plastic tube attached to wax shell with sticky wax (c) custom tray with central hole for entry of impression material and two escape holes

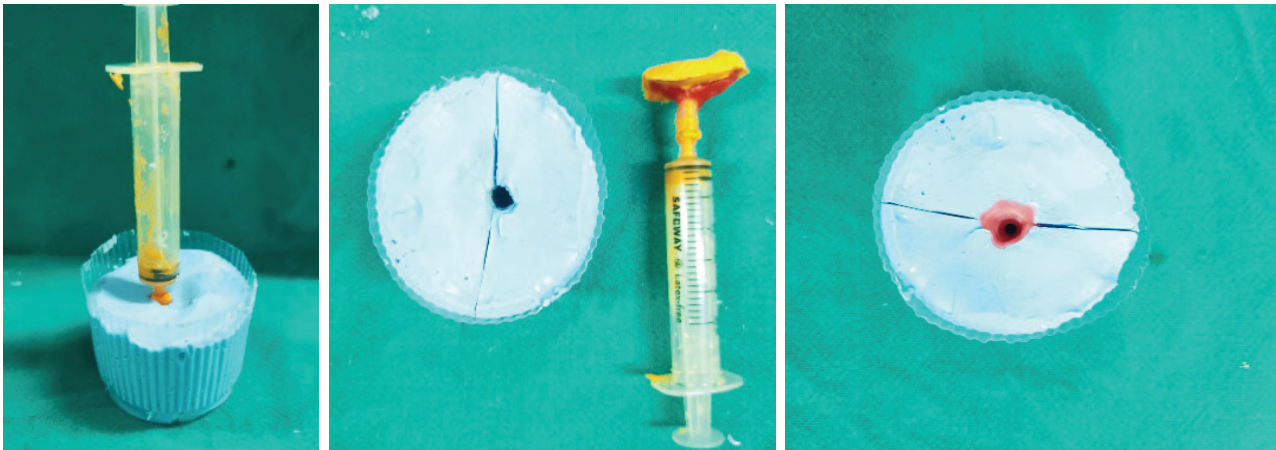


Figure 4: (a) Investing impression in alginate mould, (b) impression retrieved back by partially splitting the mould, (c) molten wax poured through the spruehole created by tube of impression tray

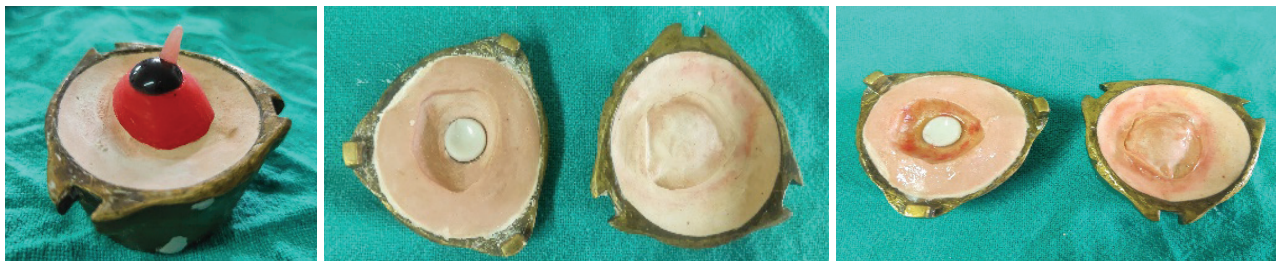


Figure 5: (a) invested wax pattern with an acrylic strut attached to the iris portion (b) dewaxing of wax pattern with iris position in place (c) packing : 1st layer of clear heat cure resin then red fibres and finally a dough of tooth colored acrylic resin matching the shade of normal sclera



Figure 6: Finished and polished prosthesis



Figure 7: Ocular prosthesis in situ

Discussion

Ocular prosthesis have a long history of successful use.¹ The major advantages of a custom ocular prosthesis are improved fit, mobility, and esthetics. Disadvantages include

increased fabrication time and cost. One of the critical fabrication steps involves impression of the socket for which numerous impression methods exist.⁴ We used the empirical/impression technique which was advocated by LeGrand

and Hughes.⁵ Compared to other impression techniques, this technique is time saving as it involves one less laboratory procedure. It can be used for almost all cases, but for certain highly irregular sockets where reading the fornices 'empirically' becomes difficult, other methods like modified impression technique may work better.⁵

Many authors have suggested the use of a stone mold for the fabrication of a wax scleral pattern.^{6,7,8} It is however a time consuming and cumbersome procedure. We simplified the process of obtaining the wax pattern by using irreversible hydrocolloid to form the mold. It also helped save a lot of time and material. In the conventional methods for replicating the iris proposed previously, the paper iris disk technique and the black iris disk technique, the iris is painted on the ocular disk using oil paints. Dos Reis et al⁹ had evaluated the color stability of painted iris colors on ocular prosthesis and concluded that the colors degraded as a function of time. Here we used the iris cut out from a stock eye thus further reducing the treatment duration. However, the availability of stock eye with matching iris as that of the patient may be a limitation.

Conclusion

Accurate ocular impression is the foundation for a successful ocular prosthesis. The technique described in this article is simple, cost effective, and time saving thus can be carried out with

limited resources. This method has provided good results in terms of esthetics, patient's acceptance and satisfaction.

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