An esthetic ocular prosthesis by characterization effect

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Abstract

The article centers fabrication of custom made eye for ocular defects. The prosthesis enhances emotional and psychological concern of the people one with eviscerated or exenterated eye. Though various types of prefabricated shell prosthesis is available in the market but the custom made prosthesis proved more advantageous in terms of precise fit, matching color of the iris with the opposing eye and eye movement.

Key Words: Custom made ocular prosthesis, Prefabricated iris shell, Enucleated.

Access this article online	
Quick Response Code:	Website: www.innovativepublication.com
	DOI: 10.5958/2395-499X.2016.00023.X

Introduction

Fabrication of orbital prosthesis that is esthetic is a difficult challenge. Because conversation with others is often initiated with eye contact, slight discrepancies in the position of the eye, lid contour or color of the prosthesis are immediately noticed by the observer[1].

Sensory organs play significant roles in our daily life[2]. Eyes are the first feature of the face to be noted. The loss of any part of the face especially eyes require prompt replacement in order to normalize the life of the patient. The disFig.urement associated with the loss of an eye can cause physical and emotional stress as well as facial impairment[3]. The primary objective is to construct a prosthesis that will restore the defect, improve esthetics and thereby benefit the morale of the patient and improve social acceptance[2]. For replacing the lost eye, fabrication of an ocular prosthesis is needed.

Before World War II, all ocular prosthesis were made of glass and supplied in standard sizes and colors. Early in the war, the scarcity of imported glass led to a search for another suitable material. In 1944, investigators at the Naval Graduate Dental School developed a custom- fitted methyl methacrylate resin ocular prosthesis. Today, three types of acrylic resin prosthesis are being used: Stock eyes, stock eyes modified by various methods and custom- fitted eyes made from an impression of the socket[4].

Surgical procedures adopted for the removal of the defective eye prior to impression taking for fabrication of prosthesis are classified by Peyman, Saunders and Goldberg (1987) into three general categories: enucleation, evisceration and exenteration. According to Scoll (1982), enucleation involves excision of globe and attached portion of the optic nerve from the orbit, evisceration involves removal of the contents of the globe, exenteration involves removal of the eye, adnexa and the part of the bony orbit[5].

Impression technique is an important step during fabrication of eye prosthesis. It varies from impression for enucleation to that of exenteration[5].

The ocular prosthesis is of the following types[6]

1. **Artificial eye:** Preformed eyes are provided to the patient who has undergone enucleation of his eyeballs which vary in thickness from 2-10mm and in size from 12x14 to 28x30 mm.
2. **Moulded eye:** It offers better results. It is prepared from an impression of the socket.
3. **Cosmetic contact shell:** This is an opaque contact lens with thin shells varying in thickness from 0.50- 2.50 mm depending upon the contour and shape of the eyeball. It is painted for all the anterior segment details including conjunctiva and sclera. Given in cases who have normal or nearly normal shape of the eyeball.
4. **Cosmetic contact lens:** It is given to corrective refractive error.
5. **Spectacle prosthesis:** It is an ocular prosthesis attached to a spectacle frame and in cases where sockets are markedly contracted beyond repair.

Case Report

A 55 years old male patient reported with chief complaint of ill fitting dentures. On examination it was found that the patient had undergone evisceration of the right eye 40 years back and was not wearing any ocular prosthesis since then (Fig. 1). On thorough examination, it was decided to fabricate a custom made ocular prosthesis with the consent of the patient.

On first visit, appropriate size of the stock tray was selected and was customized to fit in the eviscerated socket which was then attached to a disposable syringe.Impression of the defect was made with the use

of irreversible hydrocolloid in thin consistency (Fig. 2). Mixed impression material was loaded in syringe and impression was made. The impression was carefully removed from the socket. The impression along with the syringe was then invested in Vinyl polysiloxane impression material (soft putty, 3M ESPE) to form a mould (Fig. 3). Putty index was made around the alginate impression. Alginate impression tray along with impression was removed from the putty index.Molten carving wax was carefully poured inside the putty index through the opening in the mould (Fig. 4). Wax pattern was retrieved from the putty mould. Wax trial was done in patient's socket and wax pattern was tried several times until the desired bulge and contours were obtained in both the open and closed positions of the eyelids. A prefabricated iris was selected depending upon the size and colour of the opposing eye. The iris was incorporated in patient's wax trial eye. Afterwards wax trial eye with iris was matched with patient's other eye (Fig. 5). The trial eye should match contralateral eye during movement which confirms the positioning of the iris. Finally, the wax trial eye was invested, dewaxing, packing and curing was done (Fig. 6). While removing the eye prosthesis from the flask, care should be taken not to damage the invested site. The ocular prosthesis was carefully retrieved from the flask. Finishing was done with the carbide burs. After finishing, polishing was done leaving a smooth surface. Final prosthesis try-in was done. The prosthesis was inserted into the eye socket and all contours were verified and analysed for any area that required adjustments (Fig. 7). About 1 mm of the acrylic from the outer surface of the prosthesis was evenly removed. Now, characterization of the prosthesis was done in front of the patient by matching the colour of the left eye (Fig. 8). Now this prosthesis was carefully again placed in the flask and periphery of the prosthesis was sealed with the wax. Clear heat cure acrylic was mixed in proper P/L ratio, packing and curing was done. Final prosthesis was finished and polished. The aesthetics, comfort of the patient was evaluated and the eye movements were checked (Fig. 9). Prosthesis was then delivered to the patient and was taught for the insertion and removal of the prosthesis. A periodic recall appointments following 2, 3, 7 days after the insertion of the prosthesis and in every one month was scheduled for the next 6 months.

Fig. 1: Pre-operative view

Fig. 2: Irreversible hydrocolloid impression

Fig. 3: Putty mould

Fig. 4: Molten carving wax poured

Fig. 5: Positioning of iris

Fig. 6: Investment of scleral wax pattern

Fig. 7: Insertion of finished prosthesis

Fig. 8: Characterization of prosthesis

Fig. 9: Insertion of final prosthesis

Discussion

Rehabilitation of orbital defects is a complex task. It becomes obvious to achieve maximum positive

results so a multi- disciplinary approach needs to be followed[3]. Use of a stock eye, relining a stock eye and a custom made prosthesis are the various prosthetic options available. Ocular prosthesis produced by this method is the most esthetic and comfortable, so they should be provided to all patients who require such prosthesis[4]. The retention is the main concern for the success of ocular prosthesis. Impression techniques are the most important concern for such prosthesis. Various impression techniques have been discussed by many authors. Allen and Webster recommended a perforated stock ocular tray for alginate impression. In the technique by Doshi and Aruna, impression material was directly injected into the socket, no custom tray was fabricated. Skies et al(1999) utilized compound tray[5]. The custom made ocular prosthesis includes a post surgical socket with a suitable tissue bed[2]. The socket exhibits a healthy and intact conjunctival epithelium, deep fornices and taut eyelids[4].

Limitation

The only limitation in the fabrication of custom made ocular prosthesis is the difficulty in making syringe impression of the eviscerated or exenterated eye.

Conclusion

Custom tray is fabricated with a syringe attached to the tray through which impression material flows easily and record the details of the socket which aid in proper adaptation of the ocular prosthesis and improved retention. The procedures for fabricating the custom acrylic resin ocular prosthesis was not an easy task, so dentist should perform this task very deliberately and cautiously. The prosthetist should not be discouraged if he does not attain optimal results in his first endeavour, as in any prosthetic treatment experience is utmost necessary.

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