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Case Report

Reproduction of custom made eye prosthesis maneuver: A case report

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Ocular prosthesis is an artificial replacement of the eye. After enucleation, evisceration and exenteration of the eye, the goal is to replace the missing tissues with an artificial prosthesis and restore the facial symmetry and normal appearance of the anophthalmic patient. Therefore the combined efforts of the ophthalmologist, the plastic surgeon, and the maxillofacial Prosthodontist are essential in order to restore the patient's quality of life. Custom made prostheses provide more esthetic and precise result when compared to stock eye prosthesis. Simplification of the technique with the commonly available materials makes it more ease to make it. This is a case report presenting the fabrication of eye prosthesis in a cost effective manner with a unique impression technique.

Key words: Ocular defect, custom made ocular impression, custom made ocular prosthesis.

INTRODUCTION

Surgical procedures adopted for the removal of an eye are classified by Peyman, Saunders and Goldberg (1987) into three general categories: enucleation, evisceration and exenteration. According to Scoll (1982) enucleation is a surgical procedure in which the globe and the attached portion of the optic nerve are excised from the orbit. Evisceration is removal of the contents of globe while leaving the sclera and extra ocular muscles intact. Exenteration is the most radical of the three procedures and involves removal of the eye, adnexa, and the part of the bony orbit. Eye is a vital organ not only in terms of vision but also being an important component of facial expression. Loss of eye has a psychological effect on patient and their families. Immediate replacement of the lost eye is necessary to promote physical and psychological healing for the patient and to improve social acceptance.

Impression technique is an important step during fabrication of eye prosthesis. It varies from impression for enucleation to that of exenteration. Barlett and Moore (1973) advocated mixing alginate impression material with excess water until it is free flowing. Sacrificing strength of the impression which could lead to tissue distortion. Eyelids are drawn gently apart and the impression material is introduced at the inner side of the palpebral opening. Extra material should be ejected from the syringe over and around the lids. During this procedure, the patient is asked to gaze at a fixed point so that the pupil is well-centered. Welden and Nilranen (1956) also suggested alginate material as the impression material of choice but their technique involved selecting an esthetic stock eye. The peripheral borders of the stock eye are reduced according to the anopthalmic socket contours, a thin alginate mix is applied to the prepared posterior portion of the stock eye and gently inserted into the anopthalmic socket. The resulting impression is processed providing a customized stock prosthesis. In this technique, the stock eye itself acts as a tray for the impression material. Stock" or "ready-made" ocular prostheses are mass-produced. Since a "stock eye" is not made custom made for a particular person. A "custom" ocular prosthesis, on the other hand, is custom made to fit a particular patient and have better retention than stock ocular prostheses. A properly planned and well-made ocular prosthesis maintains its orientation, when patient performs various movements. Exact color match of the iris and sclera with the adjacent eye can be acheived. In the technique described below a perforated acrylic resin tray for reinforcement with disposable syringe attached is used. The anatomy of the enucleated socket and overlying tissues

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is obtained with greater detail with proper tissue contours. Thus the prosthesis obtained will have closed adaptation to the tissues, simulating natural mobility of the eye ball.

CASE REPORT

A 25-year-old man visited to the Department of Maxillofacial Prosthodontics and Implantology, HKE'S S.N. Institute of Dental Sciences and Research, Gulbarga. INDIA, with Enucleated left eye, since he was 5 years old (Figure 1). On examination, the floor of the eye socket was very shallow (Figure 2). So it was decided that a custom-made ocular prosthesis would be best to meet the needs of the patient. The extra effort that would be put into fabrication of a custom-made prosthesis would enhance the esthetics and functional results rather than a stock eye shell.

The treatment planned and technique involved was explained to the patients with limitation of the technique.

Procedure

Impression of the external surface of the defect was made with polyvinyl siloxane putty consistency (Reprosil, Dentsply, USA) and the impression was poured after beading and boxing procedure in type II Dental plaster (Kalabhai, INDIA).

A special tray was fabricated with a disposable syringe attach to it on the primary cast (Figure 3). Escape vents were made in the special tray and tray adhesive (Caulk, Dentsply, USA). Regular viscosity addition silicone (Reprosil, Dentsply, USA) was loaded into the syringe attached to the special tray. Inject the impression material down the syringe into the eye socket through the hollow stem of the tray.

The patient was instructed to make muscular movements so as to get functional impression of the socket. Remove the impression (Figure 4) and pour a 2 piece split cast mold (Figure 5).

Molten modeling wax (Hindustan, Hyderabad, INDIA) was poured in to the mold to form a wax conformer. After lubricating the socket to avoid tissue irritation, wax conformer was tried on the patient in order to evaluate the size, comfort, the eyelid support and the simulation of eye movement (Figure 6).

The flasking and dewaxing of the wax conformer was done and packing of the mold was done with tooth colored heat cured acrylic which was selected after matching with the contra lateral eye sclera. Curing and polishing is done to obtained acrylic scleral shell. The fabricated acrylic scleral shell was placed in the socket to check for the color and contour (Figure 7). The dimension and color of the iris was matched and marked with the contralateral eye.

In this technique according to the size of iris, the fabrication of the corneal button with stud for easy handling and cost effective was fabricated with clear acrylic. Black

Figure 1. Patient with eye defect.

Figure 2. Enucleated socket.

Figure 3. Custom made tray with syringe attached to it.

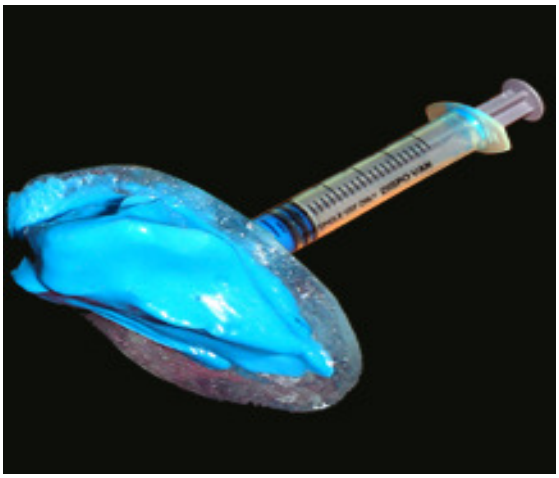

Figure 4. Final impression of the defect.

Figure 7. Custom made acrylic shell in the socket.

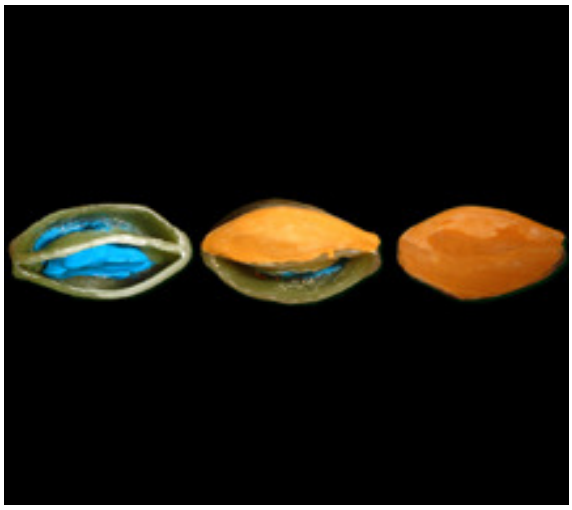

Figure 5. Two pour technique for pouring the final impression.

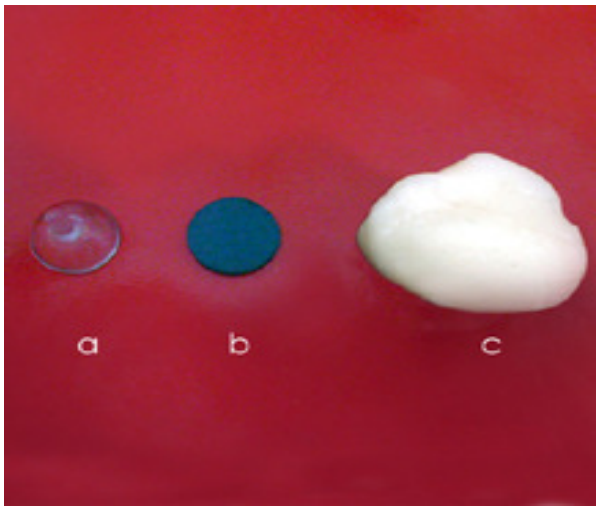

Figure 8. Custom made a) corneal button, b) iris disk and c) Tooth colored acrylic eye shell.

Figure 6. Wax conformer in the socket.

acetate disk of the size of patient iris was taken and painted with acrylic paints (Camalin, Mumbai, INDIA) (Figure 8).The painted iris disk was checked for color accuracy against the contralateral eye. Allow the iris disc to dry.

A drop of glue was placed on the iris disk and the corneal button was gently slid on top of the iris disk to avoid air entrapment and kept it for drying (Figure 9).The iris disk attached with corneal button was placed in the centered position of the prepared scleral shell, as per the markings and sealed with the glue. The stud attached to corneal button was removed.

Thin layer of wax was placed over the surface of scleral shell to create space for clear acrylic to give conjunctival effect. Flasking and dewaxing of the scleral shell was done. Red color silk thread, which simulates the capillaries, was glued to the sclera portion of the shell

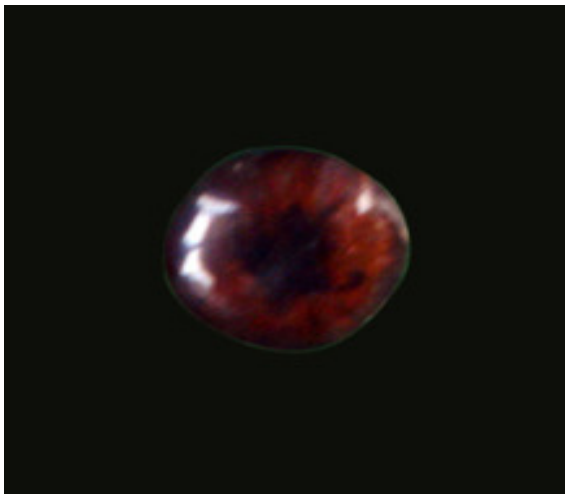

Figure 9. Painted iris with corneal button attached to it.

Figure 11. Final prosthesis in the socket.

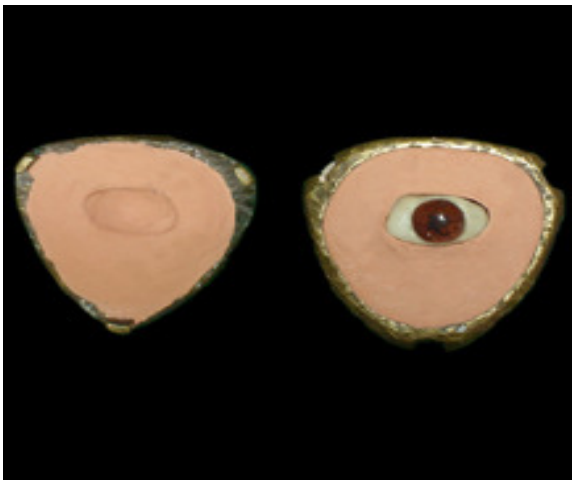

Figure 10. Mold after burn-out of the wax.

(Figure 10). Packing of the mold containing scleral shell was done with clear acrylic (DENTSPLY, USA) to give the conjunctival effect. After curing, the prosthesis was finished and polished.

Finished prosthesis was placed in socket to evaluate (Figure 11). Required modifications were done to get the proper fit of the prosthesis and then the final polishing was done and then finally cleaned in the disinfectant before placing in the eye socket.

DISCUSSION

Surgical removal of an eye may be due to trauma, infection, tumor, need for histological confirmation of a suspected diagnosis, possible prevention of sympathetic opthalmial and cosmetic reasons. Ocular prostheses can be option for these patients. The retention is the main concern for the success of ocular prostheses. Various impression techniques have been discussed by many authors. Allen and Webster (1969) recommended a perforated stock ocular tray for alginate impression. They recommended using ophthalmic alginate. Cain (1982) recommended Allen and Webster's technique and called it the modified impression technique. He suggested using an impression tray with a hollow stem in the shape of the ocular prosthesis. He did not mention fabrication of the impression tray. In the technique by Doshi and Aruna (2005) impression material was directly injected into the socket. No custom tray was fabricated; there was no proper support for the impression obtained. The technique described in this paper utilizes iris button fabricated as per the size of contralateral eye, and also the conjunctival effect was provided over sclera with clear acrylic to simulate the natural eye. Technique described by Skes et al. (1999) utilizes compound tray and ophthalmic grade irreversible hydrocolloid impression material. Iris button whether fabricated or stock made was not discussed. But the technique described here utilizes medium viscosity addition silicone, which records greater detail of the socket surface and which can be easily removed from undercuts without distortion. Thus recorded undercuts will help for better retention of the prosthesis.

Stock conformers often require elaborate, time consuming adjustments. The presence of the custom made conformer and its close adaptation to the tissue in the socket, simulate the eye muscles to move, thus exercising them and preventing disuse atrophy. Stock conformers lack a close fit and therefore cannot stimulate eyelid movement.

Conclusion

The technique discussed in this paper has its own advantage. Custom tray is fabricated, so there is proper fit of the tray and a syringe is attached to the tray through

which impression material flows easily and record the details of the socket which aid in the proper adaptation of the ocular prostheses and improved retention than stock eye shell.

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