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MODIFIED EXTERNAL TRAY TECHNIQUE FOR CUSTOMIZED EYE PROSTHESIS – A CASE REPORT.

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ABSTRACT

A case of unilateral evisceration is described. Each individual copes in a unique way to the loss of eye. Orbital defects with total or partial loss of eyeball cannot be satisfactorily repaired by reconstructive surgery. While prosthetic replacement is the treatment of choice owing to its acceptable and life like appearance, retention of the ocular prosthesis is an important factor for the success of the prosthesis. This paper describes a modified technique for fabrication and retention of an ocular prosthesis.

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KEY WORDS: Evisceration, Ocular Prosthesis

INTRODUCTION

Patients requiring treatment with custom ocular prosthesis are those who have lost ocular structures through orbital evisceration or orbital enucleation. A fundamental objective when restoring an ophthalmic socket with an ocular prosthesis is to enable the patient to cope better with the difficult process of rehabilitation after an enulceation or evisceration.[1] The placement of an ocular implant provides additional anatomic support for the residual contents of the orbit, increases motility of the overlying ocular prosthesis, and provides muscular stimulus for orbital growth. The disfigurement associated with the loss of an eye can cause significant physical and emotional problems.[2]

In an evisceration procedure wherein only the intraocular contents of the globe are removed, minimal prosthetic treatment is required. Evisceration involves removing the globe but leaving the sclera and sometimes the cornea in place. The advantage of an eviscerated defect is that the light sclera shell will not depress the lower eyelid with its weight and a bulk of material is not required to fill a sunken superior sulcus. [3]

Case report

A 65 year old female was referred to the Department of maxillofacial prosthetics of Jodhpur Dental College General Hospital. The patient complained of facial disfigurement due to loss of the left eye, and a history of trauma of the left eye followed by evisceration was recorded(**Fig.1**). As a result of altered facial esthetics, the patient suffered severe emotional trauma in terms of social acceptance. No signs of inflammation were noted on ocular examination and patient was referred to ophthalmologist for his consent.

Petroleum jelly was applied to the eyebrows for the easy removal for the impression material. Alginate (Zelgan plus, DENTSPLY) impression material was mixed with a water powder ratio of 16 gm powder with 45 ml water to obtain a slight fluid flowable mix which can be easily syringed into the defect under the lids while the patient gazes directly forward at a fixed point at least 6 feet away. This will allow the recording of the site with the muscles captured in a neutral gaze position. Next alginate was placed over the defect and was covered with a gauge piece(**Fig.2a)** . This was then reinforced with dental plaster allowing the impression to be picked without distorting the impression. The impression thus obtained was poured in stone. Wax spacer was adapted on the cast and an acrylic custom tray was then fabricated **(Fig.2b)** on this cast ensuring good fit on the defect, and a final impression was made with elastomeric impression material.

A perforated acrylic custom tray was loaded with elastomeric impression material (3M-ESPE poly vinyl siloxane) medium body addition silicon and

Fig.1.Pretreatment Photograph of the patient

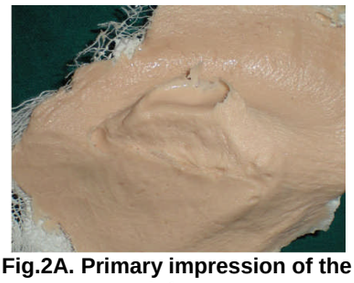


Fig.2A. Primary impression of the defect.

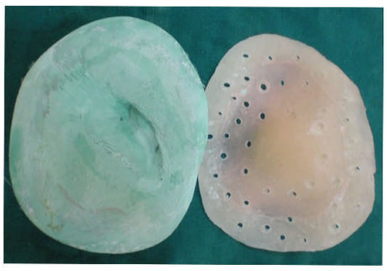


Fig.2B. Custom made acrylic tray

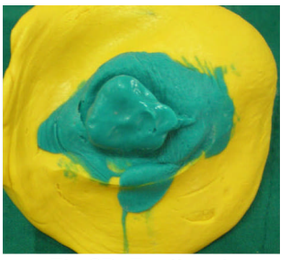
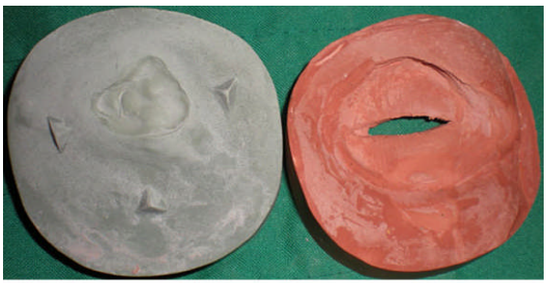


Fig.2B. Funtional impression



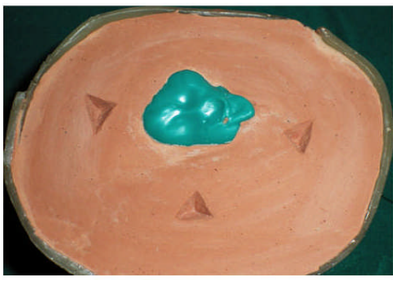
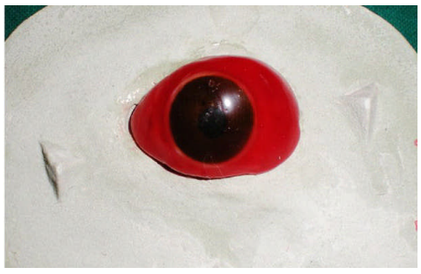


Fig.2D. Master cast with orientation notches for proper realignment

Fig. 2. External Tray technique



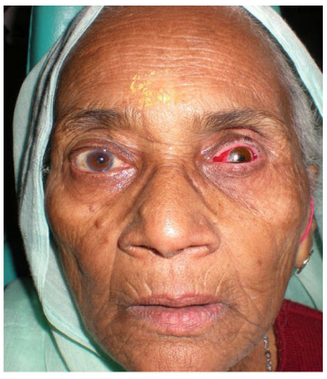


Fig. 3.Wax trial to check the Iris position and eye movements

simultaneously light body was auto-mixed (3M ESPE) and injected into the defect. The custom tray was then placed over the defect, and the material was allowed to set while the patient was asked to make the eye moments so as to obtain a functional impression, care was taken not to exert any pressure while making the impression**(Fig.2c).** Once set, the impression was removed by having the patient wiggle the face to break the seal. The impression was removed from the lower, shallower sulcus first, and then rotated out of the deeper, upper sulcus. The impression was boxed and poured in two sections; first section is upto the height of contour of the impression of the defect. Orientation grooves are made on this section and a separating agent is applied, second section of the impression was then poured**(Fig.2d).** Once set, the cast can be trimmed on a model trimmer separated and re-assembled in the same position.

The defect site was filled with molten baseplate wax. Once the wax has solidified, the cast was separated and the upper half sectioned to within about one-eight inch of the medial and lateral canthus with a coping saw. The cast was then fractured and the wax pattern retrieved. The sprue was removed with a sharp scalpel and the anterior surface of the wax pattern smoothed with a flame. The fit of the pattern was observed by gently lifting the lids and observing the extension into the fornices**(Fig.3).** Areas of under extension may be corrected by adding baseplate wax or hard impression wax. The support and contour afforded by the scleral pattern may be compared visually with the patient's eyes open and by bimanual palpation with the eyes closed. Wax was added or trimmed from the basic scleral pattern until satisfactory contours of the eyelids are achieved both in open and closed positions. A prefabricated iris button, whose shade matched with the contra lateral eye, was selected. The position of iris was determined with help of landmarks making the patient look straight. Later the final try in was done keeping the iris in its defined position. Then shade of the sclera portion was selected using the tooth colored acrylic shade guide. Flasking was done taking care that the iris is secured to one counter of the flask and remaining part in the other portion of flask. Packing was done with the selected heat cure tooth colored acrylic with small red color silk thread, which may simulate the blood vessels. Slow curing cycle was carried out for acrylisation. After curing the prosthesis was recovered, polished and inserted in patient's eviscerated socket. **(Fig.4 and Fig.5)**

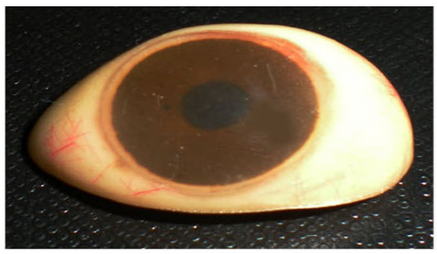


Fig.4. Finished eye prosthesis

Discussion

Earlier to World War II glass eye was considered as the state of art till acrylic resin was invented. An acrylic resin eye was easy to fit and adjust, unbreakable, inert to ocular fluids, esthetically well long lasting and easier to fabricate.[4] Several techniques have been used in fitting and fabricating artificial eyes. Empirically fitting a stock eye, modifying a stock eye by making an impression of the ocular defect[5], and the custom eye technique[6] are the most commonly used techniques. The fabrication of a custom acrylic resin eye provides more esthetic and precise results because an impression establishes the defect contours also the custom tray fabricated in this technique reduces the pressure being applied on the eye ball during impression making.

The external tray technique is particularly useful for patients with less desirable morphology of the defect, usually as a result of trauma, infections, or complications during healing, as there is no tray placed within the defects.[7] There are various techniques used in fitting and fabrication of artificial eye. In the past empirically fitting a stock eye was a popular method, and it is still in use today. This method relies heavily on intuition and the ability to visualize the anatomy and contours of the socket.[8]

A more precise method of fitting artificial eyes is the modified impression technique.[9] This method employs the use of an impression to establish the initial contours of a trial wax shape and modifying this shape to establish the proper fit and support of

Fig.4. Comparison of Pretreatment and Post treatment Photographs

the socket and eye lid. Elastomeric impression material can be used for recording the details more accurately[10] also it has better tear strength, accuracy and stability even in thin sections as compared to alginate, the modified technique discussed in this article is better than the other techniques as it provides more patient comfort and better movements of the prosthesis with least or no irritation to the mucosa of the socket. The functional impression made with elastomer provides good retention and fit of the prosthesis. Variations of the modified impression technique have been developed over the years to suite the individual patient needs. These variations all have some common traits, such as the use of impression trays, impression material, and a trial shape usually made of wax.[11]

CONCLUSION

An ocular prosthesis or artificial eye (a type of Craniofacial prosthesis) replaces an absent natural eye following an enucleation, evisceration, or orbital exenteration. An ocular prosthetic does not provide vision; Someone with an ocular prosthetic is totally blind on the affected side and has monocular (one sided) vision which affects depth perception. The use of custom-made ocular prosthesis has been a boon to the patients who cannot afford for the implant placement. Also, as discussed above, the esthetic and functional outcome of the prosthesis was far better than the stock ocular prosthesis. Although the patient cannot see with this prosthesis, it has definitely restored her self-esteem and allowed her to confidently face the world rather than hiding behind dark glasses.

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