

RESEARCH ARTICLE

FABRICATION OF OCULAR PROSTHESIS - A COMBINATION OF A STOCK AND CUSTOM MADE PROSTHESIS- A CASE REPORT

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Manuscript Info	Abstract
<i>Manuscript History</i> Received: 10 September 2020 Final Accepted: 15 October 2020 Published: November 2020	An ocular defect may affect a patient psychologically and an ocular prosthesis is given to uplift the patient psychologically and improve the confidence. Defects of the eye may follow the removal of a part of or the entire orbit. This results in the patient becoming visually and psychologically handicapped. Restoring the defect with a prosthesis not only restores esthetics but also gives back the lost confidence to the patient. This is a case report of a patient with a prosthetic eye fabricated by the combination of a stock eye and a custom ocular prosthesis.

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Introduction:-

'Vision is the main aspect of the eye. Prosthodontists cannot replace this aspect, but can restore the most beautiful aspect next to God: aesthetics and facial expression.'The art & science of eye prosthesis has been refined over many decades to provide a cosmetic replacement of the enucleated or eviscerated eye.

Defects of the eye may include removal of the entire orbit - exenteration or enucleation of only the eyeball - scleral defects.¹ Suffering a loss of vision, these patients become esthetically and psychologically handicapped.² Not all such defects areamenable to surgical correction. In such cases, a prosthetic eyecan prove beneficial.

An ocular prosthesis is an artificial substitute for an enucleated eyeball. A prosthesis which adapts well improves the psychological state and also increases the patient's confidence level and the esthetic value.³ An ocular prosthesis may be available as a stock ocular prosthesis or can be custom made.³ A stock ocular prosthesis can be given for a patient when time limitation exists and the cost factor is taken into consideration.⁴ But many disadvantages exist in a stock ocular prosthesis, such as ill-fitting, improper shade matching, and so on, whereas a custom-made ocular prosthesis increases the adaptiveness, movement of the eyeball, and exactly matches the iris position as that of the adjacent. This case report combines the advantages of both the stock ocular prosthesis as well as the custom ocular prosthesis.

Method:-

A 38-year-old female patient reported to the Department of Prosthodontics with a defect in her left eye (Fig-1). The defect was caused by an accident during her childhood. The patient was evaluated for the relationship of palpebral fissure in an open and closed condition, the muscle control of the palpebrae, and the internal anatomy of the socket in resting and in full excursion. On inspection, inflammation was absent. The muscle function of both the upper and lower eyelid was normal. There was adequate depth between the fornices, which could be utilized for better

retention of the prosthesis. So, it was decided to replace the missing eye with a combination of stock eye and custom made ocular prosthesis. The consent of the patient was taken for the procedure.

Impression Tray Selection:

"Chalian stated that the prefabricated resin eye should not be used in eviscerated/ enucleated socket as intimate contact between ocular prosthesis and tissue beds is needed to distribute pressure equally". Hence, the procedure was initiated by selecting and modifying a pre-fabricated stock eye, whose iris and pupil closely matched that of the natural eye of the patient, to comfortably and loosely fit the socket (Fig-2). Andit was thereafter used as a conformer or tray for impression making. The patient was asked to be in a relaxed position to provide a natural drape of tissues.

Impression:

The patient was made to look straight and keep all facial muscles relaxed. A light bodyimpression material was injected into the impression tray with a syringe. It was slowly filled into the defect to prevent overfilling. A little amount flowing outthrough the inner canthus indicates adequate material filling of the socket. The impression was gently removed first by massaging the lowerlid downwards and away from the nose first and then sliding theimpression out from the upper eyelid in an arc like path. Theimpression was then washed and disinfected.

Making a Wax Pattern:

A silicone putty index was made of the impression (Fig-3). Onceit set, it was cut open and wax was flown through it. Onhardening, the wax pattern was gently retrieved, cooled incold water, and smoothened with the help of a carver and gauze. The tissue surface of the wax pattern was not manipulatedat this stage. This stock eye-wax pattern combination was tested in the socket and modified for the adequacy of ocular movements, correction of pupillary alignment, proper palpebral movements, scleral contour, and convexity. It was also checked for fit, comfort, bulkiness of the pattern, and drape and mobility of the eyelids. Necessary adjustments were made.Corneal prominence was checked for, by standing behind thepatient, retracting her eyelids and making her look downward. Then the adjusted and modifiedstock eye-wax pattern combination was invested, flasked (Fig-4), and dewaxing was done. Red silk fibers to mimic veinswere placed in the dough of the determined acrylic shade followed by curing, (Curing protocol: A modified curing protocol, referred to as 'reverse curing' as has been reported by Jorge and co-workers⁵ was followed to minimize monomer content water at 95°C for 20 minutes and thereafter in boiling water for an additional 20 minutes.) finishing, and polishing.Rough edges of the prosthesis were trimmed off. It was polished with the help of polishing burs, pumice and a buff to give the prosthesis a natural glossy finish (Figure-5).

Prior to insertion of the finished prosthesis, it was disinfected using 70% isopropyl alcohol and 0.5% chlorhexidine solution. After thoroughly cleaning the prosthesis with saline solution to prevent chemical irritation, it was inserted and checked for fit, contour, and movements (Fig-6). Minor adjustments were made at the time of delivery asper the patient's comfort and esthetics. The patient was taught how to place and remove the prosthesis. Necessary instructions for cleaning, placement, and removalof the prosthesis were given and the need for regular recallappointments was emphasized.⁶

Repolishing of the prosthesis may be required on a timely basis and this was explained to the patient.

Discussion:-

The prosthesis, though not functional, is a very suitable esthetic replacement for such patients. It restores self-confidence in patients and prevents social embarrassment. Two options are available for artificial eye prosthesis, one is apre-fabricated ocular prosthesis and the other is custom-made.Pre-fabricated prosthesis carries potential disadvantages ofpoor fit (which endangers the eye to granuloma formation),poor esthetics and poor eye movements.⁶ Custom-madeprosthetic eye fabrication involves complex paintingprocedures in various stages that are quite difficult and basedpurely on the painting skills of the operator.⁷ The technique to fabricate ocular prosthesis in these case reports modifies a pre-fabricated eye prosthesis to a custom-made fit andesthetics. This helped us to overcome the disadvantages ofpoor fit, esthetics, and movement of a prefabricated prosthesis and complex painting procedure and technique involved inmaking a custom-made ocular prosthesis. This technique would also be relatively easy to perform, along with saving on laboratory time.

According to Beumer et al.,⁸ intimate contact between the ocular prosthesis and the tissue bed is needed to distribute even pressure, so a prefabricated prosthesis should be avoided. Moreover, the voids in the prefabricated prosthesis collect mucus and debris, which can irritate mucosa and act as a potential source of infection, which are minimized in custom-made prosthesis.⁹

Limitations of the technique are that the clinician isdependent on the availability of a pre-fabricated eyewith properly matching iris and pupillary part. Also, the long-term color stability of the heat-cured acrylic and the strength of its union with the stock eye will have to be closely evaluated.



Figure 1:- Pre Operative Photographs.







Right Lateral View



 Left Lateral View

 Figure 2:-Pre-Fabricated Stock Eye, Whose Iris and Pupil Closely Matched That of the Natural Eye of the Patient



Figure 3:- Impresssion Procedure:

Impression Made and a Silicon Putty Index Made Of the Impression



Figure 4:- Flasking Procedure.



Figure 5:- Final Polishedprostheses.



Figure 6:-Post Operative Photographs



Satisfied Patient

Conclusion:-



Right Eye



Left Eye (Prosthesis)

A prosthetic eye is useful in patients with scleral defects and helps restore esthetics. It also goes a long way in completing psychological rehabilitation in situations where loss of vision is permanent. The goal is to return the patient to the society with a normal appearance and reasonable motility of the prosthetic eye. The artificial eye is a triumph of resourceful human ingenuity, and a tribute to the unique enduring spirit that persists in the desire to prevail over adversity. The next time you gaze into an unseeing eye, you just might see a happy **SMILE FACE** painted where the iris ought to be!

References:-

- 1. Lal S, Schwartz AB, Gandhi T, Moss ML. Maxillofacialprosthodontics for the pediatric patient: "An eye-openingexperience". J ClinPediatr Dent 2007;32:5-8.
- 2. Lubkin V, Sloan S. Enucleation and psychic trauma. AdvOphthalmic PlastReconstrSurg 1990;8:259-62.
- 3. Cain JR. Custom Ocular Prosthetic. J Prosthet Dent 1982;48:690-4.
- Taicher S, Steinberg HM, Tubiana I, Sela M. Modified stock-eye ocularprosthesis. J Prosthet Dent 1985;54:95-8.
- 5. Jorge JH, Giampaolo ET, Vergani CE, Machado AL, Pavarina AC, Carlos IZ. Biocompatibility of denture base acrylic resinsevaluated in culture of L929 cells. Effect of polymerisationcycle and post polymerisation treatments. Gerodontology2007;24:52-7.
- 6. Cain JR. Custom ocular prosthesis. J Prosthet Dent 1982;48:690-4.
- 7. Allen L, Webster HE. Modified impression method of artificial eyefitting. Am J Ophthalmol 1969;67:189-218.
- 8. Beumer J, editor. Maxillofacial rehabilitation-prosthodontics and surgical considerations. Isiyaku Euro America Publication, St Louis(MO) 1996.
- 9. Grisius MM, Robert L. Treatment of lagophthalmos of the eye with custom prosthesis. J Prosthet Dent 1993;70:333-5.