

Fabrication of A Customized Ocular Prosthesis: A Case Report

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Abstract

After the loss of an eye, immediate fabrication of a cosmetically appealing prosthetic eye is a key factor for a successful social, occupational and psychological rehabilitation.

1. The objective of prosthetic rehabilitation of an ocular defect is to provide a well-fitting ocular prosthesis that closely resembles the original eye, restoring the patient's confidence and social acceptance.
2. Ocular prostheses can either be customized or prefabricated. The challenge encountered with prefabricated eye prostheses is poor fit and esthetics.

Customized prostheses exhibit better fit, aesthetic outcome, and comfort to the patient in the long term. ²

Keywords: Customized, Ocular, Prosthetic, Psychological, Rehabilitation.

Introduction

Loss of an eye can result from congenital defects, tumours, or trauma with compromised appearance and function, creating a deep psychological impact on an individual’s life.

The globe of the eye can be surgically removed using procedures such as enucleation, evisceration, or

exenteration. ³ Enucleation - consists of removing globe from the orbit along with all intraocular contents as well as a part of the optic nerve.

Evisceration – In this procedure the contents within scleral shell of the eye are removed while extraocular muscles are preserved.

Cases of orbital necrotizing fasciitis or in case of mucormycosis

Case Report

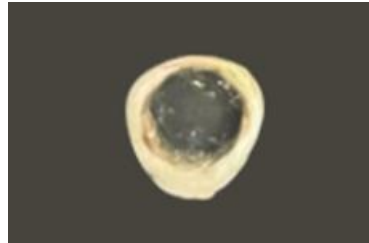
A 53 year old male patient reported to the department of prosthodontics with the complaint of ill-fitting, discoloured and damaged prosthesis. Patient presented with a history of traumatic injury to his right eye 46 years back followed by the surgical removal of the affected eye and its restoration with a stock eye prostheses and 4 years later socket reconstruction surgery was performed. On examination it was found that the socket of the eye had undergone contraction (stage 2) with mild inflammation.

Socket contraction is one of the complications of anophthalmic sockets. It has been divided into the following stages -

Stage 1; It is not an actual contraction, but considers fornix loss due to lower eyelid laxity, and is associated with the absence of orbital implant and large, thick prostheses.

Stage 2; refers to mild contraction with actual shortening of the fornices so that the prosthesis no longer fits properly. The upper and/or lower lid may retract, or the eyelids tend to roll inwards (entropion). More severe contractions (grade 3) is characterised by loss of conjunctiva, that will have to be supplemented, which is generally done with harvested buccal mucus membrane. The worst socket contractions are grade 4 with severe phimosis in all directions and include recurrent and post radiation and chemical burns cases.

Steps Followed During the Fabrication of Prosthesis



Examination of Normal Eye

- Opening: Adequate
- Colour: Brown
- Sclera colour: White
- Any characterization: Grey hue around iris
- Blood vessels: Visible

Examination of Anophthalmic Socket:

- Opening of eye:
9mm –Palpebral fissure height
15mm- Horizontal palpebral fissure
- Musculature support: Inadequate
- Opening: asymmetrical
- Closing: asymmetrical
- Any other findings: Contracted Socket
- Ocular implant: Absent

Fabrication of Custom-Made Impression Tray





Customised impression tray was fabricated using clear self-cure acrylic using the existing eye prosthesis and vent holes were created for the excess impression material to flow out and a hollow handle was attached to inject the impression material through it.

Checking Fit and Positioning Of the Tray



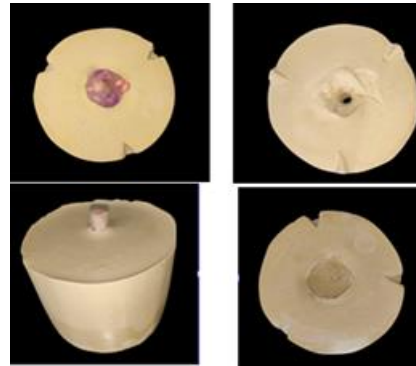
Using an indelible pencil reference markings were made on the tray as well on the patients eye region for accurate positioning of the tray during impression making.

Impression Making



Prior to impression making patients eyelashes and eyebrows were lubricated with a thin layer of Vaseline. Impression was recorded with irreversible hydrocolloid impression material. The Impression material was loaded into a 5ml syringe and injected through the hollow handle of the customized impression tray which was positioned onto the anophthalmic eye socket using the reference makings. Patient was then instructed to perform all the eye movements (up, down, medial, lateral, opening and

closing). The tray was removed from the socket after the material had set



Two piece-mold was prepared using Type III Dental Stone as this technique is easy, quick and more accurate in fabrication of wax model. Molten wax was poured into the mold to obtain a wax model.

Checking Fit of the Wax Model



The wax model was tried in patient anophthalmic eye to check for adequate fit and contour to match with natural eye.



Grid and anatomical marking technique was used for centering of the eye in the wax pattern followed by acrylisation with white color heat cure polymethylmethacrylate.



The acrylic shell thus obtained was trimmed and polished.



The contour and fit of the eye shell was verified and then reduced evenly by 1mm all over except the edge of nasal corner area to maintain the integrity of the fit. Painting of the iris was done using acrylic colors over which a layer of monopoly was added to protect it from monomer. Later painting of sclera was done and over this layer of clear heat cure polymethylmethacrylate was added and acrylised. Acrylisation was followed by finishing and polishing. Finally, the polished ocular prosthesis was inserted into the eye socket.

Discussion

In the present case, the prosthesis was customized. This type of prosthesis provides better mobility, pressure distribution and better fit in the socket compared to

prefabricated prostheses. A customised ocular prosthesis is a precisely fitted artificial eye, it offers superior aesthetics, better mobility, pressure distribution, better fit, comfort and movement compared to stock prostheses. This personalised approach significantly improves a patient's confidence and self-esteem providing psychological and social benefits after the loss of the eye. These factors are possible because a personalized eye prosthesis achieves close contact with the tissue, and this can help restore considerable eye movements without pain or discomfort.⁴

The method of insertion and removal of the prosthesis and its care was demonstrated to the patient and the patient was asked to practice the same.³

Conclusion

Rehabilitation of the patients with ocular prostheses is a challenging task due to the difficulty in reproducing the aesthetic characteristics of the natural eye. The success of the ocular prosthesis depends on the operator's skill and the accuracy of the laboratory technique. The technique of replacing missing eyes has been practised from very early periods in history and technological advancements have been helpful in enhancing the patient's overall well-being.

In the present case, the patient was satisfied with the aesthetics and comfort of the prosthesis.

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