



FABRICATION OF OCULAR PROSTHESIS IN A SINGLE APPOINTMENT USING A CUSTOM PAINTED IRIS- A CASE REPORT.

Dental Science

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ABSTRACT

Loss of any facial structure can have a deep social, physical and psychological impact on the patient. Rehabilitation of such patients with ocular prosthesis helps to overcome not only their psychological trauma but also social acceptance by restoring the lost facial structure and aesthetics of patient. The present article describes a method of fabricating ocular prosthesis in a single appointment by using conventional materials for acceptable fit and optimum aesthetic treatment outcome.

KEYWORDS

Ocular prosthesis, Maxillofacial prosthesis, Maxillofacial rehabilitation, Evisceration.

INTRODUCTION:

The eye is a very important organ and can be regarded as the most crucial constituent of facial expression. It is regarded as a window to one's soul. The loss of an eye can be considered as a permanent damage or a diminution to one's vital cardinal senses i.e. vision.¹

The trauma associated with the loss of an eye can cause significant physical, psychological as well as social problems (Lubkin & Solan, 1990). Reasons for an eye loss can be innumerable ranging from congenital defect, tumour, irreparable trauma that to the need for histological confirmation of a suspected diagnosis.^{2,3} Surgical procedures for the removal of an eye can be broadly classified as: evisceration (where the contents of the globe are removed leaving the sclera intact), enucleation (most common, where the entire eyeball is removed after severing the muscles and the optic nerve) and exenteration (where the entire contents of the orbit including the eyelids and the surrounding tissues are removed). An ocular prosthesis can be regarded as an alloplastic prosthesis restoring a person's identity and reintegrating him/her in society.⁴

Majority of patients till the end of 19th century used to have prefabricated artificial eye made up of porcelain glass but after World War II, the use of customised ocular prosthesis made of acrylic became popular. Custom-made ocular prosthesis shows close contact with surrounding tissue, and has capability of distributing pressure equally as compared to stock shell and also scores over other alternative in decreasing conjunctival abrasion. The advantage of close tissue contacts to surrounding tissue improves tissue health by reducing fluid accumulation in tissue prosthesis interface. Fluid accumulation has disadvantage of tissue irritation and increased bacterial growth.^{5,6}

Custom made ocular prosthesis with all their advantages are more time-consuming to fabricate than their stock artificial eye counterpart, thus even if stock eye prosthesis are less time consuming they should be given only as an interim prosthesis. Thus this article demonstrates a conventional technique for an ocular prosthesis fabrication with customised iris in a single day.

CASE REPORT

A 46-year-old male patient reported to Department of Prosthodontics and Crown & Bridge, at Guru Nanak Institute of Dental Sciences and Research, Kolkata, with a complaint of a facial defect involving his right eye. On clinical examination it was found that the content of the globe was missing with some part of the sclera remaining and completely intact eyelids. Extraocular muscles were functional for both the upper and lower eyelids, no inflammation was seen. On taking history it was revealed the patient had suffered trauma while farming 10 years back, following which evisceration was done.

Conjunctiva, depth of fornixes, and presence of cul de sac was also examined. It was planned to rehabilitate the patient with an ocular prosthesis fabricated by combination of custom and stock ocular prosthesis.

The procedure was started with making an impression. The socket was cleaned by irrigating with saline solution and dried with cotton pellets. Eyebrows and eye lashes on the defect side were lubricated with petroleum jelly. Patient was seated in a semi reclined position. A Polymethyl Methacrylate, self-cure acrylic (DPI, India) mould was made on the opposite side of a putty dispensing spoon after application of a thin layer of separating medium. The mould was checked and made to a size smaller than the size of the defect to be recorded, about 2mm overall. The centre of the mould was perforated to the size of a 5ml syringe. Multiple other perforations were made for retention of the impression material.

Patient was made to sit in a semi reclined position. Alginate was mixed in a thin injectable consistency (Coltoprint, COLTENE) and dispensed through a 5ml syringe with the mould attached with it into the defect and an impression was recorded under functional movements of the ocular muscles. After the material had set, the impression was retrieved from the socket and checked to ensure that all the surfaces were recorded.

A two-layer dental stone cast was poured to immerse the lower part of the impression first. Three uniform round depressions were made around the circumference and they were marked which would help in orientation of the second layer of the stone poured later. After the stone had set, separating media was applied on the surface.

Then the second layer was poured. The impression material was retrieved and the two layers of stone was assembled and reoriented with the help of the round indices made. A mould space was created into which self-cure autopolymerising resin was poured (DPI, India) to fabricate a scleral shell.

The scleral shell was properly contoured and trimmed to give it a simulation of the lost eye. It was tried in patient's socket and checked for size, comfort, support, fullness, and retention by performing the functional movements. A surgical adhesive tape (Micropore, 3M) was pasted horizontally over the middle of the forehead.

The points corresponding to the outer canthus, inner canthus and centre of the iris was marked. The distance between the outer canthus, the centre of the iris and the inner canthus was measured on the non-defect side and the corresponding was marked on the defect side. The outer diameter of the iris was also measured.

A circular disk of 1mm thickness was fabricated with autopolymerising resin 0.5mm more in diameter than that of the original measured iris. The disk was hand painted using a thin brush and artist paint (Poster Colour, Camel). Many strokes from the center of the iris to the periphery were painted to match the colour of natural iris. The colouring was done in layers to get more lifelike appearance. The first layer was for the basic background colour; the second layer was for the colour around the pupil and the for third layer additional

lighter striation was applied to give the lower layers a three dimensional effect. A black spot was painted in the center of the disk to represent the pupil. Each layer sprinkled with self-cure clear acrylic (DPI, India) was allowed to completely set before applying the next coat.

The point corresponding to the iris mark on the adhesive tape was marked on the scleral shell and it was trimmed to receive the painted iris and which was checked and secured in place with wax. A thin layer of wax about 0.2mm layer was painted all over the sclera and the iris. The assembled scleral shell with the iris was tried in for a final all necessary function, comfort and aesthetics.

The final tried in prosthesis was attached with a metal wire around the lower border of the iris with self-cure resin and was prepared to be flaked and cured. The lower portion of the ocularist flask was filled with dental stone (BN Chemicals, India), the posterior tissue surface of the scleral shell was laid on it, and the dental stone was allowed to set. Separating media was coated over the first stone layer, and the upper half of the flask was then filled with dental stone to engage the wire and the iris and it was assembled and subjected to dewaxing. The mould space created was filled with heat cured polymerising resin (DPI, India) and the entire scleral portion was coated with monomer polymer syrup to keep the blood-vessel fibres in place which were retrieved from a red ribbon and hand painted. The flask was then closed and subjected to curing. After curing final prosthesis was obtained, trimmed, finished & was highly polished. Prosthesis was thoroughly cleaned with saline solution to prevent any kind of irritation. The final prosthesis was inserted and checked for fit, contour, and movements. Instruction were given about proper insertion and removal of the prosthesis and its maintenance.

DISCUSSION:

Prosthodontist plays a vital role in giving back patients with such defects a chance toward a normal social life by restoring the lost ocular tissue with artificial substitutes. Literatures have suggested many procedures for the fabrication of ocular prosthesis such as use of stock eye shell, relining stock eye shell and custom ocular prosthesis.⁷

Custom ocular prosthesis provides good fit, enhanced aesthetics, proper eyelid fullness, accurate sclera contour and iris colour match and positioning. Polymethyl Methacrylate resin (PMMA) and glass are generally used for custom ocular prosthesis fabrication. When compared to glass, PMMA has several advantages like easy availability, simplified fabrication method and less chance of breakage.⁸

A well fabricated customised ocular prosthesis not only retains shape of the defective socket, prevents collapse of lids, provides muscular functions of the lids and also maintains palpebral opening and gives a gaze similar to that of natural eye.^{9,10}

The technique of fabrication described here is very simple with minimal and readily available equipment and can be performed by someone also who may not have very high artistic acumen. Another important advantage of the mentioned technique is the time required is acceptable by such patients and the whole process of fabrication takes 1-2 appointment.

CONCLUSION:

The result of any custom-made ocular prosthesis is far superior than that of market available stock ocular prosthesis. The technique described in our article is easy to follow, fast and cost-effective method and with results that more sufficiently aesthetic and accurate.

Note: Patient's Consent Was Taken To Use His Pictures For Scientific Writing And Presentations.



Preoperative View Of The Eviscerated Right

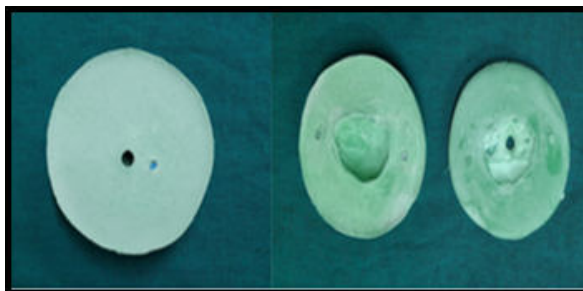


(left)making Of Alginate Impression.

Self Cure Acrylic Mould Made With Perforations And Attached With A 5ml Syringe Socket



(middle) Retrieved (right) Pouring Of Made Impression. Impression



(left) Two Layered Dental Stone Cast.

(right) Mould Spcae Made



(left) Adhesive Tape Attached.



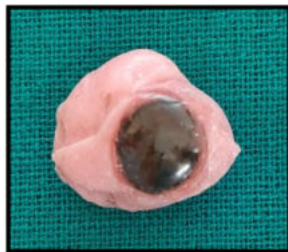
(right) Tryin Of The Scleral Shell



Customised Iris Painting



FINAL TRY IN



Trial Prosthesis Before Investing



Metal Wire Attached Over The Iris



Investing Of The Trial Prosthesis



After Dewaxing



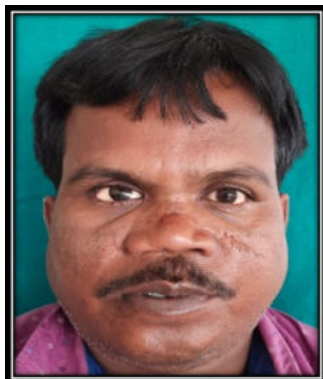
Incorporation Of Red (blood Vessel) Fibres



Final Finished And Polished Prosthesis



Pre Operative



Post Operative

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