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Research Article

REHABILITATION OF AN OCULAR DEFECT

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ABSTRACT

Rehabilitation of mutilated maxillofacial structures to their approximate natural form has been the primary aim of clinician in the field of rehabilitation. The eye being a sensory organ is an important component of facial expression. Loss of an eye has a heavy impact on the self-image and personality of an individual. The primary purpose of an ocular prosthesis is to maintain the volume of eye socket and create an illusion of a healthy eye and surrounding tissue. A custom ocular prosthesis is a good alternative when reconstruction by plastic surgery or the use of osseo-integrated implant is not possible or not desired. This paper describes the rehabilitation accomplished with the help of a prefabricated eye shell.

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INTRODUCTION

The loss of an eye causes disfigurement and is often psychologically damaging experience for the patient. The reason for removal of an eye ball may be a congenital defect, irreparable trauma, tumor, a painful blind eye. The minimal surgical procedure is evisceration where the contents of the globe are removed, leaving the sclera intact. A more invasive procedure is enucleation, wherein the entire eyeball is severed from the muscles and optic nerve. Exenteration, the most radical involves removal of the contents of the orbit.^[1] Ocular prosthesis should be provided as soon as possible for the psychological well being of the patient.^[2] An ocular prosthesis can be either readymade (stock) or custom made. Despite the advantages of custom prosthesis most ocular prosthesis are made from a stock of prefabricated artificial eyes because of time and expense. The eyes may be trimmed and fitted so that they approximate the periphery of the eye socket.^[3] Until World War II, the glass eye was the most popular eye prosthesis. The glass eye was, however, difficult to manufacture and hazardous. The methylmethacrylate prosthesis became popular since they offered superior strength and permitted modifications in shape and size.^[4] The material was lightweight, easy to fit, translucent, easily fabricated, had intrinsic and extrinsic coloring capabilities and was inert to the socket secretions.^[5] The purpose of this article is to modify a

stock ocular prosthesis in relation to an anophthalmic socket and to produce a custom-made ocular prosthesis.

Case Report (outline of the case)

A 65 yr old patient reported to the department of Prosthodontics with a defect in the right eye. Case history revealed traumatic injury to the right eye followed by enucleation was noted and the patient was given a silicone prosthesis which she could not maintain properly and subsequently led to infection. The patient again had to undergo surgery for the prosthesis removal due to failure. The patient reported to our department 6 months after surgery.



Figure 1 Preoperative

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On examination of the defective eye socket it was found that she had a defect with a shrunken orbit with little movement of the rudimentary upper and lower eyelids. The mucosa was healthy and the eye socket showed the presence of superior sulcus deepening (Figure 1).

The patient refused to opt for implant retained prosthesis due to exposure to a no. of previous surgeries and due to the economic reasons. A pre-fabricated eye-shell was selected matching with the color of the iris of the left eye and the necessary modification was done.

Procedure

Tray Fabrication

The stock-eye shell selected was trimmed and modified^[6] with the help of a cubic trimmer as advocated by Laney and Gardener^[7] and Welden and Nhramen^[3] (Figure 2) It was then flaked in dental plaster to create the lower half of a custom made flask.



Figure 2 Orientation and Customization of the Pre-fabricated eye-shell

Separating media was applied after creating orientation grooves in the first half of flask. Then the second half of the flask was poured. The two halves of flask were removed and the eye shell retrieved. A mould was obtained into which self-cure acrylic resin was packed and allowed to polymerize (Figure 3).

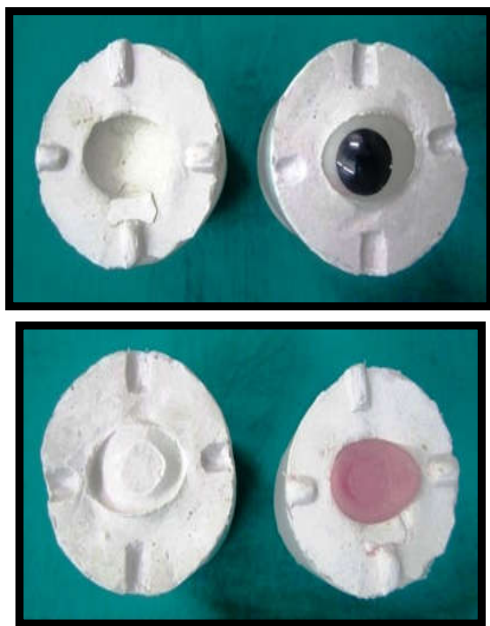


Figure 3 Fabrication of mould space and Custom Tray

The tray was retrieved and a hole was made in the center of the custom tray and a hollow tube was attached to function as a sprue (1cm long and 3-4mm wide) and the tube was centered in the superior-inferior and medial-lateral axes^[4] (Figure 4), so that the medium viscosity polyvinyl siloxane impression material could be pushed into the enucleated socket. The impression surface of the tray is roughened which helps in the retention of the material for making an impression (Figure 4).



Figure 4 Custom tray with retention grooves and tube attached

Impression Procedure

External tray technique^[8] was used with medium body polysiloxane impression material for making the impression of the socket (Figure 5 and 6). The patient was seated erect, requested to stare at a distant spot, and instructed to hold her gaze in a straightforward position with eyes open while the impression was being made. A syringe was inserted into the hollow tube attached to the special tray through which material was injected into the socket.



Figure 5 Positioning of tray in the enucleated socket and impression making

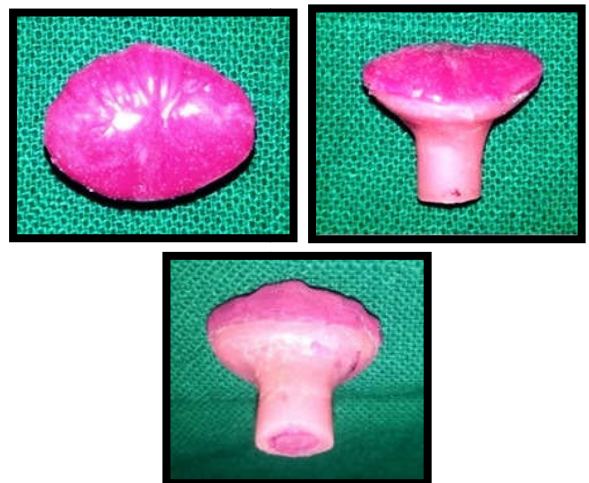


Figure 6 Final impression

Pouring of the cast

Impression was poured in dental stone and a custom made flask was created in dental plaster. Separating media was applied and then the second half of custom made flask was poured. Impression tray with polysiloxane was removed from the lower half of the flask and was replaced with transparent heat cure acrylic resin with eye shell in its place. The second half of the flask was placed over it and the two halves were tightened and secured and then subjected to polymerization procedure. After curing, the prosthesis was recovered, polished (Figure 7 and 8).



Figure 7 Packing and Flasking

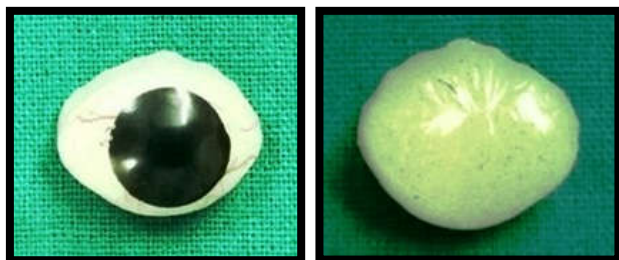


Figure 8 Prosthesis Fabricated

Insertion and adjustment

Prior to inserting the prosthesis, disinfect it in a solution of 0.5% chlorhexidine and 70% isopropyl alcohol for 5 minutes. After disinfection, rinse the prosthesis in sterile solution to avoid chemical irritation. Carefully insert the prosthesis into the socket but delay evaluation of its appearance and location for 10 minutes to allow protective blepharospasms of the orbicular muscles to subside. After 10 minutes, discrepancies in location was adjusted by grinding the prosthesis and peripheral surfaces of the prosthesis. After the location of the iris was acceptable, eyelid relationships was adjusted by grinding the anterior surface of the prosthesis.^[4]



Figure 9 Prosthesis in situ

Patient Instructions

The method of insertion and removing the prosthesis and its care were demonstrated to the patients.

The prosthesis should be removed at least once a day for cleaning. Cleaning should be done with a mild soap or detergent to avoid crazing, pitting, or clouding of the prosthesis. The patient was asked to return on the day 1, 2 and 7 for follow-ups after the prosthetic insertion. There after a 6-month follow-up was done for prosthesis evaluation and adjustment.^[9]

DISCUSSION

Fabrication of ocular prosthesis has been known to human being since times immemorial. The first attempt to achieve the same was by glass eye by Ambrose Paire. Prosthetic rehabilitation fulfils aesthetic as well as psychological requirements for a patient. A correctly placed prosthesis should maintain its orientation when the patient is looking straight ahead. A correctly placed prosthesis should restore the normal opening of the eye, support the eyelids, restore degree of movement, and be adequately retained and esthetically pleasing.

The use of a stock ocular prosthesis of an appropriate size and color, adapted by selective grinding or additions of acrylic resin, has been advocated by Laney and Gardener^[7]. Standard techniques can produce excellent results for most patients, provided the operator has an adequate selection of prefabricated eyes.

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