

# Esthetic Problem: Prosthetic Solution for an Ocular Defect

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## ABSTRACT

Anophthalmia (The loss an eye) not only impairs patient's vision but also create a noticeable deformity on facial appearance and esthetics. The condition is a psychological distress for the patient interrupting his routine work. 'Sarvendriyanam nayanam pradhanam' states vision to be the supreme among all the senses. A prosthodontist as an integral member of the craniofacial rehabilitation team can help raise the spirits and ease the mind of the affected. Among various approaches, customized ocular prosthesis achieves better comfort and function between prosthesis and orbital tissues. This is a case report of a female patient of age 22 years had lost her eye as a child due to trauma and the above mentioned prosthesis was planned and fabricated to enhance appearance and boost her confidence. Getting eyesight back is not always possible, but maxillofacial prosthetics can help to reduce the pain of psychological embarrassment. Artistic skills are needed in providing a natural look to the prosthesis; this technique may help in a naturally appearing prosthesis with lesser artistic skills.

**Keywords:** Anophthalmia, Iris, Impression of socket, Prefabricated eye/stock acrylic eyes, Split casts, Acrylic characterization.

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## INTRODUCTION

Health is defined as a state of complete physical, mental and social well being, and not merely the absence of the disease or infirmity.<sup>1</sup> Anophthalmic state of an individual fails to satisfy the above definition of health. Eye loss and subsequent loss of vision can be subjected to congenital causes, irreparable trauma, tumor, surgical intervention or the need for histological confirmation of a suspected diagnosis.<sup>2</sup> Rehabilitating the vision with transplantation of an IOL—*intraocular lens* or corneal transplant is not possible in a complete surgical intervention like enucleation or evisceration. Prosthetic replacement of the lost eye in such conditions is necessary to promote physical and psychological healing and improve social acceptance.<sup>2-5</sup> This requires a multidisciplinary management and team approach—demanding the combined efforts of an ophthalmologist, plastic surgeon and maxillofacial prosthodontist. Fabrication of an ocular prosthesis can be dated back to Ambrose Pare's gold or silver and glass eye. These were popular until World War II, till Acrylic resin

completely replaced glass eyes. Advantages which gave an upper hand to acrylic resin—prosthesis is solid, light weight, easy to fit and adjust, unbreakable, translucent, easily fabricated, has intrinsic and extrinsic coloring capabilities, increase motility of the prostheses and are inert to the socket secretions.<sup>2,3</sup> The fabrication technique using resin was developed by the US Naval Dental and Medical Schools.<sup>2,3</sup> Commonly used techniques are—fitting a stock eye, modifying a stock eye, custom made artificial eye and implant retained ocular prostheses.<sup>2,6</sup> Here, a custom modified stock eye prosthesis fabrication has been elaborated, in respect to its use for a young anophthalmic patient.

## Diagnosing and getting Acquainted with the Patient

A through history of the patient elicited a congenitally blind left eye. Examination revealed enucleated left eye socket, which was checked for complete healing of the surgical wound and also to rule out signs of edema and inflammation. All the movements of the eye socket were found to be favorable for prosthesis. Patient was planned to be rehabilitated to acceptable esthetics using modified stock eye prosthesis.

## Impression making and Use of Split Casts to Select a Stock Eye

Success of prosthesis always begins with an accurate impression of the site to be restored. Criteria for an acceptable impression includes accurately recorded posterior wall, the position of the palpebrae in relation to the posterior wall, and the greatest extent of the superior and inferior fornices of the palpebrae. This could be made in several ways: Direct impression/external impression, impression with a stock ocular tray or modified stock ocular tray, impression with custom ocular tray, impression using a stock ocular prosthesis, ocular prosthesis modification, and the wax scleral blank technique.<sup>3</sup>

This article explains a facial impression to fabricate a custom ocular tray which was used to prepare split casts. To make the facial moulage patient was seated in semi supine position (Fig. 1). Patient was informed about claustrophobia and aculophobia before making the impression and asked to relax. Petroleum jelly was applied



Fig. 1: Preoperative photograph



Fig. 4: Well-extended custom tray



Fig. 2: Facial moulage



Fig. 3: Facial cast

to eyebrows and eyelashes to prevent the adherence of impression material. Irreversible hydrocolloid was used to make the impression; gauze pieces were placed over the material to retain the plaster which was used as a backing for alginate (Fig. 2). Once both were set, it was removed from face with help slight wriggling movements of face by patient. The impression was checked for any discrepancies and poured with dental stone to form facial cast (Fig. 3). This helps to detect the external surface of ocular defect

and also to construct tray for further impression procedures. Custom tray was prepared with cold cure resin extending to cover the defect superiorly, inferiorly, medially and laterally (Fig. 4).<sup>3,7,8</sup>

For making impression of the enucleated socket, petroleum jelly was applied as earlier. Light viscosity additional silicone impression material was injected into the socket in little excess to ooze out; while an assistant retracted the upper and lower lids the special tray carrying some material was pressed onto the defect. The patient was instructed to do all the movements of the eyeball as soon as possible and is asked to stare straight at a distant point or object. Impression was removed on set and checked to ensure that all the surfaces were recorded. Two pour technique was used to prepare split casts (Fig. 5).<sup>3,9</sup>

### Choosing the Stock Eye and Subsequent Procedures

A stock eye was selected to match the shade and size of contralateral iris and acceptance of the patient assured (Fig. 6). An acrylic stem (1 cm long and 3-4 mm wide) was attached to the midpoint of the pupil on this artificial eye. Care was taken to center its axis superoinferiorly and mediolaterally. The borders of the artificial eye were reduced to avoid impingement of tissue bed and were made 2 to 3 mm short of the borders.<sup>6</sup> Using polyvinyl siloxane putty material, the stock was molded by asking the patient to do various eyeball movements and finally to stare straight at the distant object (Fig. 7). Final impression was made with polyvinyl siloxane light body material (Fig. 8). Erect posture of patient was maintained during the above step.<sup>4,7,8</sup> Shade of the sclera was selected using tooth colored shade tabs. Impression was invested in a two-piece crown and bridge flask with dental stone and processed conventionally using selected heat cured tooth colored acrylic characterized with small red silk thread to simulate the blood vessels.



Fig. 5: Split cast



Fig. 8: Impression with putty and polyvinyl siloxane

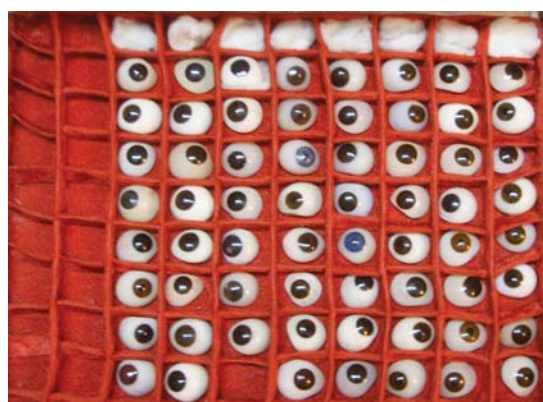


Fig. 6: Selection from various stock eyes



Fig. 9: Patient after rehabilitation with a custom modified stock eye prosthesis



Fig. 7: Checking the chosen stock eye

Processing included a bench press under 3500 psi pressure for at least 1 hour followed by slow curing cycle.<sup>4,6</sup> The processed prosthesis was deflasked and polished. Prior to insertion the polished prosthesis was disinfected in a solution of 0.5% chlorhexidine and 70% isopropyl alcohol for 5 minutes and then rinsed in sterile saline solution to avoid chemical irritation. Prosthesis was inserted into the socket and evaluated in appearance and location after 10 minutes

to allow protective blepharospasms of the orbicular muscles to subside. Small discrepancies were adjusted by grinding the posterior and peripheral surfaces of the prostheses, so as to achieve similar position as contralateral eye on straight gaze (Fig. 9).

### Instructions to the Patients

The patient was taught the proper method of removal and insertion. The patient was instructed to wear the prosthesis all day, but to remove and wash it with a mild soap once a day. A follow-up was done on the 4th day to check for signs of irritation of the socket and relieve the prostheses as needed. The patient was then instructed to visit at 6 months intervals or as needed.<sup>10</sup>

### DISCUSSION

Implant retained ocular prostheses would be the best approach to rehabilitate an anophthalmic eye, if not for economic and systemic factors. Next preferred technique is the custom-made ocular prostheses, which necessitates the services of a skilled artist for duplication of iris and the



involved time.<sup>2</sup> The technique used to rehabilitate this patient is simple to master, yet not compromising with the fit, function and esthetics of the prostheses.<sup>2-8</sup>

These prefabricated ocular prostheses made of glass or acrylic resin are known as 'stock eyes' that come in standard sizes, shapes and colors. These are relatively inexpensive and can be delivered quickly.<sup>7</sup> Customizing such a stock eye improves adaptation to the underlying tissues, increases mobility of the prostheses and improves facial contours. The availability of needed iris color and lack of control over the size of the iris and pupil can be a limitation to the above technique, which can be overcome by using various sizes and colors of prefabricated eyes.

A modified stock ocular prosthesis is an excellent alternative, which is relatively inexpensive and easy to fabricate with no special skills or materials required for its fabrication.

## SUMMARY

An anophthalmic patient was rehabilitated to an esthetic appeal by customizing a stock eye. This technique allowed the proper positioning of the iris, while simultaneously recording an impression of the ocular defect tissue bed which in turn increased its movement due to excellent adaptation to the walls of the socket. Most patients can be treated with the modified prefabricated eye technique with excellent results.

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