

# Positioning Of Iris Using A Customized Graph Grid And A Spring Bow Assembly For Fabrication Of A Ocular Prosthesis: A Case Report

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## Abstract

Positioning of iris in a custom-made ocular prosthesis is a technique sensitive procedure, where visual assessment alone may not be accurate. The present article is an illustration of a case report highlighting a guided orientation and positioning of an iris, exacting the contralateral side of the eye, using a facebow. This technique gives an accurate registration of the position and alignment of iris disc assembly, thus giving a life-like appearance to the prosthesis.

**Keywords:** *pthysical eye, custom ocular prosthesis, iris orientation*

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## I. Introduction

Father of Indian Surgery Sushrutha said, "love of face is next only to the love of our life and thus the mutilated cry for help." Therefore a prosthesis should be provided as earliest for the psychological uplift of the patient [1]. An ocular prosthesis can be either stock (prefabricated) or custom-made. Stock prosthesis are available in standard sizes, shapes, and colours to be used for interim or postoperative purposes. [2-4] Custom eyes have several advantages like intimate adaptation to the tissue bed, better eyelid movements; even distribution of pressure, reduced episodes of ulceration, improved retention, comfort and enhanced esthetics gained from control over the size of the iris, pupil and excellent colour matching of the iris and sclera, with the contralateral side. [5-7]

## II. Case Report

A 36-year-old female patient reported to department of Prosthodontics, Career Dental College, Lucknow with a chief complain of defect in the right eye. Thorough case history revealed that she has sunken eye since 15 years due to a traumatic injury.

□ On inspection, the sclera and iris, were indicative of a phtysical eye which left behind only the socket with the eye lids intact. The right eye socket exhibited eyelid constriction, reduced size and depth of inferior fornix. No inflammation was present.

It was decided to fabricate a custom made ocular prosthesis, using the iris from the stock eye to meet the needs of the patient since it would result in better esthetics than a stock eye shell.

### STEPS undertaken are as follows-

The patient was seated in upright position so as to allow the tissues involved in the defect to be recorded in their natural drape. Petroleum jelly was applied to the eyebrows and skin around it to prevent impression material from sticking to eyelashes.

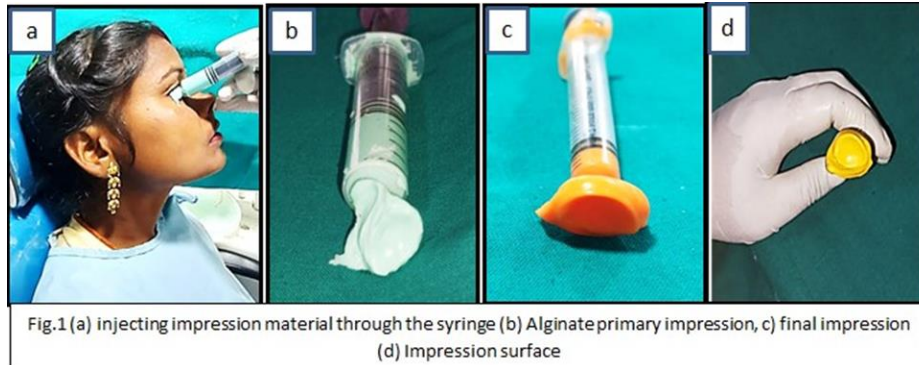
### 1. Impression-

Impression of the defect eye was taken by injecting irreversible hydrocolloid (ALGINATE) through a disposable syringe and projecting it out between the eyelids. (Fig. 1a&b) The impression was removed carefully and invested in dental gypsum in order to obtain a positive replica of the defect eye.

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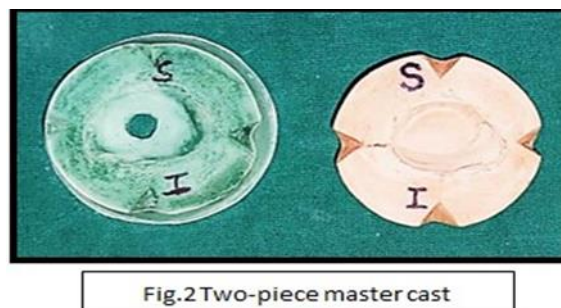
On this primary cast, an acrylic based conformer was fabricated which acted as a special tray for the final light body impression material.

For taking final impression, patient was instructed to perform various eye movements in the following order – Laterally, up and down and circular motion till the material sets and close her eyes so that the functional impression can be achieved. (Fig. 1c&d)



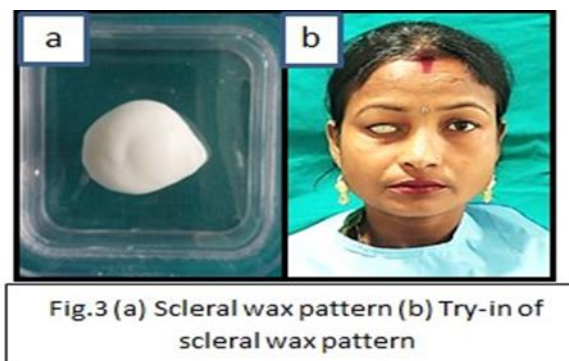
### 2. Fabrication of a master cast

Final Impression was poured using two-pour technique where the base cast was poured with diestone such that half of the impression is embedded in it. The second pour was done with dental stone after coating a layer of separating medium. Following which, markings were made on all the four sides of cast for proper reorientation of the cast. (Fig. 2)



### 3. Fabrication of scleral wax pattern

Both the part of the mold was separated to remove the impression. Next, the wax pattern was fabricated by pouring the molten wax in an empirical approximation. The wax pattern was retrieved carefully. (Fig. 3a)

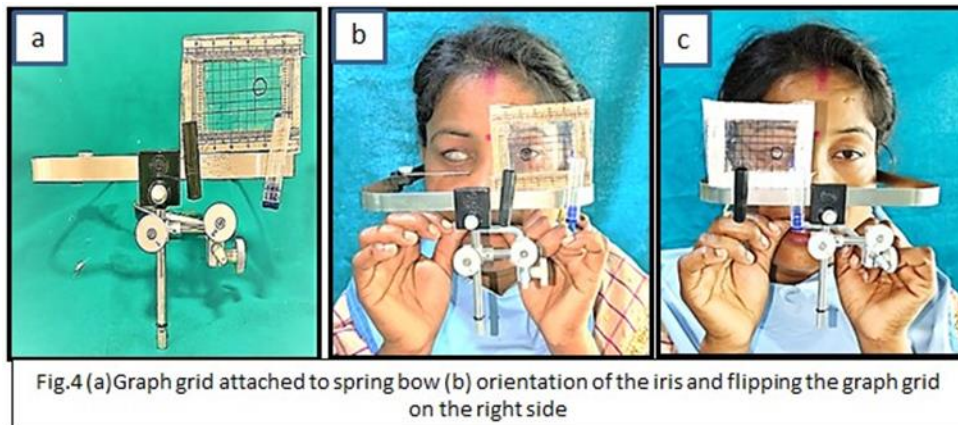


### 4. Try-in the scleral wax pattern

Wax was added or trimmed from the basic scleral pattern until satisfactory contours of the eyelids were achieved in open and closed positions. The wax pattern was tried in patient's defect socket to meet the esthetic goals like size, comfort, support, fullness, and retention of the prosthesis on performing various functional movements. (Fig. 3b)

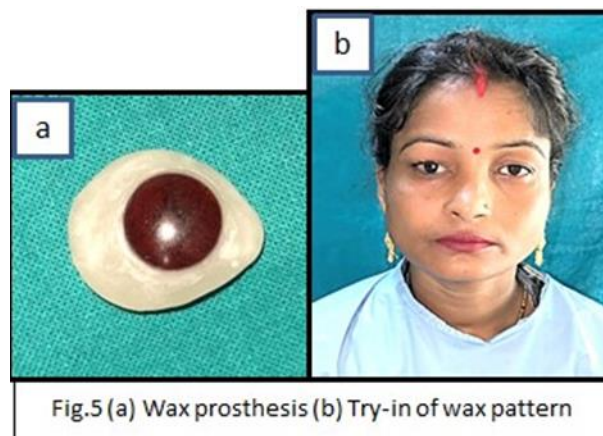
### 5. Iris Positioning Using a Grid Attached to a Spring Bow

A special assembly which consisted of a self cure acrylic resin (DPI, Mumbai) frame with a graph grid, attached to a Hanau spring bow was used to position the iris accurately. The frame was designed by transferring graph grid markings on a transparent sheet and a scribed scale on the spring bow so that this assembly can help in accurate positioning of the frame on the spring bow. This framework assembly was retained to the spring bow using ball point pen caps. (Fig. 4)



The patient was made to sit in upright position and an outline of the iris of the left eye was traced on the graph grid. The markings were transferred to the scleral wax conformer by flipping the graph grid on the right side of the patient, ensuring that the markings on the spring bow are equi-distance and symmetrical from iris of the contralateral eye. (Ankita Chamaria et al.) (Fig. 4b)

Stock eye was trimmed off to a sufficient depth to get the iris button. The positioning of iris button was done by scooping out some wax from the pre determined location (corresponding to the marking site) on the scleral wax pattern. (Fig. 5a) The wax conformer with the stock iris was tried in. After the final adjustments and ascertaining the patient's satisfaction, the wax conformer was processed in the conventional manner. (Fig. 5b)



### 6. Investing, Dewaxing, Packing

The finished pattern was invested in a small two piece brass flask. The flask was then placed in a dewaxing bath for 20 min. iris disc was shade matched with the adjacent eye and the color of the sclera was selected by making custom tab of matching acrylic shade.

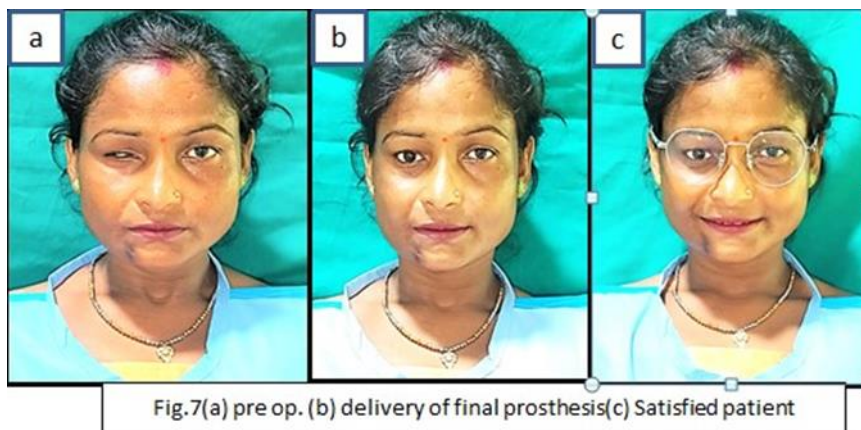
Rayon thread fibrils were used to simulate the vasculature, by monomer polymer syrup method. The selected shade of the sclera was matched with the heat cure resin which was then packed in the two piece flask for curing cycle of two hours and thirty minutes. (Fig. 6)

### 7. Delivery of ocular prosthesis

The finished and polished prosthesis was delivered to the patient and the matching of the colour of iris with respect to the contralateral eye was excellent and the patient was satisfied with the outcome. (Fig. 7)

The patient was instructed on the aspects of insertion and easy removal of the prosthesis. She was advised to limit the removal of the prosthesis to once in a day for cleaning. The cleaning can be done by hand

washing with soap and water. Recall visit was advised for polishing to prevent deposition of proteins and bacteria.



#### **Patient Follow up**

The patient was asked to return on day 1<sup>st</sup>, 2<sup>nd</sup> and a week later for follow-ups after the prosthetic insertion. Six month follow-up was done for prosthesis evaluation and adjustment.

### **III. Discussion**

Symmetry is an important criterion for governing the aesthetic appeal of a prosthesis, ocular prosthesis is not an exception to it. Accurate orientation of iris disk assembly largely contributes to the success of ocular and orbital prosthesis.

Different methods are already discussed in the literatures for iris replication including visual assesment, use of pupilometer, or calipers etc. The method discussed in this article involves the use of facebow to orient the maxilla, ensuring the arms of facebow parallel to horizontal plane and interpupillary line. This technique involves the use of customized scale for securing graph grid which helps in accurate orientation of iris position deriving the advantages of various methods advocated previously i.e. using customized scale [8] and graph grid [9], hence ensuring bilateral symmetrical iris positioning.

Other advantages of this technique are it is less time consuming, requires minimal skill, no need for assistance, uses established reference plane, allows repeated checking of iris position, and is easy to use in clinical setup.

### **IV. Conclusion**

Custom ocular prosthesis, is non-invasive, and has been a boon to the patient who cannot afford the expensive treatment modality. The procedure used here is cheaper, affordable and can be carried out in a small clinical set-up. This method has provided good results from patient esthetics, acceptance, and satisfaction points of view. Spectacles were used to conceal the background effect and enhance psychological comfort of the patient.

#### **Declaration of patient consent-**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### **Conflicts of interest- No conflicts of interest**

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