

Case Report

Simplified Custom Made Ocular Prosthesis Using Graph Grid- A Case Report

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ABSTRACT:

The eye is a vital organ and an important component of facial expression. Patients requiring treatment with custom ocular prosthesis are those who have lost ocular structures through orbital evisceration or orbital enucleation which was necessary as a surgical intervention for a congenital defect, pathology or an accident. Loss of an eye has a crippling effect on the psychology of the patient. The primary purpose of an ocular prosthesis is to maintain the volume of eye socket and create the illusion of a healthy eye and surrounding tissue. The method described here uses a transparent grid template from which the iris is traced. This gives an accurate registration of the position and alignment of iris disc assembly, giving a natural look alignment of iris disc assembly, giving a natural look.

Key words: Ocular Prosthesis, Custom ocular prosthesis, graph grid.

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INTRODUCTION:

Eye is a vital organ not only in terms of vision but also being an important component of the facial expression. Removal of this organ may be indicated in cases of a congenital abnormality; severe trauma; or disease such as an infection, a tumor or malignancy either by 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) or exenteration (where the entire contents of the orbit including the eyelids and the surrounding tissues are removed).^{1,2}

An ocular prosthesis can be either stock or custom-made. Stock prosthesis comes in standard sizes, shapes, and colors. They can be used for interim or postoperative purposes. Custom eyes have several advantages including better mobility, even distribution of pressure due to equal movement thereby reducing the incidence of ulceration, improved fit, comfort, and adaptation, improved facial contours, and enhanced gained from the control over the

size of the iris, pupil and color of the iris, sclera. This case report describes a simplified method for the construction of ocular prosthesis.³

CASE REPORT

73 years old male patient reported to the clinic of Department of Prosthodontics and Crown and Bridge with a chief complaint of a right missing eye since 40 years. As per the patient lost the eye in an incident of accident. The patient was evaluated for the relationship of palpebral fissure in an open and closed condition, the muscle control of the palpebrae, and the internal anatomy of the socket in resting and in full excursion. There was adequate depth between the fornices, which could be utilized for better retention of the prosthesis. The patient was given an option of an implant-retained ocular prosthesis but the patient was not ready to take up the surgery due to economic reasons. So, it was decided to replace the missing eye with a custom-made ocular prosthesis. Entire procedure was explained to the patient and his consent was obtained.

PROCEDURE

Impression and Wax pattern fabrication: Sykes (1996) used medium viscosity polyvinyl siloxane impression material. A modification of the technique described by

Taicher et al (1985) was performed by Sykes.^{4,5} We used the same basic technique to make primary impression in this case. Make a primary cast and custom tray on it with self cure clear acrylic.



Fig 1 - Primary impression and custom tray fabrication

Final Impression was made by injecting the material first into the depth below the upper eye lid and then into the lower. This was done so as to record the proper extensions of the defect. After that the whole eye socket was filled with material and the patient was asked to close her eye so that the excess material could flow out. After the impression material was set, the impression was removed and invested in dental gypsum in order to obtain a positive cast of the eye socket. Subsequently the gypsum cast was coated with a separating medium and paraffin wax was then shaped in an empirical approximation of the anterior curves of the investment form.



Fig 3- Mould with base

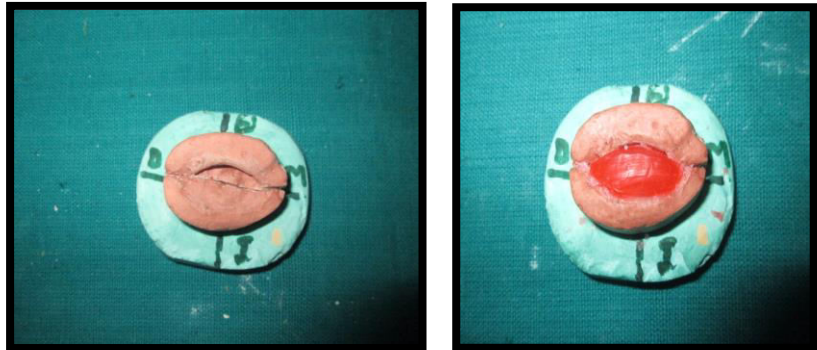


Fig 4 - Wax pattern trial

Trying the scleral wax pattern: Wax was added or trimmed from the basic sclera pattern until satisfactory contours of the eyelids were achieved in open and closed positions. The fullness of the both palpabre and the eye socket was checked along with the extensions, this were confirmed by asking the patient to close his eyes and patient was inspected from the profile view.



Fig 4 - Wax pattern trial

Dewaxing: After the trial of wax pattern the secondary impression cast was trimmed about the size of the flask. On to this the wax pattern was sealed and the whole assembly invested as in the case of a complete denture laboratory procedures. Sclera trial has been done and iris selection and location done. Iris attached to the sclera and cover with wax strip and then go for final dewaxing and curing with clear heat cure acrylic material.

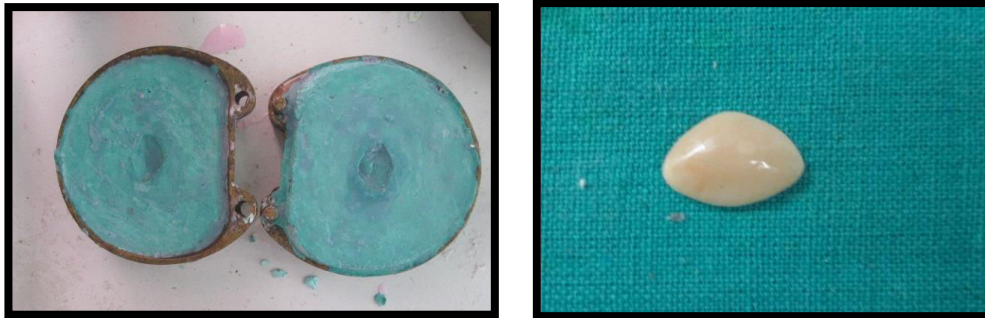


Fig 5- Dewaxing and sclera

Technique of Iris Disc Placement

- 1 Transparent graph grid was used to attach iris disc.
 - 2 Certain guidelines were marked on patients face.
 - 3 The facial markings were transferred to grid by placing it on patients' face
- The details of the technique are as follows;



Fig 6 - Sclera try in and iris position decide with grid

Transparent graph grid

Markings were made on grid template on X-axis from A to H starting from midline and on left side from A' to H'. Similarly from 1 to 7 on Y-axis and 1' to 7' on left side. The distance between each marking was 1cm on both X and Y axes.

Guidelines on patients face

A vertical midline was marked passing through the forehead crease, glabella, tip of the nose and chin. The distance from the right eye medial canthus to the midline and left eye medial canthus to the midline was measured. This distance standardized the midline marking and was used to reposition the grid template each time during the try-in visit.

Evaluation with grid placed

The patient was asked to gaze straight at an object kept 3 feet away. The operator then marked the vertical lines coinciding with the medial and distal extremities of the iris of the natural eye. Similarly the horizontal lines referring to the centre, inferior and superior limits of the iris were marked. The facial markings were transferred to the grid template by placing it on the patients face. These markings were transported to the side of the defect. These markings were transferred to the sculptured wax pattern and the iris button attached to it.

Packing And Flasking: This step is the most important, as it involves the characterisation of the prosthesis before packing with tooth coloured heat cured polymethyl methacrylate of appropriate shade, matching with the colour of the sclera of normal eye of the patient. A thin layer of heat cured clear acrylic was spread evenly in and around the iris. The characterisation is done so as to achieve the vitality necessary to give it a life like appearance and blend with the patient's natural appearance and cosmetics.^{6,7}

After the characterisation, the mold was packed with heat cured tooth coloured acrylic resin of appropriate shade and kept for bench curing to enable complete polymerisation and prevention of any excess unreacted monomer. The eye socket is extremely sensitive and the residual conjunctiva and related structures react to any surface roughness and irregularities. Final finishing and polishing of the prosthesis finished prosthesis requires a highly polished surface which would have a glass like finish to provide maximum adaptation and overall success of the prosthesis.⁸

The final outcome of the prosthesis was ascertained from the satisfied look on the face of the patient and from the follow up a week later. The patient was given instruction for wearing the prosthesis and it's home care protocol which is given below:

1. Prosthesis should be handled with care and with clean hands.
2. Removal of Acrylic prosthesis during night is ideal. It should be soaked in an antibacterial solution to kill the surface bacteria.
3. Routine polishing of prosthesis should be done every year to prevent deposition of protein and bacteria.



Fig 7- Final prosthesis

DISCUSSION:

The rehabilitation of the orbital defect is a complex task. A well-made and properly planned ocular prosthesis maintains its orientation when patient performs various movements. With the development of newer materials the socket can be finely recorded on which custom made ocular acrylic prosthesis (Sykes, 1996) can be fabricated with

exact fit and esthetics although the prosthetic rehabilitation may be enhanced with the use of implants, can coordinate the movements with natural eye, as they are not always possible or feasible. More, over the use of stock ocular prosthesis of appropriate size and colour cannot be neglected, a custom made ocular prosthesis provide better results functionally as well as aesthetically (Doshi & Aruna, 2005)

CONCLUSION:

The use of custom-made ocular prosthesis has been a boon to the patients who cannot afford for the implant replacements. Also, as discussed above, the esthetic and functional outcome of the prosthesis was far better than the stock ocular prosthesis (Cain, 1982). Although the patient cannot see with this prosthesis, it has definitely restored her self-esteem and allowed her to confidently face the world.

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