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An Alternative Method for Fabrication of Tailor Made Eye Prosthesis - A Case Report

Dr Neelanjali Matapathi, Assistant Professor

Sri Siddhartha Dental College, Sri Siddhartha Academy of Higher Education, Tumkur, Karnataka, India.

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KEYWORDS

Artificial eye, Ocular prosthesis, Enucleation, Quality of life.

ABSTRACT:

Ocular prosthesis can be stock or custom made. Stock prosthesis is generally placed immediately after the ocular surgery during the healing period. Once the eye socket is completely healed the custom prosthesis can be made for the better fit and adaptation of the prosthesis to the patient eye. The eye prosthesis though non functional provides aesthetic to the face, self confidence to socialize, hence overall a enhanced quality of life.

Various techniques and methods are used to fabricate a custom prosthesis. This technique is an attempt to utilize fewer appointments for the fabrication and to increase patient comfort and aesthetics. The case report explains the steps involved in the fabrication of completely customized ocular prosthesis with minimum appointments.

1. Introduction

As William Shakespeare quoted 'The eyes are the windows to the soul' they add beauty to the face and express emotions. The removal of eye due to trauma or congenital defects will lead to impaired vision or function of the eye with affected aesthetics causing low self esteem and social acceptance[1]. The rehabilitation of the eye defect can be done by stock or custom ocular prosthesis.

According to a three and half years study conducted in the year 1998, it was found that the prevalence of population undergoing enucleation was 33 per 10,000 [2]. The post surgery an immediate stock ocular prosthesis usually will be provided. Custom-made prosthesis, in comparison to stock prosthesis, gives better fit to the eye socket, better cosmetic results, and less discomfort to the patient in the long term [3,4]. Custom-made ocular prostheses have the disadvantage of a long laboratory fabrication time and more number of clinical appointments[4]. This case report describes a technique to provide a better fit custom prosthesis in short duration with minimal clinical appointments.

2. Case History

A 42 year old female reported to the Department of Prosthodontics, with chief complaint of ill- fitting eye prosthesis along with pooling of fluids in the socket (Fig 2). It was revealed that the patient had glaucoma when she was 2 years old which lead to the enucleation of her left eye. Previously the patient had worn two different eye prosthesis over the years both of which were ill fitting and unsatisfactory to the patient.

On external examination Left ocular defect showed drooping of the eye. Inadequate closer of eyelids when contralateral eye was closed (Fig 1). Completely healed socket bed, Shallow lower lid was observed on local examination. Customized removable heat cured acrylic ocular prosthesis was planned for the patient.

Figure1: Left ocular defect showed drooping of the eye.

Figure2: Ill fitting previous stock prosthesis.

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Impression of the eye socket was made using direct technique by injecting Poly Vinyl Silloxane material in light body consistency and patient was asked to perform all the functional movements (Fig 3 & 4). The impression was reinforced using plastic syringe, further it was poured in three sections using dental stone (Fig 5 & 6). The try-in wax block was made by flowing the molten wax into the mold created by the impression.

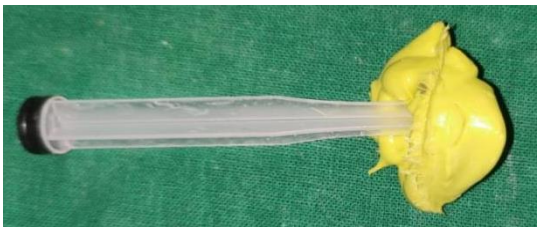

Figure 3 & 4: Impression of the eye socket reinforced with the syringe plunger

Figure 5 & 6: Impression poured in three segments

Appointment 1: Wax block was tried in the patient's eye, contours and extensions were corrected by asking the patient to do all the functional movements, anterior convexity was corrected by comparing it with the right eye by standing behind the patient and looking downwards (Fig 8). Positioning of the pupil was carried out once the patient is comfortable with the wax block. An adhesive tape is placed on the forehead, above the eyebrows(Fig 9). Facial mid-line was marked, then by asking the patient to look forward to the level of her eye the contra lateral pupil was positioned and the centre of it was marked on the tape. Now the distance from the mid-line to the pupil line was measured on right side and transferred to the left eye, the centre of the pupil was marked and a thin plastic straw was placed, further the eye movements were checked (Fig 10&11). Similarly by asking the patient to fix her straight gaze, a metal scale was held against and the iris diameter was measured to be 10mm. Pictures of the contralateral eye was taken to record the colour of the iris and reference for any characterization needed.

Figure 8 : Wax block try in

Figure 9: pupil positioning and eye movements were evaluated

Figure 10 & 11: Iris diameter was measured and marked on the wax block.

Wax block was flasked and mold was created by dewaxing, Tooth colored heat cured acrylic of shade B2 was packed and prosthetic eye block was acrylized and the molds were preserved (Fig 12 & 13). On the acrylic eye block the center of pupil is marked and using a straight bur around 2-3 mm depth groove is made. Then around 1.5-2mm facial surface was trimmed and the iris diameter was drawn and was painted to match the contra-lateral colour of the eye (Fig 14).

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Figure 12 : Was block was flasked and dewaxed to create the mold

Figure 13: Tooth colored heat cured acrylic of shade B2 was packed and prosthetic eye block was acrylized.

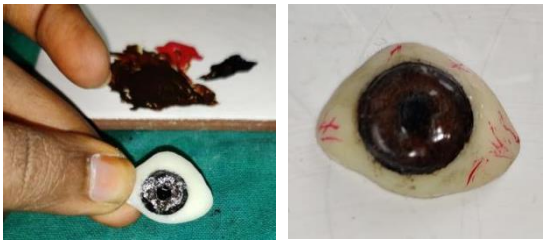

Figure 14 & 15: Iris was painted and characterization was done using acrylic paints.

Characterization such as veins on sclera was painted (Fig15). The painting was fixed by monopoly liquid and left it to dry for 24hours. Further the Heat cured clear acrylic was packed using same mold and acrylized. The prosthesis was finished and polished(Fig16&17).

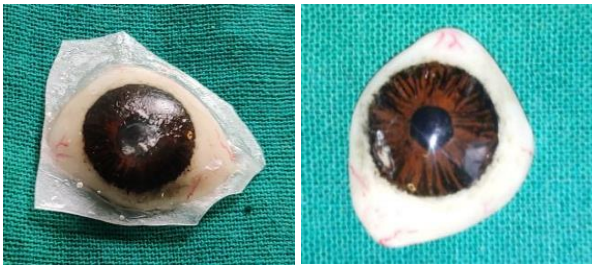

Figure 16 & 17: Clear acrylic was layered and finished and polished

Appointment 2: The eye prosthesis was inserted and movements were checked(Fig18). Post insertion instructions and prosthesis care techniques were explained to the patient and follow up was done.

Figure 18: Insertion was done and movements were evaluated

3. Discussion

Fabrication of ocular prosthesis particularly customized prosthesis consume significant amount of time, however it adapts better to the tissues and render comfort to the patient [5].

There are existing techniques and procedures to reduce the number of appointments and time, one such article authored by Sulaiman et al 2023[6] discussed the three visit technique where the first visit includes examination and diagnosis, treatment planning, impression, wax pattern try-in, and iris marking. All the steps described above were done by the author at the chair side. The second visit where an ocular wax pattern with the iris was tried in the patient eye socket and the third visit was when the eye prosthesis was inserted [6].

Similarly Another technique employed by the author Abdul Muttlib et al 2024 where the fabrication is done in three appointments but longer chair-side clinical and lab procedure. The author discusses the making of impression, wax pattern, iris positioning, and color matching on the first day, iris button try in on the second visit and prosthesis delivery on the third[7].

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Jogeswar Barman et al has explained in his article regarding the semi-custom eye prosthesis where the iris button is obtained from the stock eye prosthesis and the remaining structures are fabricated according to the patient measurements. According to the author, limitation of this method was to match the patient's iris and pupilary part with prefabricated eye [8]. Another semi-custom technique described by the author Sultana et al where a stock iris and customized sclera was utilized to fabricate an ocular prosthesis [9].

Limitations in the present technique can arise when the clinician fail to capture the colour of iris with detail or fail to preserve the mold space created during the first acrylization.

4. Conclusion

This article successfully adds to the pool of techniques for fabricating eye prosthesis in a simplified manner with less number of appointments with precision. As a result the patient is provided with better fit and adapted prosthesis, to boost his aesthetics and confidence, to indulge in social activities. Overall it enhances his quality of life.

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