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Adhesive Retained Ocular Prosthesis - "Correcting Defects Providing Quality Life": Clinical Case Series

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ABSTRACT

Ocular defects are usually due to maxillofacial trauma. This causes an alteration of facial appearance and aesthetics. Apart from psychological trauma to the patient, it interferes with the normal life. Hence correcting such defects with prostheses can get back the individual to normal social life.
A prosthetic eye is an answer for these defects. It can help in improving the appearance of the defective eye socket. Even though it cannot restore vision, it gives normal appearance for the patient and mental support to a great extent. Adjusting to the ocular prosthesis can be really challenging both mentally as well as physically. This article describes the fabrication of custom-made ocular prostheses retained by adhesives in a series of cases where patients have lost their eyes due to trauma.

Key words: Eye prosthesis, Ocular Prosthesis, Custom eye prosthesis, Adhesive retention

INTRODUCTION

Eye is a vital organ which adds to an aesthetic facial appearance. Congenital defects, trauma, malignancies, infections can be the reasons for the loss of eye. Facial disfigurement due to loss of eyes, affects individual's personality, causes mental trauma and affects social life. Hence in any case of loss of the eye, replacing it with ocular prosthesis is utmost important to improve facial appearance. Even though it does not help in restoring the vision, it reduces the mental trauma an individual pass through. Different materials and approaches have been used for the fabrication of ocular prosthesis. Treatment for such cases include stock eye prosthesis or customized eye prosthesis. As an economic and more precise fit alternative, custom made prosthesis is always a good option for the patient.

Today majority of the patients around the world wear resin ocular prosthesis due to its acceptability by the tissue and patient's comfort. Always a multidisciplinary approach by an ophthalmologist, surgeon and a prosthodontist play a key role for the final outcome to be successful.[1,2] The goal of a maxillofacial prosthodontist should always be replacing the lost part, trying to replicate the finer details by his knowledge and skill. The basic requirement of custom-made ocular prosthesis is its close adaptation to the tissue bed. Accurate impression of these tissues is very important for close adaptation and thereby, contributing for better movement by the patient.

The fabrication of custom-made resin eye gives a more accurate and aesthetic result because the impression captures the defect contours, and the sclera and iris are custom made and painted according to the other eye colour and finer details.

CASE PRESENTATION 1

A 32-year-old female patient reported to the clinic with a complaint of missing right eye. Routine case history was

recorded. Patient gave a history of road traffic accident as a result of which she lost her eye. A detailed examination was done, which revealed the enucleation of right eye. The right eye socket was lined by conjunctival lining and it was devoid of any infection. (Figure 1)

Figure 1- Pre Operative View Of Case 1

CASE PRESENTATION 2

A 20-year-old male patient reported with a complaint of missing right eye due to a road traffic accident. His enucleated eye was examined and found to be normal. Sulcus depth was sufficient enough to receive and retain an eye prosthesis. (Figure 2)

Figure 2- Pre Operative View Of Case 2

CASE PRESENTATION 3

A 45-year-old male patient reported to our clinic with the chief complaint of missing left eye. A detailed examination of the eye socket was carried out. The intraocular tissue bed was found to be normal and healthy with adequate depth under the upper and lower fornices to receive a retentive eye prosthesis. (Figure 3)

Figure 3- Pre Operative View Of Case 3

Treatment plan in the above-mentioned cases was fabrication of custom-made ocular prosthesis using acrylic resin. It included the following steps-

1. Impression making using alginate
2. Fabrication of mould
3. Pouring of wax in the mould
4. Wax pattern trial
5. Flasking and packing
6. Trial of acrylic custom-made prosthesis
7. Painting of iris and pupil
8. Inserting nylon fibres
9. Flasking with clear acrylic resin
10. Finishing and polishing.

FABRICATION OF CUSTOM-MADE ACRYLIC OCULAR PROSTHESIS-

Impression making using alginate **(Figure 4)**

As custom-made ocular prosthesis was planned to meet the need of the patient, petroleum jelly was applied to the skin around to prevent impression material from sticking to eyelashes. A pre designed acrylic conformer with a tube attached at one end was used to make impression. The conformer was seated into the eye socket and alginate impression material was loaded into a syringe and injected into the defective eye socket, through the tube. Impression was made by injecting the material first into the depth below the upper eye lid and then into the lower. This was done to record the proper extensions of the defect. After injecting the material, the patient was asked to close the eye so that the excess material could flow out. Patient was then asked to move the eye to the left, then up and down

and finally in a circular motion, so that functional impression of the defect was obtained. After the impression material got completely set, it was retrieved from the socket.

Figure 4- Impression Using Pre Designed Acrylic Conformer

Fabrication of mould and pouring of wax in the mould (Figure 5)

A negative replica of the defective eye was obtained which was then covered with putty addition silicone impression material. A zigzag cut was given along the putty material to remove the alginate impression, to obtain a mould (Figure 6). Molten wax was poured into the putty mould.

Figure 5 - Putty Mould

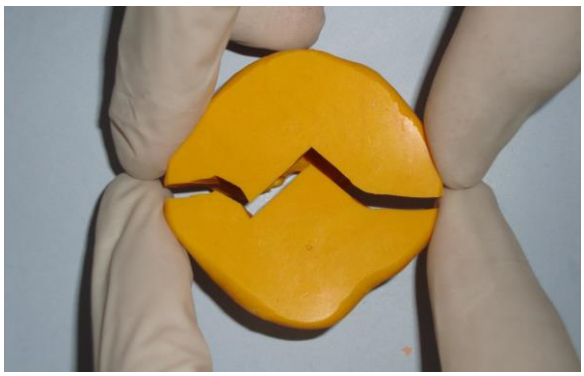

Figure 6- Zig Zag Cut Given

Wax pattern trial and flasking and packing

The wax was properly carved and contoured in order to give it a simulation of the lost eye. The wax pattern was tried in patient's eye socket and checked for size, comfort, fullness, and retention by performing all the functional movements. The contralateral eye was inspected to mark and carve the position of iris and pupil. Black acrylic button was shaped into the size of iris and placed on the wax pattern and a small acrylic stick was made and fixed to note the position of pupil. (Figure 7)

Figure 7- Wax Pattern

After the wax pattern trial, flasking was done. Dewaxing of the wax pattern was carried out and the mould was packed with heat cured tooth coloured acrylic resin of appropriate shade and kept for bench curing to enable the complete polymerization and prevention of any excess unreacted monomer. This helps in minimizing the incorporation of porosities and thus giving a good finish to the prosthesis. Curing and polishing of scleral shell was carried out. Long curing cycle of 4-6 hours was done, so as to prevent the presence of any residual monomer in the prosthesis which may cause irritation and sensitivity to the patient.

Trial of the acrylized ocular prosthesis

The cured scleral prosthesis was trimmed and sand papered for the second try in. Noting the colour of the contralateral eye, the iris and the pupil were painted on the acrylic eye.

Flasking with clear acrylic resin, finishing and polishing

A layer of acrylic was removed from the scleral shell, in order to give the life-like appearance of natural eye using clear acrylic resin. Nylon fibres were glued on the scleral shell to imitate the normal contralateral eye. A layer of clear acrylic resin is placed on the mould in the flask after scrapping off the plaster from the mould and flask is closed and kept for curing. The finished prosthesis was procured from the flask and polished, which gave a glassy finish providing maximum adaptation and overall success of the prosthesis. (Figure 8)

The patient was given instructions for wearing the prosthesis and as well as the home care protocol. The final prostheses showing the aesthetic result can be appreciated in the following Picture (Figure 9). The patient was asked to visit the clinic for follow-up.

Figure 8- Final Prosthesis

Figure 9- Post Operative View

DISCUSSION

Loss of eye can be due to various causes like trauma, tumours and congenital anomalies.[3] Loss of eye not only causes functional and aesthetic loss but also has a great psychological impact on the patient. Rehabilitation of the lost maxillofacial part is a difficult task. This task can have a successful outcome only with a multidisciplinary approach.

The defect can be due to an enucleated eye or exenterated eye. Enucleation is the removal of entire globe, including the cornea, sclera and a portion of optic nerve. In such cases, stock or custom-made prosthetic eye can accomplish relief to the patient. Whereas, exenteration is a radical procedure, removing the globe as well as the complete or partial removal of the soft tissues of the orbit. In exenteration cases, as anatomical retention cannot be obtained like enucleation cases, other retentive aids have to be used like magnets, spectacles etc.[1] Usage of spectacles also helps in a masking effect to the defective eye with the prosthesis.

In earlier centuries, precious stones, gold, copper etc was used for the replacement of the lost eye. In the mid-19th century, methyl methacrylate resin was used by the army officials of United States for the fabrication of ocular prosthesis. The great advantage of the usage of resin is its easy fabrication and adjustability, light weight and its ability to take intrinsic and extrinsic colours.

Stock ocular prosthesis is designed in standard colours, sizes and shapes. They can be considered for interim or postoperative situations.[4,5] Stock ocular trays or prefabricated trays may not accurately adapt into the anophthalmic socket which may be irregular.[6] Stock ocular prosthesis have other disadvantages like compromised

aesthetics and limited mobility of the prosthesis. Whereas, custom made ocular prosthesis are simple and cost effective. Other advantages of custom-made ocular prosthesis include improved adaptation to the underlying tissue bed, enhanced movement of the prosthesis and a maxillo-facial prosthodontist-controlled size and shade of the iris and pupil that matches the contralateral eye.[7] This customization of the prosthesis requires extra skill and more time of the prosthodontist in order to give a life like prosthesis. In custom eye prosthesis, there is an even distribution of pressure due to equal movement thus reducing the incidence of ulceration. Apart from these, other advantages of custom acrylic ocular prosthesis that can be mentioned are: it retains the shape of the socket, prevents the collapse of the eyelids, helps in providing the proper muscular activity of the eyelids, maintains the opening of the palpebra, and has a very close look to the natural eye. Ocular prosthesis has some disadvantages or differences from the other healthy eye. They are-

1. It may not move as much as the normal eye
2. The pupil does not constrict as the normal eye in response to light.
3. It cannot restore vision.

Making an accurate impression of the eye socket is directly related to the retentive function of the ocular prosthesis because, the custom-made ocular prosthesis takes anatomic retention from the socket. Another main step during the fabrication of the prosthesis is the characterisation of iris, as it has to be in close match with the contralateral eye to give the ocular prosthesis an aesthetic, pleasing and natural look. In the cases mentioned above in this article, custom made ocular prosthesis gave a functionally and aesthetically acceptable treatment outcome, retaining the shape of the lid, preventing the collapse of eye lids and giving a close natural look to the contralateral eye.

Even though Implants stand presently as a good retentive aid, implant supported ocular prosthesis are not opted because of the cost and surgical procedure involved in it. Hence custom-made ocular prosthesis present as a good option in many clinical cases where retention can be taken from the eye socket itself.

CONCLUSION

Eye prosthesis helps in restoring the facial symmetry and orbital volume. Even though it cannot compensate for the vision, it helps in bringing confidence and psychological support for the individual. Implant supported ocular prosthesis are difficult to afford. Hence custom-made ocular prosthesis is of great help when economic factor is taken into consideration. Custom made ocular prosthesis is a lot more aesthetic and functional compared to stock ocular prosthesis. Accurately planned treatment will help in delivering aesthetic and functional restoration of the missing structures, thus giving a satisfactory treatment outcome.

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