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CASE STUDY

CUSTOMIZED OCULAR PROSTHESIS FABRICATION USING GRAPHIC GRID: A CASE REPORT

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ABSTRACT

The loss of the facial structures for an individual can have a physical, social and psychological impact. Maxillofacial prostheses that restore and replace stomatognathic and associated facial structures with artificial substitutes aim to improve the patient aesthetics, restore and maintain health of the remaining structures and consequently provide physical and mental well being. Amongst all the maxillofacial defects, eye defects require keen attention. As it is rightly said that" Eyes speak louder than words." Therefore prosthetic rehabilitation of such cases should be done. Treatment includes implants and acrylic eye prosthesis. Due to economic factors implant may not be advisable in all patients. A custom-made ocular prosthesis is a good alternative.

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INTRODUCTION

The disfigurement associated with the loss of an eye can cause significant physical and emotional problems (Lubkin and Solan, 1990). The rehabilitation of a patient who has suffered the psychological trauma of an ocular loss requires a prosthesis that will provide the optimum cosmetic and functional result.
The surgical procedures in the removal of an eye are classified into three categories, namely evisceration, enucleation and excenteration.

Evisceration: It involves the removal of the contents of the globe leaving in place the sclera and sometimes the cornea. The prosthesis best suited for the evisceration defect is the custom cover shell or the scleral cover shell prosthesis.

Enucleation: It is the removal of the entire globe after the extra ocular muscles and the optic nerve have been transected. The prosthesis best suited for the defect is conventional or implant supported ocular prosthesis. Most surgeons will place an implant in tennons capsule to fill the orbital defect and support the muscles and eyelids. Use of an implant permitting attachment of the extra ocular muscles often enhances the mobility of the prosthesis.

Excenteration: It is the removal of the entire contents of the orbit (entire eye and surrounding structures). This procedure is usually performed due to some form of malignant disease. Ocular prosthesis is a prosthesis that replaces the lost eye which may be missing due to trauma, tumors or may be congenitally missing.

Case report

A nine year old girl was referred from dept. of ophthalmology, Rural Medical College to dept. of Prosthodontics, Rural Dental College, Loni with a complaint of missing left eye (Fig.1). Case history revealed that she got her left eye enucleated when she was 4 years old due to Retinoblastoma tumour. On examination, mucosa was healthy with sufficient undercut for the prosthesis (Fig. 2). However the muscle contraction in the upper lid was excessive due to increased time span between

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Enucleation and rehabilitation of the eye defect. Rehabilitation of the eye defect can be done by either stock ocular prosthesis or custom made ocular prosthesis. In this case fabrication of the customized ocular prosthesis was planned.

Fig.1 Missing left eye

Fig. 2. Intraocular examination showing healthy tissue bed

Procedure: Fabrication of customized ocular prosthesis

Procedure was explained to patient and her parents and written consent was obtained from parents. The patient was seated comfortably on a dental chair reclined at 30 degrees. The patient's eye socket was coated with a thin layer of vaseline and an impression was made using a fluid viscosity irreversible hydrocolloid impression material (Alginate) loaded in a 5cc syringe (Shenoy and Nag, 2007). (Fig. 3) Patient was asked to look straight with the normal eye. Eyelids of the defective eye were held apart and the loaded syringe material was then slowly injected into the defect eye. The head was moved back to the vertical position and the patient was directed to move her eyes up and down without closing. This will facilitate the flow of the impression material to all aspects of the socket. Care was taken so that no air was incorporated in the impression material during impression procedure and before the material sets, a twisted orthodontic wire was placed inside the impression in the centre to act as a handle for easy removal.

Fig. 3. Impression made with irreversible hydroclloid

Fig. 4. Examination of impression for any defect

Fig. 5. Cast poured with split cast technique

After the material sets, impression was retrieved from the socket in a jerk to prevent its tearing. It is examined for completeness, any voids or defects (Fig. 4). The impression must record all the details of the socket. Boxing of the impression was done in such a way that a clearance of minimum one centimetre was there all around the impression. The cast was poured in two layers. First layer in Type-III gypsum product (Dental Stone). After the material sets, four grooves were made over the set first layer and separating media (Vaseline) was applied over it. Then the second layer is

again poured in Type-III gypsum product (Dental Stone). A split cast (Fig. 5) was prepared so that there are no undercuts and the wax pattern can be easily retrieved. A paraffin wax was melted and poured in the cast. Care was taken to confine the wax pattern within the borders of the cast. After hardening wax pattern of the defect eye was retrieved. Proper finishing and polishing of the wax pattern was done and tried in the patient's ocular defect for proper orientation. Any short comings in wax pattern contour were modified so as to have good retention during eye movements. Various techniques like paper iris disc technique (Thomas), black iris disc technique (Thomas), photographic iris disc technique (Jain *et al*., 2010) have been used in the past for the fabrication of iris disc In this case the iris disc was selected from a ready-made ocular prosthesis after matching it in size and colour with patient's natural iris and was trimmed and recovered. The iris disc was incorporated into the wax pattern and was finalized for shape and size. The proper position of the iris disc is very important (Satyabodh *et al*., 2008). Various techniques like ocular locator (Mc Arthur, 1997), facial measurements (Mc Arthur, 1997) and pupillometer[6] have been used in the past for iris placement.

Fig. 6. Transfer of marking on defect side with graphic grid

Fig. 8. Relining of wax pattern

In this case graphic grid was used for the proper orientation of the iris. Graphic grid was custom made using OHP sheet on which graph paper was xeroxed. This graphic grid was relieved in triangular form in the nose area. The patient was asked to gaze straight at an object kept 4 feet away.

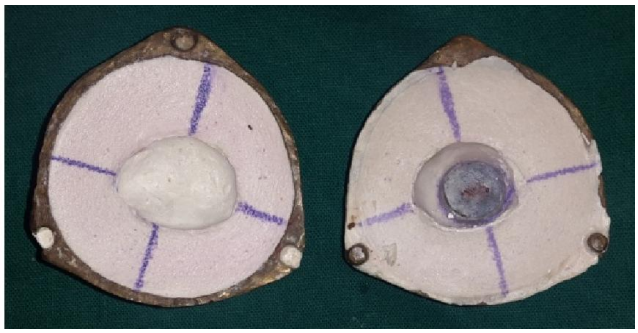

Fig. 9. Flasking of wax pattern

Fig.10. Placement of ocular prosthesis

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 transferred to the side of the defect (Fig.6) and on the sculptured wax pattern (Sinha, 2009). The iris disc was attached to the wax pattern (Fig.7). Now for a proper fit, the wax pattern was relined (Beumer, 1996) using light bodied elastomeric impression material (Fig.8). Flasking was done by investing the relined wax pattern in a denture curing flask. A two part mold was constructed by the prototype ocular prosthesis by using gypsum (Fig.9). Dewaxing was done for 20minutes. The colour of the sclera was selected using tooth colour acrylic shade guide (Mc Arthur, 1977). A thin layer of clear acrylic was adapted on the outer surface of the dewaxed mold. Rayon thread fibrils were dispersed to simulate vasculature (Thomas). The selected shade of the sclera was matched with the heat cure resin (DPI) which was then packed in the two piece flask. The flask was kept for curing. After curing, the

prosthesis was obtained from the mold. Finishing and polishing was done. The prosthesis was disinfected in a solution of 0.5 % chlorhexidine for 15 minutes and rinsed in sterile saline solution. The custom ocular prosthesis was then inserted (Fig 10). The patient was instructed and trained on the aspects of insertion and easy removal of the prosthesis. Post insertion instruction regarding care and follow up schedule was explained.

DISCUSSION

Although the effects of enucleation in early childhood on facial symmetry and orbital volume are still debated, advantages of ocular prosthesis in a school going child extends beyond esthetics. It helps in building confidence in the child, makes them more acceptable to their peer group and help in developing their personality. Although the prosthesis cannot restore the vision but it reduces the psychological trauma of being without an eye.

Further, Custom –made ocular prosthesis has the following characteristics (Thomas D Taylo, 2006):

- Retains the shape of the defective socket.
- Prevents collapse or loss of shape of lids.
- Provides proper muscular function of the lids.
- Prevents accumulation of fluids in the cavity.
- Maintains palpebral opening similar to the natural eye.
- Mimics the colouration and proportions of the natural eye.
- Has a gaze similar to the natural eye.
- Better movement of the prosthesis mimicking that of the natural eye

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.

REFERENCES

Beumer, J., Curtis, T.A., Marunick, M.T. 1996. *Maxillofacial rehabilitation, Prosthodontic and surgical considerations*. St. Louis, The CV Mosby Co.

Jain, S. 2010. Prosthetic rehabilitation of ocular defect using digital photography: A case report. JIPS; 10(3): 190-193.

Mc Arthur, D.A. 1977. Aids for positioning prosthetic eyes in orbital prosthesis. *J. Prosthet. Dent.,* 37: 192-3.

Mc Arthur, D.A. 1977. Aids for positioning prosthetic eyes in orbital prosthesis. *J. Prosthet. Dent.,* 37: 192-3.

Roberts, A.C. 1969. An instrument to achieve pupil alignment in eye prosthesis. JPD, 22: 487.

Satyabodh, S.G, Patil, N.P., Porwal, A. et al. 2008. A Simple Method of Positioning the Iris Disk on a Custom-Made Ocular Prosthesis. *J. of Prosthodontics*, Volume 17, Issue 3, Pages223 – 227.

Shenoy, K.K., Nag, P.V. 2007. Ocular Impressions. An overview. *The J. of Indian Prosthodontic Society* 2007; 7: 5-7.

Sinha, N.D. 2009. Fabrication of custom ocular prosthesis using a graph grid. Pravara Med Rev 2009; 4(1): 21-24.

Thomas D Taylor, 2000. *Clinical Maxillofacial Prosthetics*, Quintessence: Chicago, 2000; 265-7

Thomas D. Taylor. Clinical Maxillofacial prosthetics.Pg 233-76.

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