

Prosthetic Management of a patient with an Ocular Defect

Naeem Ahmad, Aruna J Bhandari, U Pai , S.A.Gangadhar

Abstract

Prosthesis is an artificial substitute that is implanted into, or integrated onto a human body part to replace the missing natural organ, for the purpose of restoring a specific function or a group of related functions so that the patient may return to normal life as quickly as possible.

The replaced function doesn't necessarily have to be related to life support, but often is. The agony over the loss of a body part such as an eye, ear, nose or a finger has a crippling effect on the psychology and behavior of a person. Prosthesis is probably the only alternative in such cases to help and rehabilitate such patients. Fabricating an ocular prosthesis in heat-polymerizing acrylic resin material (resin requiring external heat for curing) for an ocular defect is undoubtedly a challenging attempt as we have to replace a vital organ with an artificial prosthesis so as to improve the psychological and social well being of the patient. A case of a patient treated with custom-made ocular prosthesis is presented here.

Key Words: *Ocular prosthesis, Eye Prosthesis*

Introduction

Ocular prosthesis is a prosthesis that replaces the lost eye which may be missing due to trauma, tumors or may be congenitally missing. The fabrication of prosthesis is as much an art as it is a science. Fabricating a prosthesis that appears to have a realistic appearance while achieving seamless visual integration with the surrounding tissue requires both artistic and technical expertise. The ideally constructed prosthesis must duplicate the missing features so precisely that the casual observer notices nothing that would draw attention to the prosthetic reconstruction.

Case-Report

Seventeen year old female patient reported to the department of Prosthodontics, Rural Dental College, Loni wearing ready-made eye prosthesis. Case history recording revealed that she got her right eye enucleated when she was 4 years old due to Retinoblastoma

tumour. On examination, Mucosa was healthy. However the muscle contraction in the upper lid was excessive due to increased time span between enucleation and fabrication of a well fitting prosthesis, therefore new custom-made ocular prosthesis was planned. Impression is the negative likeness or copy in reverse of the surface of an object. The impression of the ocular defect was recorded with a fluid viscosity irreversible hydrocolloid impression material^[1] (Alginate, Zelman: DPI) loaded in a syringe (Figure 1a). Care was taken so that no air was incorporated in the impression material during impression procedure. While inserting the material in the patient's defect, the patient is asked to look straight to the front. Once the material has been introduced, the patient is asked to perform eye movements so that the impression is recorded in a functional form and before the material sets, a twisted paper clip is placed inside the impression in the centre to act as a handle for its easy removal.

After the material sets, impression is retrieved from the socket in a jerk to prevent its tearing. (Figure 1b). It is examined for completeness, any voids or defects. 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 centimeter was there all around the impression.

Address for correspondence:

Dr. Naeem Ahmad, Department of Prosthodontics, Rural Dental College, Pravara Institute of Medical Sciences, Loni, Taluka - Rahata, Ahmednagar, Maharashtra-413 736, India.
E-mail: naeem_bds@yahoo.co.in



Figure 1 (a & b): Making of Primary Impression of Ocular Defect in Alginate

The cast was poured in two layers. First layer in type-IV gypsum product. 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 poured in type-III gypsum product of a different colour for visual demarcation of the two pieces of the split cast. Usually a split cast is prepared so that there are no undercuts and the wax pattern can be easily retrieved.

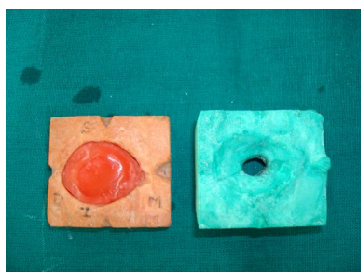


Figure 2: Laboratory procedure; Split Cast

A wax pattern is then fabricated in the cast (Figure 2). The pattern should be confined within the borders of the cast. After proper finishing and polishing, the wax pattern is tried in the patient's ocular defect for proper orientation and any short comings in contour are corrected (Figure 3 a). During eye movements, it should be retained.



Figure 3 (a & b): Scleral Wax Pattern Try-in & Finished Ocular Prosthesis

After the wax pattern is finalized for shape and size, the iris is incorporated into the wax pattern. The iris is selected from a ready-made ocular prosthesis after matching it in size and colour with patient's natural iris. The proper position of the iris is very important^[2]. It is done both in horizontal plane and in vertical plane. For determining the position of the iris in vertical plane, the midline of the patient's face is marked first. The patient is then asked to look straight. Then the distance from the midline to the center of the existing iris is measured. Another line is marked on the side of the defect at the same distance from the midline. This marking is then transferred on the wax pattern keeping the pattern in the patient's socket and making the patient look straight. The contra lateral iris is then placed at that position of the marking. For determining the position of the iris in horizontal plane, patient was asked to look in front with head erect; an imaginary inter-pupillary line was drawn parallel to the floor. It is then checked in the patient to see whether it is correctly placed.

Now for a proper fit, the wax pattern is relined^[3] (second impression) in light bodied elastomeric impression material. Flasking of the relined wax pattern is done. Dewaxing is done so that a mould space is obtained in which the prosthesis can be processed. An acrylic stent is placed on the iris for proper orientation of the iris after flasking and also to act as a guide for easy retrieval.

The shade of sclera is determined according to the patient's natural eye sclera colour^[4]. Packing of the selected acrylic resin material (Trevelon:Dentsply) is done in the mould. First layer is packed in clear acrylic resin (Trevelon:Dentsply) in which the Rayon or silk thread fibrils are incorporated to replicate the blood vessels. Then the selected scleral coloured acrylic resin is packed over the clear acrylic. The pattern and position of blood vessels is determining by the position of the vessels in the existing eye. After packing, curing was done and prosthesis was finished.

Finished Prosthesis (Figure 3b). The contours have been restored and the palpebral opening is similar to the natural eye. The shade of the prosthesis matches with that of the existing eye. The gaze of the patient also matches the natural eye (Figure 4).



Figure 4: Pre & Post-operative photograph

Instructions were given to the patient at the time of insertion of the prosthesis:

- Regarding the use and care of the prosthesis.
- Regarding practice of insertion and removal of the prosthesis before a mirror and then without a mirror.
- Prosthesis should be removed at least once a day and washed properly.
- Prosthesis should be stored in water when not in use to avoid shrinkage.
- If the prosthesis is scratched in any way it should be repolished and only then worn.
- The patient is recalled for follow up after 1 day, 3 days, 1 week, 1 month, 3 months and 6 months.

Discussion

The art of making artificial eyes has been practiced since ancient times. The first ocular prosthesis was made by Romans and Egyptian priests as early as the fifth century BC. Artificial eyes were made of enamel, metal or painted clay and attached to cloth and worn outside the socket. In the 15th century, the first in-socket artificial eye was made using gold with colored enamel^[5]. Recently with the advent of some newer materials like Heat-polymerized acrylic resin, as being used here, it is possible to fabricate prostheses with a life-like appearance. By rehabilitating a patient with an ocular defect by a custom-made ocular prosthesis, we are improving the facial appearance and by relining technique, the fit of the prosthesis is also enhanced. Custom –made ocular prosthesis has the following characteristics^[6]:

1. Retains the shape of the defective socket.
2. Prevents collapse or loss of shape of lids.
3. Provides proper muscular function of the lids.
4. Prevents accumulation of fluids in the cavity.

5. Maintains palpebral opening similar to the natural eye.
6. Mimics the colouration and proportions of the natural eye.
7. Has a gaze similar to the natural eye.
8. Better movement of the prosthesis mimicking that of the natural eye.

Conclusion

Prosthetic rehabilitation is advantageous in that it is relatively quick, reversible, medically uncomplicated and allows the surgical site to be closely monitored. The custom-made ocular prosthesis is esthetic. It is socially acceptable and comfortable for use in patients with an ocular defect, resulting in improvement of psychological well being and personality of the patient^[7] “If there’s a defect on the soul, it cannot be corrected on the face. But if there is a defect on the face & one corrects it, it corrects the soul...”

References

1. Shenoy KK, Nag PV. Ocular Impressions. An overview. *The J. of Indian Prosthodontic Society* 2007; 7: 5-7
2. A Simple Method of Positioning the Iris Disk on a Custom-Made Ocular Prosthesis. Satyabodh S.G, Patil NP, Porwal A etal. *J.of Prosthodontics*, Volume 17, Issue 3, Pages223 – 227, 2008 *American College of Prosthodontists*
3. Beumer J, Curtis TA, Marunick MT, *Maxillofacial rehabilitation, Prosthodontic and surgical considerations*. St. Louis, 1996: The CV Mosby Co.
4. Prosthodontic Rehabilitation of a Patient with Orbital Defect: case report, Dahane TM, Bhandari AJ, *Journal of Indian Prosthodontic Society*, Vol 4, No 4, Page 9-11
5. Cain JR. Custom Ocular Prosthesis. *J Prosthet Dent* 1982; 48: 690-4
6. Thomas D Taylor: *Clinical Maxillofacial Prosthetics*, Quintessence: Chicago, 2000; 265-7
7. Prashanti E, Reddy JM, Vinay Kumar, Mathew X, All about Ocular Prosthesis-A Review. *Indian Dentist Research and Review*. 2008; 63: 53-8