

CASE REPORT

## Ocular Prosthesis: Rehabilitation using old prosthesis

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### ABSTRACT

The loss of the facial structures can have a physical, social and psychological impact on those affected. Maxillofacial prostheses which restore and replace stomatognathic and associated facial structures with artificial substitutes primarily aim to improve the patient aesthetics. In addition it aims to restore and maintain health of the remaining structures and consequently provide a sense of physical and mental well-being to the patient. Anophthalmia can be stigma for the patient and relatives. The ocular prosthesis rehabilitates the patients with anophthalmia in order to promote facial aesthetics, to recover their identity and to insert them in society. Accurate impressions of these tissues facilitate a close adaptation of the custom prosthesis to the tissue bed resulting in better potential for movement by the patient. Treatment of anophthalmia includes implants and acrylic eye prosthesis but because of economic factors implants retained eye prosthesis may not be feasible in all patients. Hence, a custom-made ocular prosthesis is a good alternative. A case of a custom-made ocular prosthesis made using iris of patient's old prosthesis is presented here, which had acceptable fit, retention and esthetics.

### INTRODUCTION

Face is the index of an individual's personality. It not only depicts various emotions, but is also a channel for verbal and non – verbal communication<sup>1</sup>. The eye loss resulting from congenital malformation, tumor treatment, or trauma; may lead to several social, familial and psychiatric problems<sup>2</sup>. The mutilated face can be stigma for the patient and relatives. This may affect the individual's self-esteem due to difficulty in establishing emotional ties, new life style, insecurity and rejection<sup>3-6</sup>. The ocular

prosthesis rehabilitates the patients with anophthalmia in order to promote facial aesthetics, to recover their identity and to insert them in society<sup>7</sup>. The close adaptation of custom made ocular prosthesis to the tissue bed provides maximum comfort and restores full psychological function to the accessory organs of the eye<sup>8</sup>. The primary purpose of an ocular prosthesis is to maintain the volume of eye socket, create an illusion of a perfectly normal healthy eye and surrounding tissue, and facilitates excellent eye movements which not only enhances the appearance but also the self-esteem and confidence of the patient<sup>9,10</sup>.



The art of making artificial eyes has been practiced since ancient times. Egyptian priests made the first ocular prosthesis, called Ectblepharons, as early as the 5th century BC. In those days, artificial eyes were made of enameled metal or painted clay and attached to cloth and worn outside the socket.

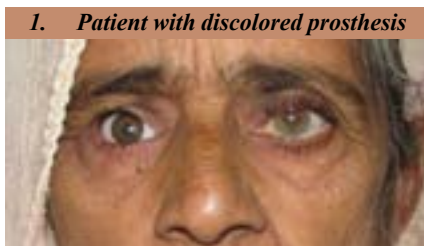
The first in-socket artificial eye made in the 15th century was made of gold with colored enamel. In the latter part of the 16th century, the Venetian glass artisans discovered a formula that could be tolerated inside the eye socket. These early glass eyes were crude, uncomfortable to wear and very fragile.

A definitive technique for fabricating artificial eyes using acrylic resin was developed by the United States Naval Dental and Medical Schools and was published in 1944. Unlike glass eyes, the acrylic resin eyes were solid. The material was lightweight, easy to fit and adjust, unbreakable, translucent, easily fabricated, had intrinsic and extrinsic coloring capabilities, and was inert to the socket secretions.

Today the vast majority of patients all around the world wear ocular prosthesis made of acrylic. Several techniques have been used in fabricating and fitting artificial eyes. Empirically fitting a stock eye, modifying a stock eye by making an impression of the ocular defect<sup>11</sup> and the custom eye technique<sup>12</sup> are the most commonly used techniques. The fabrication of a custom acrylic resin eye provides much better esthetics and gives more predictable results.

### Case Report

A sixty eight years old woman reported to the Department of Prosthodontics and Implantology, B.R.S Dental College and Hospital, Barwala with the complaint of poorly color matched artificial right eye prosthesis (Fig.1). History revealed that patient was wearing a different colored ocular prosthesis for the last



2: Left- Discolored prosthesis  
Right- Almost similar ill-fitting prosthesis



twenty years and was having an ill-fitted accurately color matched ocular prosthesis (Fig.2).

Examination of the socket revealed healthy socket with adequate depth of fornices (Fig.3). The case was planned for fabrication of new custom made ocular prosthesis using iris of ill-fitted accurately matched pre-fabricated ocular prosthesis.

3: Socket with adequate depth



### PROCEDURE:

#### Impression

A modification of the technique described by Taicher *et al*<sup>11</sup> was performed by Sykes. Sykes<sup>13</sup> used medium viscosity polyvinyl siloxane impression material for making the impression. Impression was made with the help of pre-fabricated ocular stock tray using irreversible hydrocolloid alginate (Zelgan, Dentsply India). Stock tray was adjusted according to the socket (Fig.4) and extensions were checked. The patient's eye socket was coated with a thin layer of Vaseline. Impression was made by injecting the alginate through stock tray till 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. Patient was then asked to move her eye to the right then to the left, then up and down and finally in a circular motion, so that the functional impression of the defect could be ob-

4. Adjusted Stock Tray



5. Ocular Impression



tained. The impression was then retrieved when it had completely set (Fig.5).

### Fabrication of wax pattern

Wax pattern was fabricated with the help of sectional casts. The first half of sectional cast was poured while keeping the impression surface facing upwards and after which the indexing of the first pour was done so as to allow orientation of the second half (Fig.6). This impression was then poured in the samemanner as the primary impression except keeping in mind the handle length and position. Then the two halves of casts were separated and the final impression retrieved so as to keep the mold space ready for wax pattern fabrication from which molten wax was poured into the secondary cast through the sprue channel (Fig.7).

6. *Impression poured along with indexing*



7. *Mold space for wax pattern*



In order to prepare the wax pattern for the ocular prosthesis, the inner surface of the mould was coated with separating medium. Modeling wax was heated and the molten wax was poured into the mold. Additional wax was poured to compensate for the wax shrinkage. When the wax had set the cast was separated and the wax pattern was retrieved and carved (Fig.8).

8. *Cast separated and wax pattern retrieved*



The irregularities in the wax pattern and sharp edges were removed and recontoured into a smooth hemispheroid. The wax pattern should be highly polished and free from dust and debris before placing it in the socket.

### Wax pattern trial

First of all the fullness of the both palpabre and the eye socket was checked along with the extensions, this was confirmed by asking the patient to close her eyes and patient was inspected from the profile view. During try-in the iris was placed keeping in mind the symmetry with the iris of the adjacent unaffected right natural eye of the patient. To achieve this exact location, a micro tape was secured on the fore head and the midline of face was marked along with the position of the natural iris while she was looking straight ahead to a distant object.

9: *Iris from old ill-fitting prosthesis*



The distance was measured from the midline to the centre of the pupil of the natural eye and the same distance to the left side was marked and engraved into the wax pattern. The pattern was taken out. Iris was used from her old stock eye which had almost matching resemblance to her unaffected natural eye (Fig.9). Then Iris was added to the wax pattern and keeping position in mind, the iris was placed and adjusted according to the horizontal and vertical axis. Also her eye movements were checked for symmetry and function and it was found that the wax try-in moved and synchronized in harmony with the patient's natural eye movements (Fig.10). This gave a realistic feeling and instilled confidence in the patient.

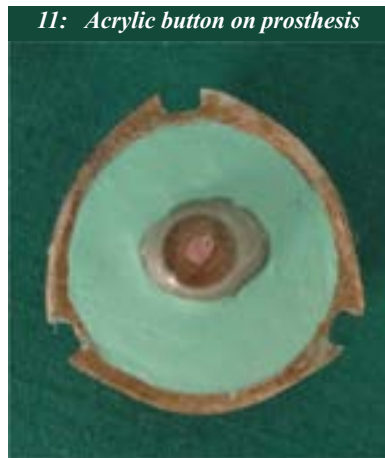
10. *Try-in of prosthesis*





### Flasking

The trial of wax pattern was invested as in the case of complete denture laboratory procedures. An acrylic button was attached to the iris, so as to prevent the displacement of the iris during dewaxing (Fig.11). The second pour was poured in such a way that the acrylic button attached to the iris was embedded into the plaster of the counter flasking.



### Dewaxing

The dewaxing was done after the final set, taking care so that there was complete wax elimination from the mold space (Fig.12).



### Packing and flasking

This step is the most important, as it involves the characterization of the prosthesis before packing with tooth colored heat cured polymethylmethacrylate of appropriate shade, matching with the color 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 characterization 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. After the characterization, the mold was packed with heat cured tooth colored acrylic resin of appropriate shade and kept for bench curing to enable complete polymerization and

prevention of any excess unreacted monomer. This enables the minimization of porosities and gives a good finish to the prosthesis. We used long curing cycle of 4-6 hours so as to prevent the presence of any residual monomer in the prosthesis which is very essential. It prevents any untoward irritation or sensitivity and thereby rejection of the prosthesis by the patient. 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. 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 (Fig.13). The patient was given instruction for wearing the prosthesis and its home care protocol which is given below:



Prosthesis should be handled with care and with clean hands.

Removal of Acrylic prosthesis during night is ideal. It

should be soaked in an antibacterial solution to kill the surface bacteria.

Routine polishing of prosthesis should be done every year to prevent deposition of protein and bacteria.

Children and those living in arid climates require polishing every six months.

## DISCUSSION

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<sup>13</sup> 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 color cannot be neglected, a custom made ocular prosthesis provide better results functionally as well as aesthetically<sup>14</sup>.

## CONCLUSION

The use of custom-made ocular prosthesis has been a boon to the patients who cannot afford the implant retained replacements. The esthetic and functional outcome of the custom prosthesis was far better than the stock ocular prosthesis<sup>15</sup>. Although the patient cannot see with this prosthesis, it has definitely restored her self-esteem and allowed her to face the world confidently.

## REFERENCES

Beumer, J., Chrtis, T.A. and Firtell, D.N. 1979. Maxillofacial rehabilitation: Prosthodontic and surgical consideration. Los Angeles: Mosby. Page 348-370.

Goiato, M.C. 2010. dos Santos DM, Haddad MF, Pesqueira AA *et al.* Most frequent tumors in maxillofacial area rehabilitated through surgical reconstruction and prosthesis. *J CraniofacSurg.* **21**: 396-9.

Goiato, M.C., Pesqueira, A.A. and Silva, C. 2009. Gennari-Filho H, Santos DM. Patient satisfaction with maxillofacial prosthesis. *J PlastReconstrAesthetSurg.* **62**: 175-80.

Hatamleh, M.M., Haylock, C., Watson, J. and Watts, D.C. 2009. Maxillofacial prosthetic rehabilitation in the UK: a survey of maxillofacial prosthetics and technologists attitudes and opinions. *Int J Oral MaxillofacSurg.* **39**: 1186-92.

Nicodemo, D. and Ferreira, L.M. 2006. Questionnaire of the psychological profile of the patient with anophthalmia with indication of ocular prosthesis. *Arq Brar Oftalmol* **69**: 463-70.

Goiato, M.C., dos Santos, D.M., Bannwart, L.C., Moreno, A., Pesqueira, A.A., Haddad, M.F. and dos Santos, E.G. 2013. Psychosocial impact on anophthalmia patients wearing ocular prosthesis. *Int J Oral Maxillofac Surg.* **42**: 113-119.

Goiato, M.C., Moreno, A., dos Santos, D.M., Dekon, S.F., Pellizzer, E.P. and Pesqueira, A.A. 2010. Effect of polymerization and accelerated aging on iris color stability of ocular prosthesis. *Contact Lens & Anterior Eye.* **33**: 215-218.

Cain, J.R. 1982. Custom ocular prosthesis. *J Prosthet Dent* **48**: 690-694.

Chalian, A. and Drane, P. 1971. Maxillofacial prosthetic multidisciplinary practice. Williams and Wilkins co. Baltimore. pp: 286-290.

Parr, G.R., Goldman, B.M. and Rahn, A.O. 1983. Surgical considerations in the prosthetic treatment of ocular and orbital defects. *J Prosthet Dent.* **49**: 379-385.

Taicher, S., Steinberg, H.M., Tubiana, I. and Sela, M. Modified stock-eye ocular prosthesis. *The Journal of Prosthetic Dentistry.* **54**(1): 95-98.

Bensen, P. 1977. The fitting and fabrication of a custom resin artificial eye. *The Journal of Prosthetic Dentistry.* **38**(5): 532-538.

Sykes, L.M. 1996. Custom made ocular prosthesis: a clinical report. *The Journal of Prosthetic Dentistry.* **75**(1):1-3.

Doshi, P.J. and Aruna, B. 2005. Prosthetic management of patient with ocular defects. *The Journal of Indian Prosthodontic Society.* **5**(1): 37-38.

Cain, J.R. 1982. Custom ocular prosthetics. *The Journal of Prosthetic dentistry.* **48**(6): 690-694.

