Prosthetic approach following traumatic evisceration: a case report

[1]Mariska Juanita, [2]Riezky Ramdhani, [3]Irfan Dammar
Department of Prosthodontics
Faculty of Dentistry, Hasanuddin University
Makassar, Indonesia
Corresponding author: **Mariska Juanita**, e-mail: **mariskajuanita@gmail.com**

ABSTRACT
A 20-year-old male patient was referred to Prosthodontic Department, Dental Hospital of Hasanuddin University, Makassar with chief complaint of disfiguration of the face. Medical history revealed a significant trauma to the left eye 6 months prior which stayed after evisceration. Patient has never used prosthetic eye afterwards. Examination of the left eye socket revealed a healthy conjunctiva covering the posterior wall of the anophthalmic socket with synchronous motions and absence of infection or inflammation signs. Sulcus depth was sufficient enough to retain prosthetic eye. This article presents rehabilitation of the ocular defect with customized acrylic-based ocular prosthesis to increase patient's appearance and to prevent further shrinkage of the eye socket. Preliminary impression was done using customized tray fabricated from modelling wax and hydrocolloid irreversible impression material. An intraocular custom tray for secondary impression was fabricated with acrylic resin and modified with a syringe that attached to the custom tray. Secondary impression of the defect was recorded using polyvinyl siloxane light viscosity material followed by wax pattern fabrication using modelling wax. The wax pattern was tried in patient's socket and checked for size, comfort, support, fullness, and then packed with tooth colored heat cure acrylic resin. After determining the location and diameter of the iris with an optical vernier pupillary distance ruler, the color of sclera was determined by shade guide and confirmed with technician using digital photo. Ocular prosthesis was fabricated afterwards and inserted into the eye socket and evaluated for suitability, aesthetic and also movements with the contralateral eye. It is concluded that customized ocular prosthesis was significantly more aesthetic than pre-fabricated one with better contouring, color matching, and coordinated movements with the contralateral eye. This prosthetic approach may restore patient's appearance, increase their self-esteem, and improve their quality of life.
Keywords: eye trauma, evisceration, eye socket, anophthalmic socket, customized ocular prosthesis

This title has been presented in The 12th Biennial Congress of Asian Academy of Prosthodontics, 21 August 2021

INTRODUCTION

The loss or absence of an eye may be caused by a congenital defect, trauma, or other pathologic condition, including tumor. This can have a physical, social, and psychological impact on those affected. Therefore, ocular prostheses aim to improve patient's esthetics, restore and maintain health of the remaining structures, and consequently provide physical and mental well-being, even though the visual function did not return. The function of the surrounding tissue will be affected by the loss of the eyeball for a long time if it is not quickly replaced with an ocular prosthesis, and eyelids may atrophy. Between the upper and lower eyelids, the ocular prosthesis serves as a barrier for foreign objects that might enter the eye chamber.[1]

Depending on the severity of the situation, surgical management may include: evisceration, enucleation, or exenteration. Evisceration is a surgical procedure wherein the intraocular contents of the globe are removed, leaving the extraocular muscles, and optic nerve intact. Enucleation is the surgical removal of the globe and a portion of the optic nerve from the orbit. Exenteration is the en bloc removal of the entire orbit, usually involving partial or total removal of the eyelids.

Based on fabrication technique, ocular prosthesis is divided in two types, prefabricated and customized prosthesis. Customized ocular prostheses have several advantages which makes it more favorable than the prefabricated one such as: even distribution of pressure on the eye socket, highly esthetic iris, better comfort and better eyelid movements.[2]

Orbital implants and ocular prostheses are two kinds of rehabilitation for loss of eyeball cases. Fabricated and nonfabricated ocular prostheses are the two types of ocular prostheses. The advantage of fabricated ocular prosthesis is that they take less time to manufacture because they don't require any laboratory stages. Iris sizes and colors are available in three different sizes and hues in the fabricated ocular prosthesis. Gradually there will be difference in size between the prosthetic eyeball and the socket which cause a water sac forms where bacteria can grow, producing discomfort and infection. Another downside is that color discrepancies in the iris can cause aesthetic issues.[4,5]

Non-fabricated ocular prosthesis are self-made ocular prostheses. The advantages of the ocular prosthesis are the color of the prosthesis can be modified to match the remaining eye, the cost is less expensive, and it fits to the patient's eye socket condition. The downside of nonfabricated eye

DOI: 10.46934/ijp.v3i2.148

prostheses is that laboratory techniques take time to complete. After evisceration and enucleation surgery, a non-fabricated ocular prosthesis indicatted. Patients who are allergic to acrylic and have an eye retention socket that is poor in retention are contraindications to use a non-fabricated ocular prosthesis.[4]

After enucleation and evisceration with or without implant implantation, blind eyes with corneal scarring, and congenital anophthalmia/microphthalmia are all indications for ocular prosthesis.[8]

Patients who experience eye defects due to the action of enucleation of the eyeball often experience sighting dysfunction, aesthetic and psychological disturbance. To overcome those problems, rehabilitation efforts are carried out by making non-fabricated ocular prosthesis.

CASE

A 20-year-old male patient was referred to the Prosthodontic Department of Hasanuddin University Dental Hospital, Makassar with a chief complaint of disfiguration of the face. Medical history revealed a significant trauma to the left eye 6 months ago which had been thereafter eviscerated. Patient has never used prosthetic eye afterwards (Fig.1).

Figure 1 Profile of patient

Examination of the left eye socket revealed a health conjunctiva covering the posterior wall of the anophthalmic socket with synchronous motions and absence of infection or inflammation signs. Sulcus depth was sufficient enough to retain prosthetic eye.

MANAGEMENT

Anamnesis and objective examination were performed to confirm the diagnosis of anopthalmic socket post evisceration. The treatment planned to rehabilitate the ocular defect with customized acrylic-based ocular prosthesis to increase patient's appearance and to prevent further shrinkage of the eye socket. Preliminary impression was done using customized tray from modelling wax and hydrocolloid irreversible impression material (Fig.2).

An intraocular custom tray for secondary impression was fabricated with acrylic resin and modified with a syringe attached to the custom tray. Secondary impression of the defect was recorded using polyvinyl siloxane light viscosity material. Before inserting the impression material, the eyelashes and around the eyes were smeared with petroleum jelly so it did not stick with the impression material when inserted into the socket (Fig.3).

Impression material was injected slowly into the socket through the tray hole. The patient was asked to move the socket and palpebra so that the impression material fills all aspects of the socket. Within 1-2 minutes, the impression material formed the desired consistency and the impression material and tray were removed from the socket. The mold was then filled with gypsum. The hardened cast was then used as a working model for custom tray ocular using self-cure acrylic resin followed by wax pattern fabrication using modelling wax. It's best to avoid leaving any impression material in the eye socket (Fig.4).

The patient was instructed to sit upright and relax. The upper eyelid was raised and upper edge of the sclera wax model was inserted. The lower eyelid was pulled so that the lower edge of the wax pattern can be inserted. The wax pattern was tried in patient's socket, while areas of over extensions were adjusted by trimming the wax. The contour and support of the eye lid was checked while the eye was in open and closed positions by evaluate its size, comfort, support, fullness, and then packed with tooth colored heat cure acrylic resin that had been decided before.

The opening and closing movements of the eyelid

Figure 2 Preliminary impression

Figure 3 Fabrication of intraocular custom tray

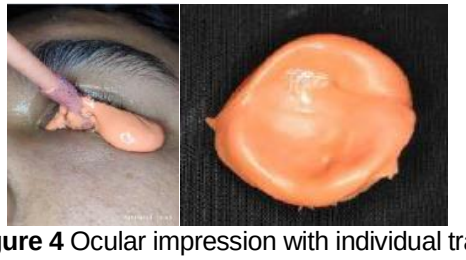

Figure 4 Ocular impression with individual tray

DOI: 10.46934/ijp.v3i2.148

Figure 5 Sclera wax model on patient

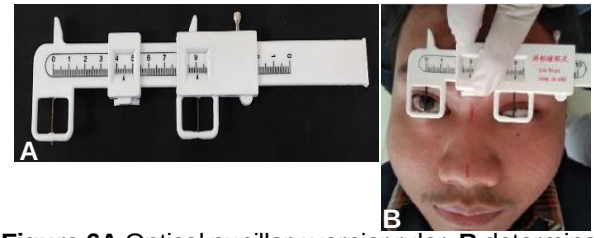

Figure 6A Optical pupillary vernier ruler, **B** determination of inter-pupil length, location & diameter of the iris

and the shape of the sclera wax were observed from all directions so that it resembles the eye next to it (Fig.5).

In the next appointment, we determined the location and size of the iris with an optical vernier pupillary distance ruler, by place it at the base of the nose. Then three reference lines were made at the base of the nose, healthy eye and anopthalmic parts place by mark a dot on scleral blank using a marker (Fig.6).

Scleral blank is removed from the eye socket followed by making a circle on the center of the mark.

After that, the color of scleral blank was determined by shade guide and confirmed with technician using digital photo. Ocular prosthesis was fabricated afterwards then inserted into the eye socket.

Prior to insertion of the finished prosthesis, it was disinfected and thoroughly clean with saline solution to prevent chemical irritation, it was inserted and evaluated for fit, aesthetic and also movements with the contralateral eye. Follow up appointment was performed 24 hours, 1 week and 6 months after the insertion and showed no inflammation with excellent adaptation of the ocular prosthesis (Fig.7)

Figure 7A Insertion, **B** control

DISCUSSION

Making a prosthesis following enucleation or evisceration necessitates preparation both before and after the procedure. This should be inserted as soon as possible after enucleation or evisceration. The goal is to protect the suture line, keep the fornix in good shape, prevent contractures, and make the patients as comfortable as possible. Prosthetic eye also keeps the eyelids in better shape and prevents eyelashes from entering the socket, that can cause irritation.[9]

Acrylic or methyl methacrylate was chosen because of its good tissue adaptability, good aesthetics, durability, ability to shape according to the socket, low cost, and ease of manipulation.[10]

During insertion, the ocular prosthesis must be retained, stabilized, and comfortable. One week after insertion, a control and evaluation of socket alterations in the use of nonfabricated ocular prosthesis was performed. Because the ocular prosthesis is built to match the contour of the eye socket, the movement of the ocular prosthesis is satisfactory in this patient. This ocular prosthesis is superior from an aesthetic standpoint because the sclera and iris drawing are adjusted to the opposite eye. Nonfabricated eye prosthesis are more patient-acceptable than fabricated eye prosthesis because they fit the contour of the patient's eye socket better.[1]

Ocular prosthesis can last an average of 5-7 years, depending on the quality of accuracy, comfort and patient compliance to clean the prosthesis regularly. Cleanliness of the eye sockets and hands must be considered before installing prosthesis. Maintenance of acrylic ocular prosthesis is easy to do. The prosthesis can be immersed in water, saline solution, or contact lens fluid to remove deposits that have formed and are attached to the ocular prosthesis. These deposits originate from the production of non-infectious mucus. The prosthesis is brushed with a soft brush and then rinsed with clean water to remove the remnants of soap, then dried with a clean cloth. For harder deposits, wet tissue can be used to scrub the entire surface without scratching it. The patient must be able to maintain the cleanliness of the prosthesis so that the prosthesis can last a long time.[1]

Ocular prosthesis can last anywhere from 5-7 years, depending on the precision, comfort, and care provided by the patient. Before putting on a prosthesis, make sure your eye sockets and hands are clean. Acrylic ocular prostheses are simple to maintain. To eliminate deposits that have accumulated and are connected to the ocular prosthesis,

DOI: 10.46934/ijp.v3i2.148

the prosthesis can be immersed in water, saline solution, or contact lens fluid. These deposits are formed when non-infectious mucus is produced. The prosthesis is washed with a soft brush before being rinsed with clean water and wiped with a clean cloth to eliminate any soap residue. Wet tissue can be used to scrub the entire surface without scratching it for tougher deposits. The patient must be able to keep the prosthesis clean in order for it to survive as long as possible.

Delayed treatment of an ophthalmic socket with prosthesis may result in its settling and sinking into the socket, compromising the esthetic appearance and adequate eyelid support of the defect region.

Prosthesis rotation within the socket, loose fit, decentration of the cornea, cosmetically significant ptosis, or discoloration of the prosthesis are several signs that indicate ocular prosthesis replacement.

It is concluded that the custom-made ocular prosthesis presented in this case can give the patient with an eviscerated eye a more natural final look. This technique also permits the finished prosthesis to generate an equal distribution of pressure and intimate adaptation to the surrounding tissue which may reduce the psychological trauma associated with the loss of an eye, increasing their self-esteem and improving their quality of life.

REFERENCES

1. Taylor TD. Clinical maxillofacial prosthetic. Illinois: Quintessence Publishing Co, Inc; 2001.p. 265-70.
2. Adarsh N, Suresh BS, Yogesh RB, Rachana KB. Ocular prosthesis made easy a case report. Int J Dent Clin 2011;3(1):105–6.
3. Dixit S, Shetty PBG. Ocular prosthesis in children – clinical report. Kathmandu Univ Med J 2005;3(1):81–3.
4. Aggarwal H. Rehabilitation of phthisis bulbi: a case report. J Pakistan Dent Assoc 2012;21.
5. Cafiero-chin M, Marques C, Danz HJ, Ave T. Ocular prosthesis: indications to management. Can J Optom 2015; 77 (2):24–32.
6. Soni S, Singh PR, Singh A, Srivastava S, Shekhar A. Ocular prosthesis : simplified custom made technique-a case report. Int J Oral Heal Med Res 2016;3(1):107–10.
7. Baino F, Perero S, Ferraris S, Miola M, Balagna C, Verne E, et al. Biomaterials for orbital implants and ocular prostheses: Overview and future prospects. Acta Biomaterialia 2014;10(3):1064–87.
8. Parekh AA, Bhalerao S. Rehabilitation of ocular defects: Custom made and modified stock eye prostheses. SRM J Res Dent Sci 2016;7:6–8.
9. Stewart WB. Surgery of the eyelid, orbit, and lacrymal system, vol 3. American Academy of Ophthalmology, Oxford: Oxford University; 1995. p.133–66.
10. Jamayet N, Srithavaj T, Alam MK. A complete procedure of ocular prosthesis: a case report. Int Med J 2013; 20:1–3.

DOI: 10.46934/ijp.v3i2.148