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Case Report

Rehabilitation of eviscerated missing eye with customised heat cure acrylic ocular prosthesis: A case report with a follow-up period of 6 years

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ABSTRACT

Ocular prosthesis refers to a specialized medical device designed to replace a missing or damaged eye. These prostheses are custom-made to fit the individual's unique anatomy and are primarily used for cosmetic purposes, though they can also help in maintaining the natural shape of the eye socket and supporting surrounding tissue. This article describes a case of rehabilitation of the missing right eye due to evisceration by a customized ocular prosthesis with a follow-up period of six years and gives a brief description of the method of processing, centration and fabrication. Acrylic customised ocular prosthesis for the rehabilitation of the eviscerated eye reported higher patient acceptance and satisfaction due to the lifelike appearance of the prosthesis.

1. Introduction

Evisceration, Enucleation, and Exenteration are different methods of surgical removal of a damaged eye.[1] Anophthalmia, eye infections, tumours and accidental trauma can be certain reasons for the surgical removal of the eye affecting appearance, and function and causing psychological trauma to the patient. An ocular prosthesis replaces a missing or damaged eye to establish a natural look, it provides structural support to prevent the collapse of surrounding tissues and maintain facial symmetry.[2,3] Ocular prostheses are stock and custom-made to fit the individual's unique anatomy and are primarily used for cosmetic purposes, maintain the natural shape of the eye socket and support surrounding tissue, prevent eyelid collapse and deformity, and protect the socket against injuries.[3,4]Ocular prostheses are made from high-quality biocompatible medical-grade acrylic or silicone materials due to their durability, comfort, and resemblance to natural eye tissues.[4,5] There are various techniques used for fabrication, centration of iris and processing of ocular prosthesis.[6–10]

This article describes a case of rehabilitation of the missing right eye due to evisceration by a customized ocular prosthesis with a follow-up period of six years and gives a brief description of the method of processing, centration and fabrication.

2. Case Description

A 33 years old male patient underwent evisceration of the right eye in the department of Ophthalmology due to trauma 10 years back. He reported to the department of Prosthodontics with the chief complaint of missing right eye and for the fabrication of eye prosthesis. He gave a history of implantation of an 8.5mm polymethyl methacrylate implant in the right eye socket followed by the placement of a stock conformer to prevent the collapse of the socket. On examination, the palpebral fissure of the affected eye had

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sufficient width with proper upper and lower eyelids. The base of the socket was well keratinized with adequate mass volume comprising good motility of the prosthesis (Figure 1). The treatment plan was the rehabilitation of the missing right eye with a customized heat cure acrylic ocular prosthesis. Detailed patient information sheet and written informed consent were obtained from the patient.

Figure 1: Preoperative extraoral Picture showing eviscerated right eye

Figure 2: Impression of the eye socket made using light body polyvinylsiloxane impression material.

Figure 3: Centration of the Iris using gaze method

Before making an impression the anophthalmic socket was cleaned. The worn stock conformer was used as an impression tray. Onto the worn stock conformer, an acrylic handle was placed in the centre and perforations were made on the surface of the conformer for mechanical interlocking of the impression material. Before the impression making, for easy removal of impression material from the eyelashes petroleum jelly was applied.[8] An impression of the eye socket was made by injecting light body polyvinylsiloxane impression material (GC Flexceed) (Figure 2). The tray handle was removed and the impression was poured and flasked in type III gypsum product (Zhermack elite rock) to obtain mould for the fabrication of a custom conformer. The mould was packed with heat-cure clear acrylic resin (DPI Heat cure) and was bench-cured followed by acrylising using a short curing cycle at 74 degree Celsius for 2 hours

Figure 4: Tooth-coloured heat cure acrylic customised ocular prosthesis

Figure 5: Staining, characterization and addition of a layer of heat cure clear acrylic resin to final prosthesis

Figure 6: Post-operative picture showing customised ocular prosthesis in the right eye socket

followed by boiling at 100 degree Celsius for 1 hour. The customized heat-cured clear acrylic conformer was finished and polished using an acrylic polishing bur kit (Shofu). The customised heat-cured clear acrylic conformer was inserted into the eye socket and the patient was recalled after two weeks. The mould was fabricated to duplicate a heat-cured clear acrylic conformer for the formation of a wax conformer. The wax conformer placed in the eye socket was evaluated for all movements and comfort of the

patient. The artificial iris button shade was selected and placed on the wax conformer according to opposing iris shade. The gaze method was used for the centration of the iris button. An acrylic handle was attached to the iris button and the patient was asked to look straight ahead to a distant object, with the use of a flashlight the symmetry with the adjacent unaffected left natural eye was maintained (Figure 3).[8] The wax conformer was then flasked to form a mould for a definitive customised ocular prosthesis made up of tooth-coloured heat-cured acrylic resin (DPI Heat cure) (Figure 4).[8] The staining and characterization of ocular prosthesis was done according to unaffected eye followed by the addition of a thin layer of heat cure clear acrylic resin (Figure 5). The definitive customised ocular prosthesis was finished, polished using an acrylic finishing polishing burs kit and inserted into the eye socket (Figure 6). The periodic recall of patient was done after one day, once in a week, once in a month and annually. The present case showed a follow-up of six years. Patient satisfaction was evaluated over 3 months, 6 months, after 12 months and for the next five years using a Visual analogue scale. The survival rate of the prosthesis was measured at the same time intervals where any loss of the prosthesis was observed. In the present case, the patient showed high satisfaction and a 100 percent survival rate as the prosthesis was intact and fully functional.

3. Discussion

The orbit content eyeball, orbital fascia, bulbar fascia, muscles, vessels, nerves, lacrimal gland, and orbital fat. The surgical removal of the contents of the orbit depends upon the type of injury. Evisceration is the removal of the contents of the globe, but leaving the sclera and sometimes the cornea in place and as the extra-ocular muscles are left intact, good mobility of the prosthesis is usually possible.[1,4,8] Enucleation is the removal of the eyeball itself, the removal of the whole intact eye by cutting the six extraocular muscles and transecting the optic nerve.[1,4] Exenteration is the removal of the entire contents of the orbit, including the extraocular muscles.[1,4,8] In the present case the patient reported an eviscerated right eye and as the extraocular muscles were intact ocular prosthesis was fabricated.

To regain the volume loss acrylic implants were placed that provide an area for muscle attachment and help in the movement of the prosthesis. Mathews et al., stated that various impression materials can be used such as tissue conditioner, irreversible hydrocolloid, and elastomeric impression material.[5] In this case we have used light body addition silicone as it has excellent elastic recovery, adequate working time and sets faster.[5] L. M. Sykes et al., compared the use of stock conformers and custom-made conformers and concluded that stock conformers merely maintain the socket size and prevent scar tissue contractures and the custom-made conformers can be used to enlarge unfavorably small sockets, stimulate eyelid movement, aid hygiene, help the clinician develop the final shape for the definitive prosthesis, and reduce the amount of post insertion adjustments needed.[6,9] So in this case we used a customized conformer. For centration of the iris, different methods like grid, digital, photographic, and gaze method can be used. In the present case, the gaze method by using the Hirschberg Light reflex test was used for pupil centration using a wax conformer as it is simple and convenient.[7] Custom-made ocular prosthesis are thus more comfortable, esthetical, and economical and allow movement of a prosthesis naturally and competently.[8]

Ocular prostheses play a vital role in restoring both the appearance and function of the eye socket for individuals who have lost an eye due to injury, disease, or congenital conditions. Advances in materials and technology continue to improve the effectiveness and aesthetics of these devices, offering better outcomes for patients.

4. Conclusion

Custom-made Ocular prosthesis showed good results in terms of esthetic and comfort. The clinical and laboratory procedures used were simple and cost-effective. The artificial prosthesis doesn't replace the original anatomy but it increases the confidence of the patient to live in the world. Acrylic customised ocular prosthesis for the rehabilitation of the eviscerated eye reported higher patient acceptance and satisfaction due to the natural appearance of the prosthesis.

5. Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has given his consent for his images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

6. Conflict of Interest

None.

7. Source of Funding

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