

A Custom made ocular prosthesis

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Abstract:

Mutilation of a portion of a face can cause a heavy impact on the self-image and personality of an individual. Acceptable cosmetic results usually can be obtained with a facial prosthesis. Enucleation of the eye is often indicated after ocular injury or for the treatment of intraocular tumors and severe ocular infections. An ocular prosthesis is given to uplift the patient psychologically and improve the confidence. Ocular prosthesis can be custom made or a stock shell. To improve the comfort and matching of the prosthesis with that of the adjacent natural eye an custom made ocular prosthesis is preferred. Different techniques are available to fabricate a custom ocular prosthesis. This paper describes prosthetic rehabilitation of a 27-year-old woman patient having a left ocular defect.

Key words: Trauma, Ocular defect, Custom made Ocular prosthesis

1 Introduction:

The absence of ocular content may be congenital [1] or acquired due to surgical removal which can be indicated in several cases such as traumas [2-4], cancer, blind painful eye, microphthalmos, endophthalmitis, and suprachoroidal hemorrhage [3].

A 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. The aim of all ocular prosthetic procedure is to enable rehabilitation of the patient in the society with a normal appearance and self-esteem. Furthermore, the ocular prosthetic rehabilitation is associated to psychosocial improvement, once the prostheses are able to influence positively the interpersonal

relations [5, 6], which leads to a positive impact on the quality of life. A way to reduce the psychological impact caused by ocular loss is by shortening the interval between the surgery and rehabilitation [7]. Also after enucleation surgery, the loss of volume and rotation of infraorbital contents can result in superior sulcus deepening, enophthalmos, ptosis, ectropion, and lower lid laxity, which are known as post-enucleation socket syndrome³. Before starting the design of the prosthesis, it is essential to assess the psychological component in order to gain the confidence of the patient, in addition to a detailed medical history that includes the condition that led to the excision and enucleation in order to alert the possibility of recurrence [8, 9].

2 Case report:

A 28 year old female patient was referred to the Department of Prosthodontics at Kobry El Koba Military Hospital, Cairo, Egypt, for the successor of his lost left eye (Fig. 1). A conformer which is a temporary plastic prosthesis used after surgery to maintain the size of the socket (Fig.2, 3). After healing found satisfactory, the patient was referred for the prosthetic management. On examination, there were no signs of any adhesion or dehiscence

of conjunctiva and tissue bed were free of inflammation to start with the impression procedure for fabrication of ocular prosthesis. Ocular prosthesis can be either ready-made (stock) or custom made. Because of the benefits of the custom-made ocular prosthesis it was decided that it would be the best prosthetic option to meet the needs of the patient.

The entire procedure was explained to the patient. An ophthalmic topical anesthesia was given to increase the comfort of the patient. Before making the impression, petroleum jelly was applied to the eyebrows for the easy removal of the impression material after it sets. The patient's eye socket was coated with a thin layer of Vaseline. An impression was made of the ocular defect using a perforated ocular tray made from self-curing acrylic resin and check it (Fig. 4). The tray was finished, the borders were smoothed inside the ocular cavity under the eyelids and the tray attached to the nozzle of 10 cm plastic syringe through a perforation made at the center of it. The patient was instructed to tilt the head backward, an impression was made by injecting alginate impression material first into the depth below the upper eyelid and then into the lower. This was done to record the proper extensions of the defect, the fine details, anatomy and peripheries of the socket. Once filled the head was moved back to the vertical position and the patient was directed to move his normal eye in all directions to allow the material to flow into all areas of the enucleated socket. This will facilitate the flow of the impression material to all aspects of the socket. The patient was asked to look at a distant spot at eye level with his gaze maintained in a forward direction. The impression was recorded in the functional form. After the material was set; the impression rotated out of the socket. The impression was checked for accuracy and excess material was trimmed and the impression was checked for air bubbles. After an acceptable impression of the eye socket has been obtained, the impression was packed inside the putty rubber base (Reprisal, Dentsply, Internationals) to produce rubber base mold (Fig. 5). After setting of rubber base split with scalpel to remove the impression. After that the mold was filled with molten base plate wax to produce a wax pattern (Fig. 6, 7). The sclera wax pattern was fabricated by pouring the molten wax

into the cast. The wax was properly contoured and carved to give it a simulation of the lost eye. The wax pattern was tried in patient's socket and checked for size, comfort, support from tissue, simulation of eye movement, eyelid coverage fullness, and retention by performing the functional movements. The position of the iris was located with the help of a millimeter grid placed on the patient's face.

The patient was instructed to fix the gaze of the natural eye on an object at least 3 feet in front and at eye level. The position of the iris-pupil area of the natural eye in relation to the inner and outer canthus and upper and lower lids was marked on the grid. Before flasing cast was reduced from the fitting surface to decrease the bulk taking care that the iris was secured to one counter of the flask and remaining part in the other portion of the flask. Packing was done with the selected heat cure sclera shade colored acrylic resin (Fig. 8). Try in of acrylic prosthesis, the position of the iris – pupil area, coloring of the iris and pupil. Final coloration of sclera and application of blood capillaries (Fig. 9). Red silk fibers to mimic veins were placed in the dough of the determined acrylic shade. A very thin layer of wax was adapted on the acrylic prosthesis to apply the transparent acrylic resin for protection of color and give a beautiful appearance then flased. The stalk of the ocular button, flash, and irregularities were removed from the surface. The prosthesis was finished and polished (Fig. 10). The properly finished and polished prosthesis was inserted in the socket after being disinfected and lubricated with an ophthalmic lubricant to maintain a tear film over the prosthesis and to improve eye movements Fig. 11). Minor adjustments were made at the placement and removal of the prosthesis were given and the need for regular recall appointments was emphasize.

3 Discussion:

Ocular prosthesis is an artificial replacement of the bulb of the eye. Multidisciplinary management and a team approach are essential in providing accurate and effective rehabilitation and follow-up care for the patient. Although the prosthetic rehabilitation may be enhanced with the use of implants, which can coordinate with the movements of the natural eye, they are not always possible or feasible. The custom-made ocular prosthesis conforms accurately to the socket as the prosthesis fabrication is based on the existing anatomy of the patient, thus giving benefits of increased adaptation, movement of the eye ball, and the exact match of the iris position as that of the adjacent natural eye.[1]. A prefabricated prosthesis should be avoided, the voids in the prefabricated prosthesis collect mucus and debris, which can irritate mucosa and act as a potential source of infection, which are minimized in custom-made prosthesis.[1,8]. The custom prosthesis has restored patient's self-esteem and allowed him to confidently face the world.

4 Conclusion:

A technique has been described to manufacture a custom eye prosthesis. This technique also allows the final prostheses to generate equal distribution of pressure and intimate adaptation to the tissue layer. A properly designed prosthesis enhances patient comfort and confidence by increasing adaptation and natural appearance and maintains its direction when the patient makes various eye movements. The optimum cosmetic and functional results of a specially designed ocular prosthesis enhance the patient's rehabilitation of a normal lifestyle

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Figures:

Fig. 1. The patient with the defected left eye



Fig. 2. Conformer: a temporary clear plastic prosthesis used after surgery to maintain the size of the socket



Fig. 3. The patient wearing the conformer



Fig. 4. Impression tray



Fig. 5. Rubber base mold



Fig. 6. Wax pattern



Fig. 7. Completed wax pattern



Fig. 8. Ocular attached to index after flask separated



Fig. 9. Painting the sclera



Fig. 10. Finished ocular prosthesis



Fig. 11. Delivery



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