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RESEARCH ARTICLE

PROSTHETIC REHABILITATION OF OCULAR DEFECT WITH A CUSTOMISED PROSTHESIS- A CASE REPORT

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ABSTRACT

The eye is a vital organ and an important component of facial expression. Loss of an eye has a crippling effect on the psychology of the patient. Maxillofacial prostheses restore and replace stomatognathic and associated facial structures with artificial substitutes. The objectives of eye prosthesis is to improve the patient esthetics, restore and maintain the health of the remaining associated structures, consequently provide physical and mental well-being. The primary purpose of an ocular prosthesis is to maintain the volume of eye socket and create the illusion of a healthy eye and surrounding tissue. A case of a custom- made ocular acrylic prosthesis is presented with acceptable fit, good retention, and esthetics.

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INTRODUCTION

The human eye is a powerful tool that radiates the statement of personality, when this symbol is lost or absent due to congenital defects, intraocular malignancies, acquired traumatic lesion may affect the surrounding soft tissues and muscles within the orbital cavity. It impairs the individual's visual function and also results in a noticeable deformity leading to a facial disfigurement (Sykes, 1996). The deformity caused due to enucleation of the eye result in significant physical and emotional imbalance. Most patient experience stress, primarily due to adjusting to the visual functional disability (Patil, 2008). Though the loss of sight cannot be replaced, the emotional depression can be partially elevated by restructuring the unsightly appearance. Ocular prostheses are either readymade (stock) or custom-made (Cain, 1982). The following case report demonstrates the steps in fabrication of custom-made ocular prosthesis as it increases the adaptiveness than that of the stock shell, matches the iris portion of the existing natural eye and also can simulate the slight eye motion.

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CASE-REPORT

A 51 years old male patient reported to the department of Prosthodontics with the complaint of missing teeth in the upper and lower arch since 2 years. On complete intra-oral & extra-oral examination along with medical history it was found that patient had undergone eye enucleation due to accident 5 years ago. He was using a stock shell since the enucleation and he was not satisfied with the esthetics. Being unaware of custom-made prosthetic rehabilitation of the eye, he was explained all the steps involved and with his consent the further treatment was planned (Fig. 1). The impression of the socket was made as suggested by Barlett and Moore (Bartlett, 1973) using irreversible hydrocolloid. In this technique, the alginate impression material was mixed using excess water until it is very free flowing and fill it in a plastic disposable syringe. The eyelids was drawn gently apart and the impression material was injected on the inner side of the palpebral opening and excess material was ejected from the syringe over the surrounding structures (Shenoy, 2007) (Fig. 2). The impression was reinforced with plaster to increase the strength of the impression and for easy retrieval.(Fig. 3). The primary impression was poured in type II dental stone(Ultra Rock,

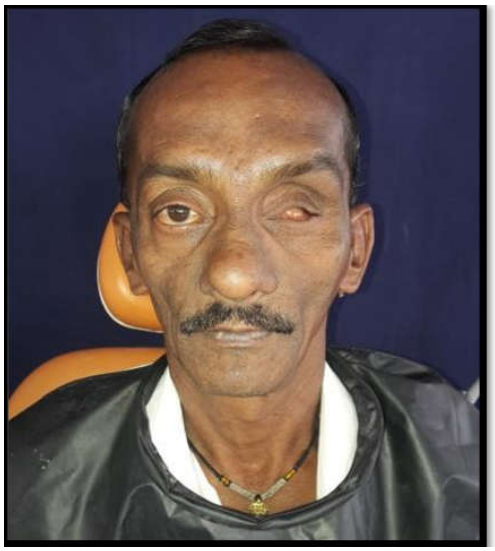

Fig. 1. Pre-treatment extra-oral view

Fig. 2. Primary impression using injection technique, impression reinforced with plaster

Fig. 3. Primary (Alginate) Impression

Fig. 4. Dental stone cast

5. Custom tray

Fig. 6. Making final impression using custom tray with PVS

Fig. 7. Mould pour in die stone with sectioned upper part

Fig. 8. Processing of altered wax pattern

Kalabhai, India) (Fig. 4) over which a custom tray was fabricated after adding a 2mm thick layer of spacer wax (Fig.5). Final impression was made with the custom tray using Polyvinyl siloxane (PVS) light body impression material (Aquasil Densply USA)(Fig.6).

Fig. 9. Measurements for iris

Fig. 10. Characterisation of corneal surface with final custom-made eye prosthesis

Fig. 11. Post-treatment extra-oral view

A two-piece dental stone cast was poured from the impression and the upper section was further divided into two equal parts for the easy retrieval of the wax pattern (Taicher, 1985). (Fig.7) The wax pattern was placed into the socket for evaluation. Patient was instructed to move his natural eye in various directions and the required modifications were made on the wax pattern. The altered wax pattern was used to fabricate the final acrylic resin ocular prosthesis (Fig.8). The measurements of the natural eye were accessed to coordinate the iris of the prosthesis and the position was determined using a grid (Fig.9). At a determined position the iris was incorporated in the custom-made eye shell. Characterisation of the corneal surface was done by removing a thin layer of acrylic resin and painting the surface similar to that of the natural cornea and thin strands of red nylon fibers were painted to represent vessels along the outer periphery (Brown, 1970). The space created on the corneal surface was covered with thin layer of clear acrylic. (Fig.10) The highly polished custom-made prosthesis was placed into the ocular defect and was evaluated for iris and corneal colour, contour, dimension (Brown, 1970)(Fig.11). The patient was educated about the insertion and removal of the prosthesis and the importance of careful cleansing and handling of the prosthesis.

DISCUSSION

Various techniques have been used in fitting and fabricating ocular prosthesis. Ocular prostheses are either readymade (stock) or custom-made (ERPF, 1982). Stock shell can be given when there is time limitation but it might result in ill fitting prosthesis with poor esthetics. They come in standard sizes, shapes and colors. These prostheses can be used for interim or postoperative purposes. If we consider custom-made prosthesis these drawbacks can be eliminated. The fabrication of a custom acrylic resin eye provides a more precise and satisfactory esthetics as an impression outlines the defect contents, with the iris and the sclera being fabricated and painted (Patil et al., 2008). Standard techniques can produce excellent results for most patients, provided the operator has an adequate selection of prefabricated eyes. Therefore, because of the extreme individual variation and diverse nature of ocular injuries, certain patients would benefit more from custom-made ocular prostheses that are modified to their individual needs (Sykes, 1996). Benefit more from custom-made ocular prostheses that are modified to their individual needs (Sykes, 1996). Although the prosthetic rehabilitation may be enhanced with the use of implants, which can coordinate the movements with natural eye, they are not always possible or feasible (Doshi et al., 2005). This article explains some of the basics principles associated with the fabrication of the custom ocular prosthesis. A properly fitted and acceptable custom ocular prosthesis has the following characterstics (Taylor, 2000):

- Retains the shape of the defect socket.
- Prevents collapse or loss of shape of the lids.
- Provide proper muscular action of the lids.
- Prevents accumulation of fluid in the cavity.
- Maintains palpebral opening similar to the natural eye.
- Mimics the colorations and proportions of the natural eye.
- Has a gaze similar to the natural eye Complications in ocular prosthesis:

Ptosis, for the purposes of resolution by ocular prosthesis it can be divided into two major categories i.e, Pseudoptosis and true ptosis. Pseudoptosis occurs when the superior palpebral is not properly supported by the prosthetic eye. This can be managed by changing the contours of the prosthetic eye that can properly support and reposition the lid. True ptosis occurs because of inadequate musculature or lack of tissue tone, the superior lid droops over the prosthesis (Beumer, 1979). Allen (1976) described a method to overcome ptosis by enlarging the upper corneal prominence to raise the lid then by reducing the superior aspect of the prosthesis to form a shelf or depressed area onto which the lid may rest and fold. Also, lower lid drooping can be solved with the similar manner. By removing some of the inferior aspect of the anterior prominence of the prosthesis, pressure forcing the lid downwards is reduced (Beumer, 1979).Other problems associated with the ocular prosthesis like entropion and ectropion, where the contours of the lower lid or position of the eyelashes leave an unesthetic appearance which can be corrected surgically as per Reeh and Beyer but Bulgarelli suggested careful contouring of the wax pattern to relieve the pressure on the lid and increase its support will correct the situation without surgery. Cicatricial bands or adhesions are found that unite the wall of the socket to the lids. These scar bands will reduce the mobility of prosthesis or prevents fabrication.

Surgical revision of the socket in conjunction with a pressure appliance is sometimes successful in eliminating these scar bands. A contracted socket can occur after trauma, infection or when a patient does not utilize a prosthesis for a long period (Beumer, 1979).

Conclusion

The rehabilitation of a patient who has suffered the psychologic trauma of an ocular loss requires a prosthesis that will provide the optimum cosmetic and functional result. . This case report represented a properly finished and polished custom-made prosthesis that enhanced the patient's comfort and confidence by increased adaptiveness and natural appearance and also maintains its orientation when the patient performed various eye movements. The optimum cosmetic and functional results of a custom-made ocular prosthesis enhance the patient's rehabilitation to a normal lifestyle.

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