CASE REPORT

Prosthetic Rehabilitation of a Post-Exenteration Ocular Defect with a Customized Orbital Prosthesis: A Case Report

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SUMMARY

A lost eye and the resultant ocular defect create grave functional deficits and psychological distress in the patient. Prosthetic rehabilitation by an artificial eye helps restore the facial form and allows the patient to return to a normal pattern of life. This case report describes a simple and cost-effective method of fabricating a customized orbital prosthesis.

Keywords: Ocular defect, orbital prosthesis, artificial eye, Moulage

INTRODUCTION

Facial defects either congenital or acquired cause a myriad of problems for the affected patients[1,2]. These include not only physiological but also serious psychological disturbances which are a major cause of avoidance of social contact and altered behavioral response such as anxiety and/or depression in the suffering individuals[2]. Quality of life of such patients is adversely affected and a feeling of societal discrimination is developed[2,3].

A similar scenario exists in the patients who undergo resection of an eye. In addition to the complete loss of sensory visual input to a particular section of brain resulting in blindness in one eye, there is disfigurement of face and extreme psychological distress[5,7,12].Rehabilitation of the patient with a prosthetic eye becomes necessary as soon as the surgical site is completely healed and stable[7,8]. Peymen has suggested 3 classes of ocular defects: Evisceration in which contents of the globe are removed and sclera is intact, Enucleation in which the whole eyeball is removed &Exenteration in which all the contents of the orbit along with eyelids and adjacent tissues are removed[9,10].

Prosthetic eyes have been around since several millennia as artificial eyes made up of stone, bronze, gold and copper were discovered in the Egyptians tombs [4]. In modern era with the advances in fields of material sciences and innovations in clinical methods such cases can be now be dealt with a fair deal of precision, accuracy and better esthetics.

CASE REPORT

A 65 year old female patient presented to the Outdoor of Prosthodontics Department, de'Montmorency College of Dentistry with the complaint of missing left eye. The patient had a history of Uncontrolled Type II Diabetes Mellitus for the last 10 years. She suffered from a severe Candidal infection and necrosis of the left eye 6 months ago which was surgically removed. The patient was since then functionally and psychologically compromised and limited herself to just one room in the house and avoided all types of social contact even with her own children. Clinical examination revealed Orbital Exenteration type of defect as all the contents of the orbit along with the eyelids and adjacent tissues were removed. The defect was large around 4.5cm in width and 3.5cm in height on the exterior (Figure 1). Internally there was a communication between orbital and nasal cavities in the medial aspect. Anatomical undercuts were present in the superior and medial aspects of the cavity which is always a good sign from the standpoint of prosthesis retention.

Technique:

1. The patient was seated in the dental chair in reclined position and drapes placed. She was instructed to breathe with the mouth throughout the procedure.
2. The communication between orbital and nasal cavities along with the external nares was blocked with gauze pieces to avoid lodgment and accidental breakage of impression material in these areas (Figure 2 & 3).
3. Petroleum jelly was applied to the facial hair including both eyebrows, eyelids of the right eye and hair on the forehead to avoid entanglement with the impression material.
4. A wax confiner made up of modeling wax was shaped according to the patients face to limit the flow of alginate only to the required facial area. The oral cavity was not included in the impression and left free for breathing purpose. The openings around the periphery of wax confiner were tucked with gauze pieces to

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prevent dribbling of flowing alginate along the auricular areas during impression taking (Figure 3).

5. Thorough counseling was done. Patient was informed that she will feel cold initially when alginate will touch her skin but will normalize in a minute and the final impression will be slightly heavy because of the weight of alginate and plaster of P.aris.
6. Patient was tilted backwards in supine position in the dental chair for impression taking. Alginate was mixed with cold water for delaying setting and it was injected in the orbital cavity with the help of a large bore syringe (Figure 4).
7. A second mix of alginate was immediately added over the first mix such that a continuous layer of alginate covered the whole area in the wax confiner to a thickness of about half an inch.
8. A few moist gauze pieces were spread over alginate surface and a mix of quick setting plaster of pariswas applied over it to give strength and stability to the impression.
9. During the whole impression taking procedure the patient was constantly reassured and encouraged to continue breathing through her mouth while her husband was holding her hand forencouragement and support.
10. After the plaster of paris was set, impression was removed using a wiggling motion and model poured in dental stone to form a master cast (Figure 5). The defect area of the master cast was duplicated to form a working cast.
11. An acrylic cup lined by a commercially available silicone relining material Molloplast B was fabricated from the working cast. This cup achieved excellent retention by engaging the anatomical undercuts within the defect and the color of silicone fairly matched with the patient's natural skin complexion.
12. An ocular disc was selected by matching with the color of iris of the natural eye. This disc was positioned in the cup with the help of a temporary self cure acrylic stalk and held in place by carding wax along the cup margins. Gaze was adjusted by asking the patient to look at a point at eye level 6 feet away on the front wall (Figure 6).
13. The final position of the ocular disc was sealed with the borders of the cup using auto polymerizing acrylic and the neighboring wax was washed out with hot water.
14. For the fabrication of eyelids transparent auto polymerizing acrylic resin was mixed with common acrylic paints to match the facial complexion. Thin strips of this mix were manually adapted over the ocular disc to form upper and lower eyelids.
15. Artificial eyelashes which are used by women during makeup were modified and secured with cyanoacrylate gel to form fake eyebrows and eyelashes giving natural appearance to the prosthetic eye. A pair of spectacles was also given to the patient which made the prosthetic eye look less conspicuous (Figure 7 and 8).

Instructions regarding cleaning, maintenance and protection of prosthesis from water were given and the final prosthesis was delivered to the patient.

Fig. 1: Preoperative View

Fig. 2: Blocking out Undercuts and Naso-orbital Communication with Gauze

Fig. 3: Placement of Wax Confiner

Fig. 4: Injecting Impression Material into the Defect

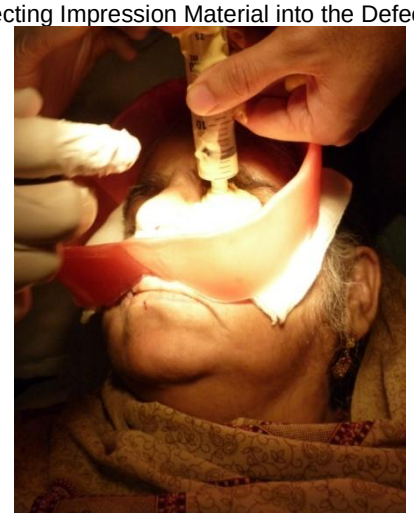

Fig. 5: Master Cast

Fig. 6: Positioning the Ocular Disc

Fig. 7: Completed Prosthesis with Eye brows and lashes

Fig. 8: Patient with Final Prosthesis

DISCUSSION

Artificial eyes have been known to exist since time immemorial. It is indeed of great assistance in moral and psychological uplifting of the suffering patient[4,5]. A custom made orbital prosthesis was fabricated for a chronic diabetic elderly female using a simple and economical method.

The primary concern for the fabrication of such prosthesis is the accurate recording of a facial moulage impression. Although digital image capture and 3D printing of the defect has recently been introduced, it is not commonly available[6]. Irreversible hydrocolloid was the material of choice in this case. Patient compliance is of utmost importance during the whole impression recording phase as the material is initially pretty cold and later becomes heavy after the application of plaster of paris. Comfortable breathing also has to be ensured through the mouth; therefore, a good time has to be dedicated in patient education and counseling sessions.

Another major concern is regarding the mode of retention for this type of prosthesis. Generally endosseous implants, magnets and adhesives are the recommended adjuncts for improving retention[11]. Mostly implants retained prosthesis are considered as the treatment of choice in maxillofacial prostheses but this patient has a long history of uncontrolled diabetes mellitus so implant surgery was contraindicated. Fortunately favorable bony undercuts were present which were engaged by the underlying silicone lined acrylic cup to achieve the desired retention. Incidentally, the color of silicone lining matched very nicely with the adjacent soft tissue and the patient was pleased and satisfied with the final result. This case shows a practically convenient solution for fabricating a custom orbital prosthesis which is esthetically pleasing, retentive and cost-effective.

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