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A Simplified Approach for Prosthetic Rehabilitation of an Anophtalmic Patient with Chronic Mucoid Discharge Using a Previous Ocular Prosthesis

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ABSTRACT

The defects of eye, whatever the cause, are associated with significant anatomical deficiency and emotional and psychological disturbance for affected patients. Defect size may range from a small enucleation defect to an extensive exenterated one affecting eye and surrounding soft and hard tissues in maxillofacial complex. A properly fabricated custom ocular or orbital prosthesis could give the patient an optimal normalcy in social and psychological as well as functional aspects. A 68-year-old male patient presented with an enucleation defect in the left eye. After clinical examination, an impression was taken with additional silicon elastomeric impression material using patient's previous prosthesis as a custom tray. Then, the scleral blank was made from wax and the Iris was attached to it. The external clear acrylic resin was packed and processed. The prosthesis was polished and delivered to patient. Modifying and converting a previously fabricated ocular prosthesis into a newly fabricated well-fitting custom ocular prosthesis can help minimizing clinical adjustments and simplifying laboratory procedures.

Key words: Impression, Custom Ocular Prosthesis, Maxillofacial Prosthesis, Prosthetic Eye

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INTRODUCTION

Anophtalmia, whatever the cause, is associated with significant anatomical deficiency and emotional and psychological disturbance to the patient and, thus, warrants immediate and accurate rehabilitation of the defect by a specialist. The success of an ocular prosthesis is directly related to aesthetics and patient's comfort. In many cases, a stock eye prosthesis is used as a substitute for a natural eye. However, such a prosthesis may not perfectly adapt to the tissue bed of the eye and it usually causes significant discomfort and fails to satisfy the patient's esthetic demands. An ocular prosthesis which gives attention to the accurate duplication of natural color, contour, size and ocular orientation will provide realism and symmetry for patients who need it.

There are some complications related to the use of ocular prostheses. Mucoid discharge is associated with prosthetic eye wear. This common problem adversely affects quality of life of the patients. Discharge is the second most important concern for experienced prosthetic eye wearers after health of their remaining eye and affects 93% of wearers –60% of these patients on a daily basis [1]. Jones and Collin classified the etiologies of eye socket discharge [2]. In that classification, acute discharge was considered to be associated with viral or bacterial conjunctivitis. Chronic discharge in cases with recurrent symptoms often did not respond to topical antibiotic therapy so the viral or bacterial infection ruled out and other etiologies were suggested.

Several techniques have been reviewed in the literature for the fabrication of custom ocular prostheses. These prostheses can be classified as stock shell and also custom-made ones. Because of close contact with the tissue bed, custom-made

ocular prostheses can improve tissue health by reducing fluid accumulation in tissue prosthesis interface -which could lead to irritation and increased bacterial growth in affected patients. In addition, these prostheses apply more equally distributed pressure on the tissue; thus decreasing the incidence of conjunctival abrasion as compared to stock ocular prostheses [3, 4]. This article describes a simplified technique for modifying and converting a patient's previous ocular prosthesis into a newly fabricated well-fitting custom ocular prosthesis that requires minimal clinical procedures and simplified laboratory procedures. A 68-year-old male was referred to the department of oral and maxillofacial prosthetics Shahid Beheshti University of Medical sciences for rehabilitation of an Ocular defect. The patient's chief complaint was eye discharge and lack of retention related to previous prosthetic eye. The patient's past medical history revealed that the left eye globe was severely traumatized in a car accident for approximately 11 years. Subsequent enucleation surgery leaded to as symmetrical appearance in the left orbital fossa. Examination of the eye Socket revealed the presence of superior sulcus deepening and normal lacrimal secretion. Patient's ophtalmologist did not found any type of infection, bacterial or viral, or inflammation or edema in the eye socket. The prosthetic eye lacked retention and patient could hardly use it. It was also considered esthetically unfavorable due to the formation of arcus senilis in the contralateral eye since 9 years ago when the old prosthesis was fabricated. The position of the iris was compared with the normal eye and considered acceptable. The treatment plan involved fabrication of an ocular prosthesis with modifications to correct these problems. In this article, the patient's ocular prosthesis was used as a custom tray for making the ocular impression. An informed consent was obtained from the patient and the protocol of the treatment was approved by the committee of research ethics, Dental school, Shahid Beheshti University of Medical Sciences.

MATERIAL AND METHODS

A suction cup was used as a handle attached to the center of the iris. This handle for the custom tray also had the role of an indicator for the orientation of the visual axis.

A silicon light body impression material (Panasil; Kettenbach GMbH, Germany) was then injected onto the tissue surface of the prosthesis and also into the ocular defect and the prosthesis inserted in the eye for accurate reproduction of surface details. The ocular prosthesis had the role of a guide for the path of insertion of the prosthesis while taking the impression. After about 5 minutes, once the impression material set completely, it was retrieved from the defect.

To get a cast, the impression surface was painted with type III stone (Type III dental stone, Pars Dandan, Iran) and was placed in a disposable plastic glass filled with type III stone immediately under the bulkiest part of the impression.

Iris positioning is a critical step in achieving facial esthetics while making a facial prosthesis that is to be placed in the focus of society's attention [5]. Therefore after gypsum setting, a wax sprue was attached directly to the site of pupil to serve as an indicator for the position of the pupil in the wax pattern. The notches were made, separating medium was used on the notches surfaces and the second half of the stone cast was poured with stone type III (Fig. 1).

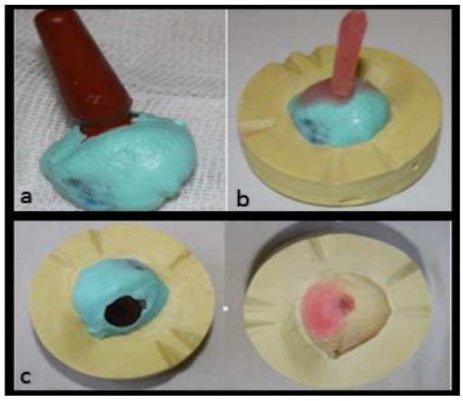

Figure 1: a) primary impression; b) spruing; c) two-part stone cast

After completion of setting, the impression material and the prosthesis were removed from two-part cast and replaced by molten wax (Modelling wax, Polywax, Turkey). After the wax cooled, the flask was reopened and the hardened wax on the tissue surface was retrieved.

The wax pattern was tried-in the eye and its positioning and external contours and eyelid opening with respect to the contalateral eye was

checked (Fig. 2). The position of pupil observed as a clearer point in the wax pattern. It was determined with a small hole on the wax for the later step. The wax pattern placed in the primary cast and the external surface was poured in type III stone again to record the modifications in wax pattern. Then, tooth-colored polymethyl methacrylate (Heat Cure Dental Products, Iranacryl, Iran) was mixed and packed in the mold space, and compression molding was carried out. After processing, the scleral blank was recovered from the flask, and finishing and polishing were done.

This custom ocular prosthesis was evaluated in the patient's eye to verify the extent, fit, comfort and iris position (Fig. 2).

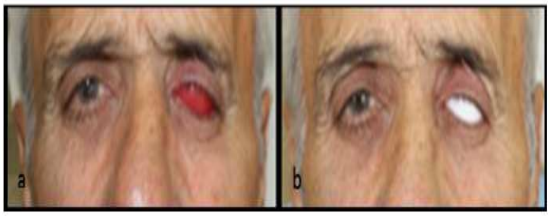

Figure 2: a) Wax pattern; b) scleral blank

With the patient in supine position, the size of the contralateral iris was measured from rear position using a digital caliper. The diameter of the iris was 12 mm. The position of iris was verified with help of landmarks making the patient look straight. A clear iris button with 12 mm diameter was made using Acrylic resin. Iris painting was performed using the conventional paint on technique and oil paints. The colour of previous prosthesis iris and a close-up of patient's eye helped in final shade matching. A more defined ring of arcus senilis was considered for the new prosthesis iris (Fig. 3).

Figure 3: ?????????????

A circle was drawn with radius of 6 mm by using a caliper. Then a 1 mm reduction in external surface of the acrilic prosthesis was done. A further 1mm reduction was made on the iris site and the iris placed on the predetermined position determined in the wax pattern.

Characterization of the sclera performed using acrylic paints and small red color silk thread, which may simulate the blood vessels. Then packing the external surface clear heat cure acrylic was done over the paint as a protective covering (Fig. 4).

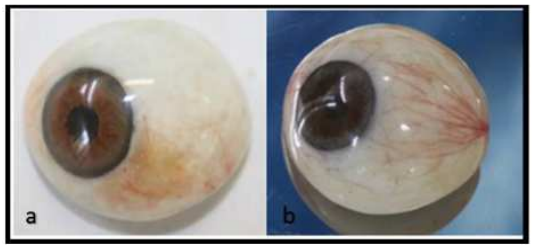

Figure 4: a) Previous ocular prosthesis; b) new prosthesis

After curing, the prosthesis was polished. After cleaning the prosthesis with mild soap, the prosthesis was delivered to the patient (Fig.5). At the time of insertion of the prosthesis, instructions about the proper use, maintenance and also insertion and removal of the prosthesis were given to the patient.The prosthesis should be removed once a day and properly cleaned with warm water. The recall appointments were scheduled for 1 day, 1 week and 1 month later. At 1-month follow-up, according to patient, the eye discharge problem was almost resolved and patient was comfortable and satisfied with the treatment.

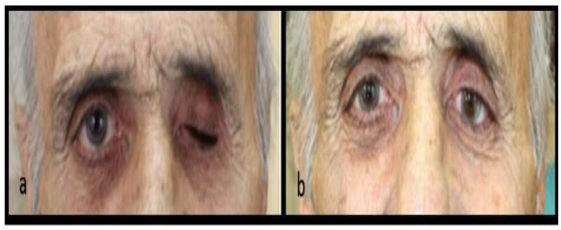

Figure 5: a) Before treatment; b) after treatment

DISCUSSION

Numerous impression techniques have been described in the literature for making ocular prosthesis. Most can be placed into one of several broad Categories: Direct impression/External impression, Impression with stock ocular tray, Stock ocular tray modifications, Impression with custom ocular tray, Impression with stock ocular prosthesis and Wax scleral blank technique [6]. In the technique presented in this article, the tissue surface of the patient's previous ocular prosthesis

was modified and used as the final impression which helped in maintaining the position of the iris at the impression stage itself. This obviated the need for complex iris positioning techniques [7-9]. In other words, the patient's prosthesis acts as a custom tray which helps in reducing the impression material thickness and provides support for it and thus increasing the accuracy of recording tissue topography and also reduce subsequent chairside adjustments. Although the final result was satisfactory, the superior sulcus deepening and the ptosis could be corrected surgically, rather than by modifying the prosthesis. The primarylimitation of this technique is that it is indicated in cases that a new ocular prosthesis is to be made for the patient.

The literature does not provide a complete understanding of the nature and causes of discharge associated with prosthetic eye wear. This is reflected in a range of opinions offered by ocularists' Websites and the lack of a standardized treatment protocol for this distressing condition [10]. Some workers believe that "properly designed, perfectly polished prosthesis is all that is required for total comfort with no excess secretions. Such a prosthesis need only be removed once each year for professional cleaning to remove natural deposits and restore its polished surface." the most important factors in managing discharge are proper design (undefined in his paper) and finish of the surface of the prosthesis [11]. In a retrospective study found that mucoid discharge was more severe in patients who have frequently removed and cleaned the prosthesis [12]. Jones and Collin classified the etiologies of eye socket discharge [2]. In that classification, acute discharge was considered to be associated with viral or bacterial conjunctivitis. Chronic discharge in cases with recurrent symptoms often did not respond to topical antibiotic therapy so the viral or bacterial infection ruled out and other etiologies were suggested. Their classification was successful in making more accurate diagnosis for infections but did not provide guidelines for effective treatment of discharge problems. In this case, eye discharge significantly reduced after delivery of the prosthesis in subsequent follow-up appointments. Generally, It seems that proper fit of the prosthesis minimizes the space between the interface and the tissue bed; thus reducing the accumulation of secretions in the eye socket.

CONCLUSION

This article describes a simplified technique of modifying and converting a previously fabricated ocular prosthesis into a newly fabricated well-fitting custom ocular prosthesis not only minimizing clinical adjustments and simplifying laboratory procedures but also improving patient's quality of life and satisfaction.

Conflict of interest

Authors declare that there is no conflict of interest regarding the publication of this paper.

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