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Custom - made ocular prosthesis: A novel way of iris positioning: Case report

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Abstract---Loss of any part from the maxillofacial region can have traumatic impact on the psychology of an individual. A prime role in facial expression is played by the eyes and tissues around it. A missing eye can be rehabilitated prosthetically. The main aim is to achieve adequate esthetic and function with rehabilitation to improve lifestyle and social acceptance. The ocular prosthesis can be a stock eye shell or custom-made eye. Exact matching of the contralateral eye is of utmost importance. Here a novel way of iris positing has been done. Thus, this case report presents a unique technique for the fabrication of a custom-made unilateral ocular prosthesis.

Keywords---maxillofacial prosthesis, custom-made eye prosthesis, ocular defect, hanau springbow, maxillofacial rehabilitation.

Introduction

The eye is a vital organ in terms of vision as well as an important component of facial expression. Loss of eye has an ill effect on the psychological well-being of the patient. Prosthetic eye must be provided to such a patient in order to boost their confidence and allow them to efficiently perform routine daily activities. An ocular prosthesis can be either stock or custom-fabricated. Stock prosthetic eye comes in standard sizes, shapes and color combinations which can be used as an interim or definitive prosthesis. Custom prosthesis have several advantages which

include better-quality fit, comfort, enhanced esthetics, control over the size of the iris, pupil and color of the iris, and sclera. Better eyelid movements as a result of even distribution of pressure reducing the incidence of ulceration. 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.^{1, 2}

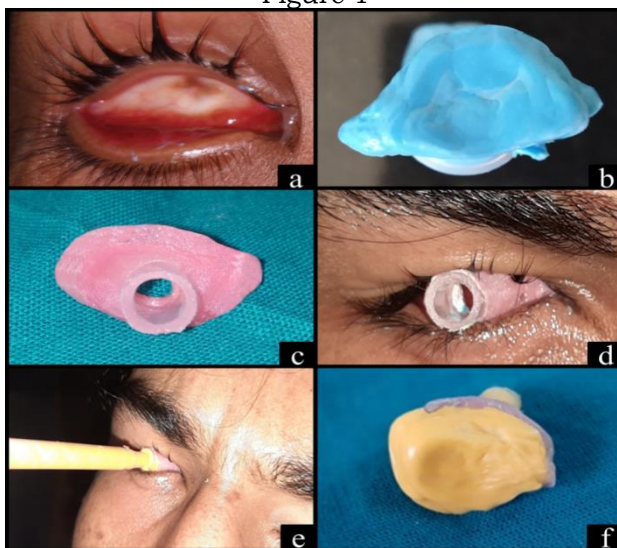
Case Report

A 20-year-old male patient reported to the Department of Prosthodontics, Al Badar Rural Dental College, Gulbarga, Karnataka, with a defect in the right eye. Case history revealed that he got his right eye enucleated when he was young due to a traumatic injury (Figure 1).^{3,4} On examination mucosa was healthy. Sulcus depth was sufficient to retain the prosthesis. A custom-made ocular prosthesis was the treatment of choice to meet the needs of the patient since it would result in better esthetics and function when compared to a stock eye shell.²

Procedure

A thin, uniform layer of petroleum jelly was used to prevent the impression material from sticking to eyelashes. The primary impression was made with irreversible hydrocolloid material (Alginate, Prime Dental Products Pvt. Ltd., Mumbai, India)(Figure 1a, b). A cast was fabricated with type II gypsum from the poured impression on which a special tray was fabricated using self-cure acrylic (Dental Products of India, Mumbai, India). A syringe was attached to the special tray through a perforation made at the center of the custom tray. Impression of the defect was recorded using cold soothing polyvinyl siloxane light viscosity material (Dentsply, Germany). The material was injected into the socket (Figure 1c, d and e).

Figure 1



The patient was instructed to make various eye movements as the material was injected so that the impression was recorded in the functional form. After the material had been set, the impression was retrieved from the socket and checked to ensure that all the surfaces were recorded (Figure 1f). Type III dental stone cast was poured to immerse the lower part of the impression (Figure 2). After the stone had set, separating media was applied to the surface. Then the second layer was poured. Markings were made on all four sides of the cast for proper reorientation. Next, the wax pattern was fabricated by pouring the molten wax into mould. The wax was properly contoured and carved to give it a simulation of the lost eye. The wax pattern was tried in the patient's socket and checked for comfort, size, support, fullness, and retention by performing the functional movements (Figure 2 a).^{5,6}

After the trial, the iris positioning was done with the help of a Hanau face-bow. The U-shaped frame of the Hanau spring bow is reversed such that the orbital pointer is stabilized on the lower border of the left ala of the nose. This will enable standardization, stabilize the facebow and act as the third point of reference (Figure 2 b). The transfer clamp assembly was attached to the reversed facebow frame. The edentulous facebow fork of the Hanau spring bow was chosen due to its thinner design, which enables it to readily accommodate the distance between the outer and inner canthi of the eye and attach it to the transfer clamp assembly.

On the bite-fork, a scale was attached and to calibrate the distance a toothpick was attached at the center of the scale. From the toothpick attached at the center of the scale, another toothpick is attached at the level of the iris of the natural eye. The distance was measured between the two toothpicks and the third toothpick was attached to the wax pattern using the distance measured (Figure 2 c).

Figure 2



The prefabricated iris button was used matching contralateral eye and is attached to the wax pattern on the position marked using the face-bow (Figure 2 e). The

wax pattern is then flaked, dewaxed, and packed with tooth-colored heat cure acrylic resin and Clear acrylic resin(Dental products of India, Mumbai) (Figure 2 f), the shade of which was initially matched with the scleral portion of the contralateral eye. After flasking and curing the prosthesis is trimmed to the desired size, and was polished before the insertion (Figure 3 a, b and c).⁷ Patient was satisfied with the comfort and appearance while wearing the custom made ocular prosthesis(Figure 3 f).

Post Insertion instructions were given for easy retrieval of prosthesis by use of a suction holder while maintaining a towel below. For cleansing exercise moderate soap or detergents can be used, Wearing the prosthesis in the course of day and night time does not damage however preserve tissue contours and use of lubricant for maintaining the eye moist as instructed by an ophthalmologist. Advice not to do stretched eye movements when gazing at something rather move neck along with gaze to make a camouflage effect. If callus formed, should be removed using fingernails. Loss of prosthesis gloss should be reported for polishing and finishing to the maxillofacial prosthodontist.⁸

Figure 3



Discussion

The ocular prosthesis is an artificial replacement for the eyeball. After the surgeon enucleates the eye, a prosthodontist is a person who comes into the picture for providing the patient with an artificial eye to overcome the agony of losing an eye (Figure 3 e). A well fabricated ocular prosthesis maintains the orientation when the patient performs functional eye movements (Figure 3 f). Now with the advent of materials like heat cure acrylic resin (DPI) as used here, it was possible to fabricate prosthesis with a natural appearance. The use of stock ocular prosthesis cannot be neglected as they are also available in various sizes and colors. Still, a custom-made ocular prosthesis provides better results both aesthetically and functionally. The prosthesis retains the shape of a defective socket, prevents collapse of lids, provides good muscular functions of the lids, maintains the palpebral openings, and also gives a gaze that is similar to that of the natural eye.

Conclusion

The esthetic and functional outcome of the custom-made ocular prosthesis is far better than the stock ocular prosthesis. The procedure used here is simple to understand and also cost effective. Although the patient cannot visualize through the prosthesis it does increase the patient's social acceptance and confidence to face the world unnoticed. In this case report novel way of iris positioning and fabrication of customized ocular prosthesis is discussed in detail.

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