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An innovative approach of precise iris position for fabrication of customised ocular prosthesis.

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Abstract

Loss of the eye could be due to a congenital defect, trauma, or tumors. Restoring such defects is necessary for esthetics and to depress the psycho logical impact of such disfigurement. A challenging task in the fabrication of an ocular prosthesis is positioning the iris precisely. The shape, size, and positioning of the iris play a pivotal role in an attractive ocular prosthesis.

An incorrectly positioned iris results in squinted eye appearance and to overcome the difficulty various methods are available. One of the known difficulties is positioning the iris in three dimensions. This case reports presents a novel technique for positioning and centering the iris thus providing a solution by duplicating the position of iris in three planes. The novel technique is based on well-established reference planes for accurate positioning of the iris. The method is readily available, easy to use in a clinical setup, and allows repeated verification of the positioning. The technique is an ergonomic and innovative alternative to known methods of iris positioning with minimal chance of errors.

Keywords: iris positioning, ocular prosthesis, enucleation

Introduction

Eyes are a window to the soul and often the first facial feature to be noticed. Disfigurement due to loss or disappearance of an eye has a profound effect on a person's psyche. Anophthalmia may result from congenital ab normalities, trauma, sympathetic ophthalmic disease, painful blindness, or cancer.[1]

Such patients are candidates for receiving prosthodontic rehabilitation in the form of an ocular prosthesis. The prosthetic rehabilitation of these defects is largely for aesthetics, comfort and for social acceptance.

Duplication of a correct gaze is of paramount importance to make an inconspicuous prosthesis. Many methods for

the precise positioning of the iris have been described in the literature, such as an ocular locator, fixedcalipers, grids, dividers, inverted anatomic tracings, and visual assessment.[2] The most common challenge while precisely positioning an iris is duplicating the position in all three planes and the novel method aims to provide an easy and accessible solution to it. The aim of this case report is to introduce a novel method for precise and symmetrical positioning of iris and thus help in aesthetics by establishing a conversational gaze that will serve as a trustworthy source of the patient's nonverbal expression.

Case report

A 52-year-old female patient presented in the department of Prosthodontics, crown and bridge with a chief complaint of missing right eye due to automobile injury 30 years ago. On examination, the tissue bed was healthy and there was adequate depth between the fornixes for retention. A customized ocular prosthesis using iris from stock eye was planned.

Procedure

The patient was seated in an erect position to allow the defect and surrounding tissues to be recorded in their natural drape. An initial impression using alginate was made and was used to make a custom tray and adjustments were made. (Figure 2) Final impression was recorded using light body elastomeric impression material (figure 3). A two-piece split cast method was used to prepare the stone mould. A wax-up was fabricated by flowing molten wax in the mould, tried in the patient's eye socket, and adjusted for desired volume, retention and comfort. A stock eye matching the color, shape and size of iris was selected. For positioning of the iris, a special assembly was made. It consisted of Plane analyzer that has occlusal bite fork and adjustable interpupillary plane onto which applicator tips were held with silicone blocks and a ruler was placed (figure 4). Digital vernier caliper was also used alongside for precise placement of markings on the patient.

Procedure for iris positioning

1. The patient was seated in the natural head position or Esthetic reference plane and midline of face was marked.
2. The position of the iris of the left eye while gazing straight was marked on the forehead by keeping a scale on the Center of the iris. Inner and outer canthus of the eye was also marked.
3. These markings were transferred onto the defect side with the help of digital vernier caliper.
4. Patient was then asked to bite on the mounted impression compound on the plane analyser for bite registration. The interpupillary line was adjusted accordingly and applicator tips were positioned for centering of the iris on the wax-up (figure 5,6,7).
5. The iris disk from the stock eye was trimmed according to the measured dimensions and placed on the markings.

Trial of wax-up with stock iris was done (figure 8). After the final adjustments and ascertaining the patient's satisfaction, the wax-up was processed using the conventional compression moulding technique (figure 9, 10). The prosthesis was delivered to the patient with post -delivery instructions (figure 11). The outcomes were highly satisfactory for the patient.

Discussion

The key to an appealing ocular prosthesis is precise Iris positioning. Like with any other restoration, bilateral symmetry is crucial for ocular prosthesis. There are numerous techniques to position iris in an ocular prosthesis.[3] A common reason for failure or unesthetic outcomes is failure to place iris precisely. One of the most challenging tasks is precise placement of iris in all

three planes i.e., coronal, mid-sagittal plane and horizontal plane and this novel technique provides a solution to it. This novel method was based on the principle of using horizontal plane and interpupillary plane to record the position of the iris.[4]. The patient is placed in Natural Head Position (NHP; also known as Esthetic reference position; ERP) to capture the horizontal plane. NHP is the position of the head most comfortable for a patient gazing at the horizon.[5] The plane analyzer records the orientation of the maxilla while patient sits upright with arms parallel to horizontal plane and interpupillary line. The technique helps with bilateral positioning and centring of the iris along the inter pupillary line, hence giving a precision position of iris in three dimensions.

The technique is also less time consuming, requires minimal skill, no need for assistance, allows repeated checking of iris position, can be used for multiple patients and is easy to use in clinical setup and is readily available.

Conclusion

The success of an ocular prosthetic rehabilitation depends on iris positioning. This technique presented here provides an objective method based on well-established reference planes resulting in accurate and bilaterally symmetrical registration of iris position.

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Legend Figures

Figure 1: Preoperative

Figure 2: Preliminary impression using irreversible hydrocolloid

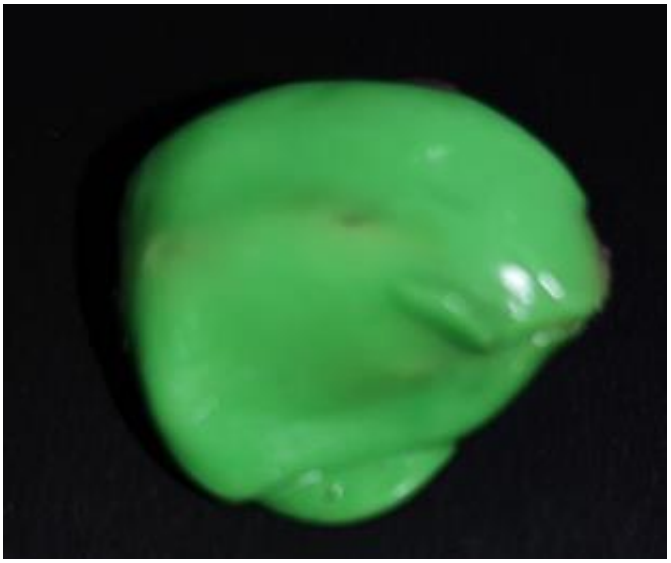

Figure 3: final impression using stock tray and elastomeric impression material

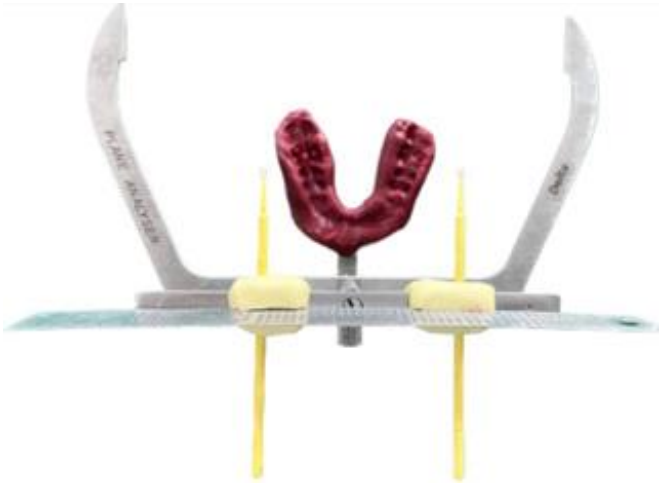

Figure 4: customized assembly for iris positioning.

Figure 5: assembly in position

Figure 6 assembly in position

Figure 7: assembly in position

Figure 8: ocular wax-up

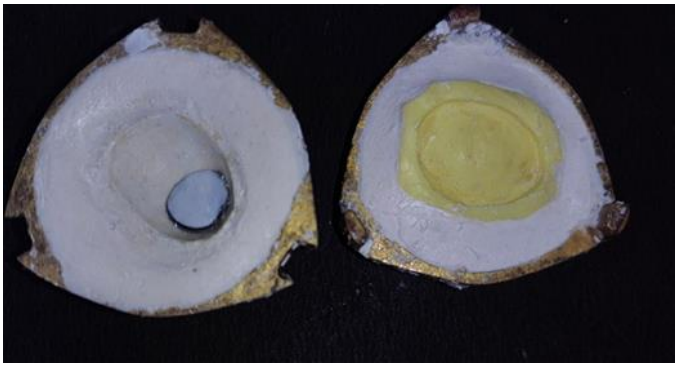

Figure 9: mould fabrication through investment and dewaxing

Figure 10: characterization by adding vein and arteries thread

Figure 11: post operative picture.