

Prosthetic Rehabilitation of a Patient with an Ocular Defect: A Simplified Clinical Approach

Dr Rewant Rajbhandari,¹ Dr Barsha Ghimire,² Dr Saishab Dhital,³ Dr Sunita Prajapati⁴

^{1,4}Post Graduate, ²Asst. Professor,

³Lecturer; Department of Prosthodontics, Kantipur dental college and research center.

Corresponding Author

Dr Rewant Rajbhandari

Email: rewant777@gmail.com

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ABSTRACT

Maxillofacial rehabilitation is always challenging task which is a blend of art and science. Providing artificial substitute to restore the form and functions is mandatory to boost psychological as well as social status of such patients. Methods : Ocular defects constitute an important maxillofacial deficiency which requires prosthetic replacement to restore aesthetics and comfort of the patient with esthetic appearance facial . Results : The optimum cosmetic and functional results of a custom made ocular prosthesis enhance the patient rehabilitation to anormal lifestyle. Conclusions: This case report elaborates the technique of fabrication of custom-made ocular prosthesis with the use of tooth colored self-cure acrylic which develop the moral to the patient.

Keywords: Iris positioning, ocular prosthesis , prosthodontics.

INTRODUCTION

The face is a picture of the mind with the eyes as its interpreter. The unfortunate loss or absence of an eye may occur due to congenital defect, irreparable trauma or tumors. The defacement due to loss of an eye can cause significant physical and emotional problems.¹ Therefore providing an artificial substitute to restore the form and functions is essential for such disability. Prosthetic rehabilitation of such patient has therefore become the treatment option to restore aesthetics and comfort and also elevate psychological status of such patients.²

The procedure of prosthetic eye replacement presents many challenges such as the precise alignment of the iris, correct inter pupillary distance and positioning with respect to the contralateral eye^{3,4}. Many methods for the precise positioning of the iris have been described such as use of an ocular locator, fixed calipers, grids, dividers, inverted anatomic tracings, visual assessment etc.⁵

CASE REPORT

A 28 year old male patient was referred to the Department of Prosthodontics, Kantipur Dental College and Hospital with a complaint of facial disfigurement due to loss of the left eye(Figure 1). History of trauma of the left eye followed by evisceration was noted. A custom-made acrylic resin ocular prosthesis was planned, and the treatment procedure was explained to the patients and consent was obtained.



Figure 1: Pre-operative view

Clinical procedures

The irreversible hydrocolloidal material as shown in figure1 (Plastalgin Chromatic, Septodont Healthcare PVT LTD, India) was manipulated with a water powder ratio of 16 gm powder with 36 ml water to obtain a slight fluid flowable mix that would easily syringed into the defect to make a preliminary impression.

Wax spacer was adapted and an acrylic custom tray was then fabricated for better fit on the defect(Figure 3), and a final impression was made with elastomeric impression material. The acrylic custom tray was loaded with polyvinyl siloxane impression material (Bonasil) and injected into the defect.(Figure 4)

The patient was ask to make the eye moments so as to obtain a functional impression. Once set, the impression was removed. The impression was boxed and poured in two sections; First section is up to the height of contour of the impression of the defect. Orientation grooves were



Figure 2: Preliminary impression made in alginate.

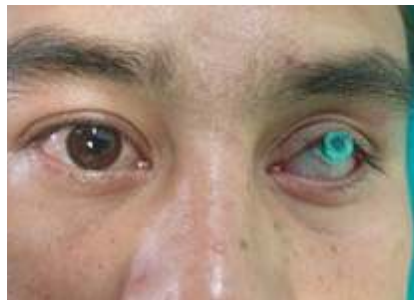


Figure 3: Custom tray fitting.



Figure 4: Impression of the ocular defect made with light-body addition silicone elastomeric impression material.

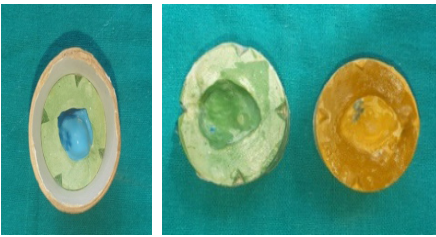


Figure 5: Preliminary molds prepared.



Figure 6: Scleral wax pattern.

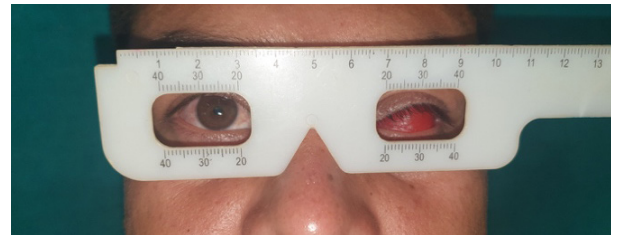


Figure 7: Positioning of the iris with the help of PD ruler.



Figure 8: Scleral wax pattern with iris placement.



Figure 9: Final eye prosthesis.



Figure 10: Before & After.

made on this section and a separating media was applied, second section of the impression was then poured. Once set, the cast was separated and re-assembled in the same position (Figure 5).

The defect site was filled with molten base plate wax. Once the wax solidified (Figure 6), the fit of the wax pattern was observed by gently lifting the lids and observing the extension into the fornixes. A prefabricated stock eye shell, whose iris shade matched with the contra-lateral eye, was selected.

After try-in of the scleral wax pattern, the iris disk was positioned with the help of a PD ruler (PD ruler; Zenni Optical, San Francisco, CA) (Figure 7). The instrument consists of graduated scales situated at the horizontal plane, relative to the axis of the patient's nose. The instrument is positioned by resting the notch on the bridge of the nose and adjusted to accommodate the eye

within the ocular aperture. The patient is asked to hold the position of the eye in a normal conversational gaze. The orientation, pupillary distance, and mediolateral dimension of the iris of the companion natural eye were measured from the graduated scale. Multiple readings were taken until consistent measurement was achieved. These measurements were transferred onto the sculpted scleral wax pattern.

The iris button was positioned in the marked area and the established orientation was evaluated for position and symmetry. This confirmed the positioning of the iris in the wax pattern in comparison to the iris of the contra-lateral eye (Figure 8).

The wax pattern was acrylized, and the prosthesis was finished and polished. Further characterization was done by attaching artificial veins to simulate that of the natural eye (Figure 9).

DISCUSSION

The ocular prosthesis is an artificial replacement for the bulb of the eye. After the surgeon enucleates the eyeball, Prosthodontist is a person who comes into an act of providing the patient with an artificial eye to overcome the trauma of losing an eye. A properly made ocular prosthesis maintains its orientation when patient performs various movements. Moreover the use of stock ocular prosthesis provide better results functionally as well as esthetically. It retains shape of defective socket, prevents collapse of eye lids, provides muscular functions to the eye lids and gives a gaze similar to that of opposite natural eye. Custom made acrylic eye is easy to fit and adjust, unbreakable, inert to ocular fluids, esthetically good, long lasting and easier to fabricate.⁶

In cases of facial asymmetry, accurate marking of the midline could produce subjective errors in this methods, due to the variation in operator's perception. Various methods regarding accurate positioning of the iris and ocular portion of the orbital prosthesis have been described.

Roberts⁷ proposed the use of the pupillometer. Joneja et al⁸ described the use of window light. Brown⁹ used caliper measurements made from the patient's face. Mc Arthur¹⁰ described the use of the ocular locator and fixed caliper for positioning the artificial eye. Benson¹¹ suggested fabrication of a custom- made acrylic resin and positioned the iris by visual judgment. Jooste¹² described the use

of dividers to decide the iris position. Nusinov et al¹³ mentioned the technique of inverted anatomic tracings for establishing the orbital tissue contours of the oculofacial prosthesis.

The conventional use of visual assessment being subjective produces inaccurate results.¹⁴ The PD meter provides an accurate registration of alignment of an ocular prosthesis.

This technique requires minimal skill and is very economical. A PD ruler is relatively more convenient than the graph grid technique, since preparation of graph cutouts and transferring landmarks to graph grids is cumbersome.^{15,16}

Though the method described here is more precise, it may not be feasible to use the PD ruler in every clinical set-up. This method is not applicable for individuals with hyper-telorism, wherein both eyes cannot be accommodated in ocular apertures of the PD ruler.¹⁷

CONCLUSION

The esthetic outcome of the custom-made prosthesis was far better than the stock ocular prosthesis. The procedure used here is simple and cost effective. Although the patient cannot see via this prosthesis, but this prosthesis will increase the self-confidence of the patient to face the upcoming challenges in his life.



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