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Case Report


# Customized Ocular Prosthesis with Eyewear-Assisted Iris Positioning: A Case Report

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## Abstract

This case report describes a modified technique for iris positioning in a customized ocular prosthesis by utilizing eyewear as a reference guide. A 35-year-old male patient with an anophthalmic socket resulting from trauma presented for rehabilitation with a custom ocular prosthesis. Due to socket irregularities and the patient's expectation for a natural and symmetrical appearance, a modified method incorporating high-quality eyewear was employed to aid in accurate iris alignment. This approach proved to be practical, cost-effective, and user-friendly, significantly reducing the likelihood of asymmetry, minimizing chairside adjustments, and enhancing overall patient satisfaction. The case highlights the importance of individualized and creative techniques in achieving optimal aesthetic outcomes in ocular prosthetics.

**Keywords:** customized prosthesis, eyewear, iris positioning, ocular prosthesis

## Introduction

Partial or complete loss of vision in an individual affects not only visual function but also self-esteem and social interactions.[1] Patients who have undergone enucleation or evisceration frequently seek rehabilitation with an ocular prosthesis. Broadly, ocular prostheses made from acrylic resin fall into three categories: I) Stock (prefabricated) prostheses, II) Custom-fitted prostheses fabricated from an impression of the socket, and III) Modified stock prostheses using various techniques.[2]

Using a custom-made ocular prosthesis enhances a person's psychological well-being, self-confidence, and social acceptance.[3] Compared with stock prostheses, custom-made prostheses provide better socket fit, better aesthetic outcomes, and reduced long-term discomfort for the patient.[4]

To achieve symmetry and a life-like appearance, the fabrication of an ocular prosthesis is a technique-sensitive process requiring precise replication of the natural eye's color, size, shape, and orientation. The construction involves multiple clinical and laboratory stages, with particular emphasis on creative and individualized strategies to ensure successful prosthetic outcomes.

Fabrication of ocular prosthesis poses numerous challenges, one of the most critical being the accurate positioning of the iris. An improperly positioned iris can result in an undesirable squinting effect.[5] The literature describes various techniques for iris placement, including pupillometers[6], visual assessments, facial landmarks[7], and grid systems.

Correct iris placement, shade selection, and contouring are key components of aesthetics. Cicatrical retraction is the prosthodontist's biggest obstacle while creating an ocular prosthesis in the anophthalmia sockets.[8] This occurs because atrophy under these circumstances causes the prosthesis's size to be reduced to achieve a precise contour and give the artificial iris a realistic, symmetrical, and natural-looking appearance.[8]

This case report details the design, positioning of iris-assisted with eyewear, fabrication, and fitting of a custom ocular prosthesis tailored to a patient's individual needs. Through careful clinical and laboratory protocols, the final prosthesis achieved an ideal balance of esthetics, comfort, and patient satisfaction.

## Case Report

A 35-year-old male patient visited the Department of Prosthodontics seeking a prosthesis for his right eye. His medical history indicated that the right eye had been enucleated 10 years ago following a traumatic injury. On examination, the anophthalmic socket was found to be fully healed, with preserved activity of the surrounding muscles (Figure 1). The patient had been wearing a stock artificial eye shell for 10 years. Owing to discoloration and ill-fitting of the prosthesis, the patient opted for a new prosthesis. A custom-made ocular prosthesis was planned for the patient.

**Figure 1:** Pre-treatment photograph.

### Impression making

• Before beginning the impression patient was seated in an upright position with a straight head posture. The patient was asked to relax the facial muscles to avoid involuntary blinking or eyelid movement, which could interfere with the uniform distribution of impression material.

• A thin layer of sterile glycerine was applied to the inner lining of the anophthalmic socket and the eyelashes using a sterile cotton swab. To reduce friction between the impression material and delicate mucosal tissues of the socket.

• For the primary impression, an irreversible hydrocolloid (alginate) such as Dentsply Zelgan Advanced was chosen. Alginate provides good surface

detail for preliminary recording.

• The mixed alginate was loaded into a 5 mL disposable syringe (Dispovan). The syringe allows controlled and directed placement of material into the socket, minimizing overflow. The material was dispensed slowly and steadily to prevent air entrapment and excessive pressure on the delicate tissues. Overfilling is avoided, as it can cause distension of eyelids, discomfort, and distorted records.

• After injecting the impression material, the patient was instructed to move the eye in different directions—right, left, upward, downward, and circular movements.

• After the impression material had set, it was removed with care. The lower eyelid was gently pulled down and away from the nasal side to release the vacuum effect. The impression was then disengaged in an arc-like motion beneath the upper eyelid.

• The impression was rinsed with lens cleaning solution and saline. Lens solution contains mild disinfectants that remove debris without damaging impression surface details.

• The cleaned impression was poured immediately using dental die stone (2GM Dental Orange Die Stone).

• A custom impression tray was fabricated on the primary cast using clear cold-cure acrylic resin (DPI RR Cold Cure). The transparency of the tray allows visualization of the material flow and positioning within the socket. It provides an accurate base for making a detailed secondary impression.

• The nozzle end of a disposable syringe was attached to the central opening of the custom tray using cyanoacrylate adhesive. This modification allows precise injection of low-viscosity material into the socket while the tray stabilizes over the surrounding tissues.

• The final impression was made using light-body silicone elastomeric impression material (Prime Dental Ad-Sil Acura). The patient was instructed to look straight ahead during the procedure to ensure a centered gaze position of the prosthesis. (Figure 2)

**Figure 2:** Final impression made with light body elastomeric impression material.

### Pouring an ocular impression into a two-piece die stone model

• The impression was poured into a piece model with die stone. An appropriately sized paper cup or similar container to hold the ocular impression was chosen.

• Die stone was mixed and poured the first layer into the container, filling only enough to cover the lower portion of the impression. The ocular impression was positioned in this first pour, so it is stable and correctly oriented.

• Before the first pour sets completely, 3-4 equidistant keying notches were made on the surface using a wax knife.

• These notches helped in reorienting the two pieces during reassembly.

• Once the first pour is fully set, a thin layer of separating medium is applied over the exposed surface to prevent bonding of the two pours.

• The second layer was poured over the first pour, completely covering the impression and filling the container.

• The impression was carefully removed from the die stone and separated into two halves
(2GM Dental orange die stone Giriraj Products, Mumbai, India) (Figure 3).

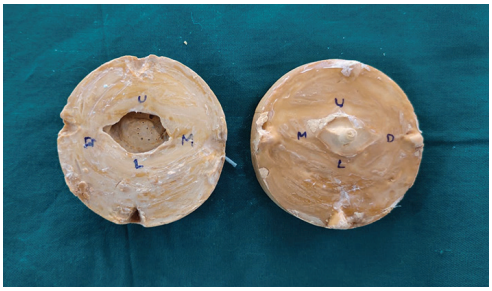

**Figure 3:** Two-piece stone model poured in the die stone.

### Fabrication of the scleral wax pattern

• After the impression was retrieved, modelling wax (MAARC DENTAL, Palghar, Maharashtra, India) was poured.

• The wax conformer's anterior surface was designed to resemble the traits of the contralateral natural eye.

• The try-on of the wax conformer was completed and examined for eyelid support, comfort, size, appearance, and eye movement simulation. The contralateral normal eye's iris and pupil diameters were measured via a Vernier caliper.

• A stock ocular eye shell that was identical to the contralateral native eye in terms of size and color was selected (Figure 4).

**Figure 4:** Original stock eye shell.

### Iris positioning

• Appropriate eyewear that covers the patient's eye from all sides was selected.

• To create a transparent graph grid, a paper graph grid was photocopied onto a transparent sheet.

• Once the sheet has been cut into two equal pieces, modelling wax is used to adhere it to the eyeglasses.

• The patient is requested to maintain the eye posture with a typical conversational gaze while facing forward (Figure 5). The medial, distal, superior, and inferior ends of the iris are traced using an indelible ink marker.

• Using the mirror image of the contralateral eye's grid cutout, an image is drawn on the afflicted side's grid cutout.

• After the stock eye shell's iris color was selected, the iris was meticulously cut and placed onto the wax design, where its location was marked using an eyeglass grid. All eye movements were used to verify and examine the iris position again.

**Figure 5:** Iris positioning assisted with eyewear.

### Flasking and curing

• The type III dental stone (Kalabhai Ultrastone, Karson Pvt Ltd, Mumbai, India) was used for flasking. Before flasking, the hub portion of the needle was cut and attached to the center of the iris with cyanoacrylate. This prevented the movement of the iris within the flask during acrylic packing. The complete wax pattern was invested in a flask, and flasking was carried out according to standard procedures.

• After that, dewaxing was carried out for 20 minutes in a water bath. Following dewaxing, the flask was unsealed and filled with Tooth Coloured Heat Cure Material (DPI, Dental Products of India, Mumbai, Maharashtra,

India).

• As directed by the manufacturer, the powder and liquid were combined. To replicate precise shade matching and vasculature, brown colour heat-cure pigment (Milestone Healthcare, Raipur, Chhattisgarh) was mixed with a minimal amount of clear monomer-polymer mix and was painted in the distal end to mimic the pigmentation.

• Rayon thread fibrils were added around the iris and the mesial end with the monomer-polymer mix. This would mimic the vasculature. Following the manufacturer's instructions, the PMMA was packed into the flask's dewaxed section and cured. Following processing, the prosthesis was removed from the flask for polishing and finishing.

### Insertion and post-care

After the ocular prosthesis was placed in the eye socket, its fit, support, appearance, and synchronization with the contralateral eye were evaluated (Figure 6). It was recommended that the patient clean the prosthesis with water and soap once a day and wipe the tissue bed once a day with a piece of moist gauze. The use of 0.5% carboxymethylcellulose sodium was recommended for the patient. It is recommended mainly because it acts as a lubricating and moisturizing agent for the ocular surface. On days one, two, and seven after the prosthesis was inserted, the patient was examined. A six-month follow-up was conducted to assess the prosthesis.

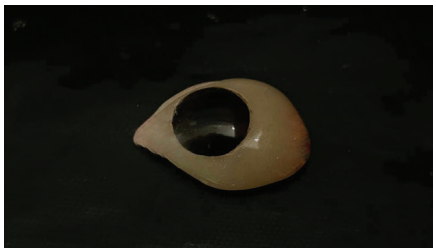

**Figure 6:** Post-treatment photograph.

## Discussion and Conclusions

Because the prosthesis is fabricated using the patient's current anatomy, the custom-made ocular prosthesis fits the socket precisely, providing the advantages of greater adaptability, eyeball movement, and an iris position that precisely matches that of the adjacent natural eye.[9]

The described technique is a simple, practical, and time-efficient method for fabricating a customized ocular prosthesis.

Various techniques have been proposed to determine the size and position of the iris through visual assessment.[10] In 1969, Roberts developed a device called a pupillometer for iris positioning in prosthetic eyes. It uses the pupil as a fixation point and rests on two plastic rotatable discs with scale marks on the nasal bridge.[11] For iris centering, McArthur employed the ocular locator. He placed an Ocular locator on the patient's face, overlaying the marks on the patient's face with the horizontal lines and the designated midline to outline the anatomy of the eye.[12] Guttal *et al*., precisely positioned the iris using a grid template. In regards to iris location, using a transparent graph grid is a straightforward and trustworthy technique as opposed to ocular evaluation. However, the graph must be held by an assistant using this approach, which is prone to inter-observer error.[13] Owing to the above-mentioned drawback, this case report highlights the use of eyewear with a graph grid attached to its glass lens.

Meena *et al*.,[5] described the attachment of a transparent grid to the spectacle frame using cyanoacrylate adhesive; however, once bonded, the grid becomes permanently fixed and cannot be repositioned, and its removal often results in damage to either the eyewear or the grid sheet. In contrast, the use of modeling wax for the attachment of grid allows easy detachment of the grid without causing any damage to the eyewear or grid sheet, making it reusable for multiple patients or repeated trials.

The versatility that eyewear provides throughout the fabrication process is one of its main benefits when it comes to iris location. The ability to wear eyeglasses during the fitting allows for real-time alignment monitoring of the prosthesis and allows for corrections to be made without requiring many visits. Additionally, it allows for a more customized fit because the eyewear may be adjusted to the patient's eye's natural position, taking into account any differences in the structure of their socket.

From a clinical perspective, this method enhances the patient's comfort and confidence. Prostheses that are closely aligned with the patient's natural eye position reduce the psychological burden that often accompanies ocular prosthetics. The use of eyewear as a temporary positioning guide can improve the patient’s satisfaction, as they can see the potential final look during the trial phase,

allowing for collaborative decision-making in the fitting process.

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None

## Conflict of Interest

The authors declare no conflict of interest.

## References

1. Fernandes AÚ, Goiato MC, Batista MA, Santos DM. Color alteration of the paint used for iris painting in ocular prostheses. Braz Oral Res. 2009;23(4):386-92.
2. Bartlett SO, Moore DJ. Ocular prosthesis: a physiologic system. J Prosthet Dent. 1973;29(4):450-9.
3. Lanzara R, Thakur A, Viswambaran M, Khattak A. Fabrication of ocular prosthesis with a digital customization technique–a case report. J Family Med Prim Care. 2019;8(3):1239-42.
4. Cevik P, Dilber E, Eraslan O. Different techniques in fabrication of ocular prosthesis. J Craniofac Surg. 2012;23(6):1779-81.
5. Meena AA, Vidya C, Praveen R, Manjita MP. Precise iris positioning in ocular prosthesis using an eyewear. J Dental Sci. 2017;2(1):000121.
6. Roberts AC. An instrument to achieve pupil alignment in eye prosthesis. J Prosthet Dent. 1969;22(4):487-9.
7. Benson P. The fitting and fabrication of a custom resin artificial eye. J Prosthet Dent. 1977;38(5):532-8.
8. Sathe S, Pisulkar S, Nimonkar SV, Belkhode V, Borle A. Positioning of iris in an ocular prosthesis: a systematic review. J Indian Prosthodont Soc. 2020;20(4):345-52.
9. Gunaseelaraj R, Karthikeyan S, Kumar MN, Balamurugan T, Jagadeeshwaran AR. Custom-made ocular prosthesis. J Pharm Bioallied Sci. 2012;4(Suppl 2):S177-9.
10. Somkuwar K, Mathai R, Jose P. Ocular prosthesis: patient rehabilitation: a case report. People's J Sci Res. 2009;2(2):21-6.
11. Roberts AC. An instrument to achieve pupil alignment in eye prosthesis. J Prosthet Dent. 1969;22(4):487-9.
12. McArthur DR. Aids for positioning prosthetic eyes in orbital prostheses. J Prosthet Dent. 1977;37(3):320-6.
13. Guttal SS, Patil NP, Vernekar N, Porwal A. A simple method of positioning the iris disk on a custom-made ocular prosthesis. a clinical report. J Prosthodont. 2008;17(3):223-7.