INDONESIAN JOURNAL OF PROSTHODONTICS

CASE REPORT

Prosthetic rehabilitation in a patient with an anophthalmic socket following enucleation for absolute glaucoma

Alyssa Salsabila,[1]* Lisda Damayanti,[2] Daisy Wulansari[2]

Keywords: Absolute glaucoma, Anophthalmic socket, Enucleation, Ocular prosthesis, Prosthetic rehabilitation

ABSTRACT

Absolute glaucoma is a progressive condition that causes irreversible optic nerve damage from elevated intraocular pressure. When it no longer responds to treatment, patients may develop severe pain and complete vision loss, making enucleation the final option for relief. After enucleation, prosthetic rehabilitation is essential to restore facial appearance, improve function, and support psychological well-being. This case report outlines the clinical course and prosthetic management of an anophthalmic socket after enucleation for absolute glaucoma, highlighting key fabrication steps and the importance of structured follow-up care. A 23-year-old male with worsening, treatment-resistant glaucoma experienced persistent pain, scleral redness, and complete vision loss, leading to enucleation in 2018. His first prosthesis loosened after two years, and recurrent socket bleeding in 2023 necessitated an additional surgery. A new custom prosthesis was fabricated using a polyvinyl siloxane impression, followed by wax try-ins and precise iris–pupil positioning with callipers and a PD ruler. Acrylic painting was applied to create a natural ocular appearance. After insertion, the prosthesis was evaluated for comfort, stability, and esthetics, with follow-ups at one day, one week, and six months. This case highlights the value of personalized prosthetic design and consistent aftercare in achieving optimal outcomes for patients with anophthalmic sockets. (IJP 2025;6(2):103-106)

Introduction

The eyes are among the most vital organs of the human body. In addition to their primary role in vision, intact eyes significantly contribute to facial esthetics and expressions. Loss of an eye not only affects a patient physiologically but also has a profound impact on psychological well-being and social life.[1] Loss of an eye may result from various conditions such as carcinoma, trauma, sympathetic ophthalmia, a painful blind eye, or congenital anomalies. Surgical management of these conditions depends on the severity of the case and may involve one of several approaches, including evisceration, enucleation, or exenteration.[2]

Absolute glaucoma is a chronic and progressive ocular disease characterized by irreversible optic nerve damage resulting from persistently elevated intraocular pressure. If left untreated or unresponsive to therapy, the condition may progress to complete vision loss accompanied by painful complications.[3] In severe cases, enucleation is considered the definitive treatment to relieve symptoms. Enucleation is a surgical procedure in which the entire eyeball is removed following the severance of the extraocular muscles and the optic nerve.[1,4]

Following enucleation, prosthetic rehabilitation plays a crucial role in restoring facial symmetry, functional balance, and the patient's psychological well-being. In cases of ocular defects, rehabilitation is achieved through the use of ocular prostheses. These prostheses are generally classified into two types: stock ocular prostheses and custom-made ocular prostheses.[5] Stock ocular prostheses, once widely used and still available today, offer advantages such as minimal fabrication time and a variety of iris sizes and colors. However, they often cause discomfort and increase the risk of infection due to poor adaptation to the socket, in addition to esthetic limitations from mismatched iris colors. Stock eyes are thin, acrylic-based, and generally indicated for post-evisceration cases. In contrast, custom ocular prostheses are suitable for rehabilitation after both evisceration and enucleation. They provide superior esthetics, as the iris and sclera can be matched to the contralateral eye, and better functional adaptation to the patient's socket. However, their main drawback is the longer laboratory processing time.[6]

Currently, ocular prostheses are commonly fabricated from polymethyl methacrylate (PMMA), or acrylic.[7] In Indonesia, PMMA is widely used because of its durability, biocompatibility, and natural esthetic appearance. Local studies have also highlighted its effectiveness in producing customized ocular prostheses that provide both improved esthetics and patient comfort.[1,8,9]

This case report aims to present the clinical progression and prosthetic rehabilitation of a patient with an anophthalmic socket following enucleation due to absolute glaucoma. It highlights the step-by-step prosthesis fabrication process and emphasizes the importance of post-insertion care in achieving successful outcomes.

Case Report

Case Presentation

A 23-year-old male patient presented with a history of worsening glaucoma unresponsive to three laser surgeries. Symp-

1Specialist Program in Prosthodontics, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia
2Department of Prosthodontics, Faculty of Dentistry, Padjadjaran University, Bandung, Indonesia

*Corresponding author: alyssa15003@mail.unpad.ac.id

DOI 10.46934/ijp.v6i2.303

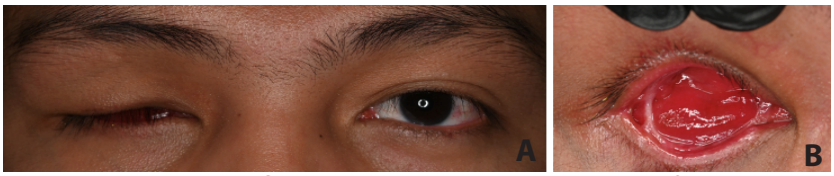

Figure 1. Patient's profile, A. Frontal view, B. The socket of the right eye

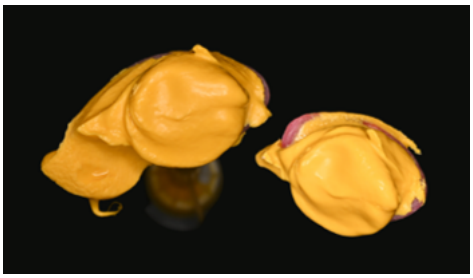

Figure 2. An impression of the socket of the right eye

Figure 3. Try in scleral shell template with wax

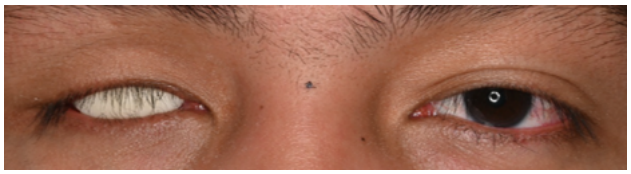

Figure 4. Try in sclera

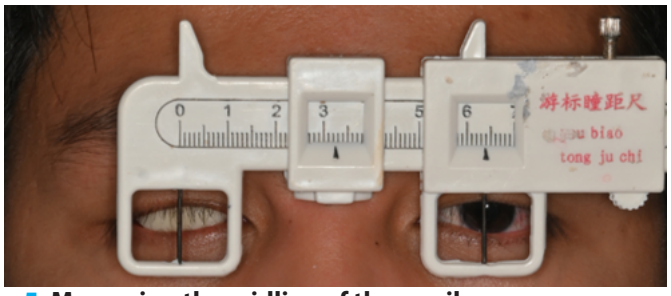

Figure 5. Measuring the midline of the pupil

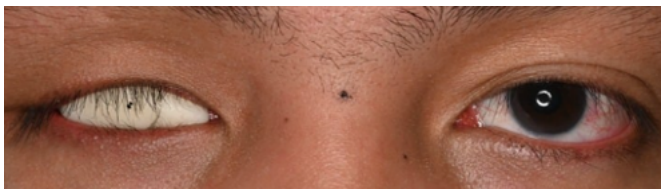

Figure 6. Marking of pupil and iris

toms included severe eye pain, scleral redness, and vision loss. In 2018, the patient was first diagnosed with glaucoma with markedly elevated intraocular pressure. A laser surgery was performed to reduce the pressure. However, the intraocular pressure rose again, accompanied by progressive visual darkening, necessitating a second laser procedure. Despite these interventions, the ocular condition deteriorated further. The patient developed severe symptoms, including conjunctival hemorrhage, mild proptosis, and a greenish discoloration of the cornea. As a result, the ophthalmologist decided that enucleation was the only definitive solution. Following the surgery, the patient was provided with an ocular prosthesis.

In 2020, after more than two years of use, the prosthesis became loose and was subsequently replaced with a new one. In 2023, the patient experienced complications associated with the prosthesis, presenting with bleeding and wound dehiscence at the surgical site. A fourth surgery was performed to re-suture the affected area. After this procedure, a new prosthesis was fitted, but it could no longer be properly retained. Therefore, the patient required a new ocular prosthesis to be made.

Examination of the left eye revealed a healthy conjunctiva with no signs of infection figure 1A. In contrast, the right eye had suffered from an infection six years earlier and subsequently underwent enucleation. Clinical examination of the right eye socket showed complete removal of the eyeball figure 1B. The diagnosis in this case was confirmed as an anophthalmic socket post-enucleation due to absolute glaucoma. The prognosis is favorable, provided that a stable and well-functioning ocular prosthesis can be fabricated. A custom ocular prosthesis with individualized iris and scleral characterization is planned for the patient.

Prior to initiating treatment, the procedure was thoroughly explained to the patient, and informed consent was obtained. After comprehensive history-taking and clinical evaluation, the impression stage was carried out, beginning with the construction of a customized impression tray designed to fit the patient's ocular socket. This tray was fabricated from self-cured acrylic resin and equipped with a straw to allow the injection of impression material. The socket was first rinsed with sterile sodium chloride solution to remove debris, and the tray was then tried in to confirm adequate adaptation.

For the impression, a light-body polyvinyl siloxane material was used. The patient was seated in an upright position and instructed to remain relaxed. Prior to placement, the eyebrow region was coated with petroleum jelly, and the socket was cleaned once again with saline and gently dried with a cotton pellet. The impression material was carefully injected into the socket in a slow and uniform manner until it completely filled the orbital and eyelid areas.

During tray placement, the patient was asked to keep the eyelids open while gentle pressure was applied, followed by functional eye movements to capture dynamic contours. After the material had set

DOI 10.46934/ijp.v6i2.303

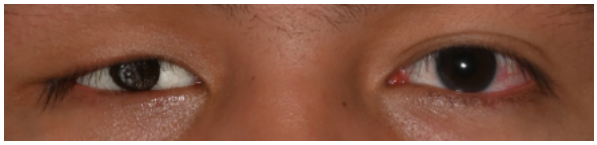

Figure 7. Coloring of pupil and iris

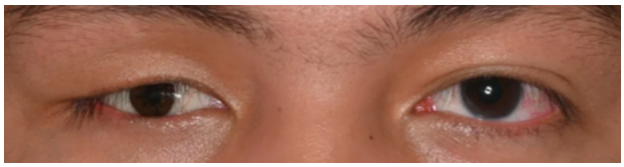

Figure 8. Insertion of ocular prosthesis

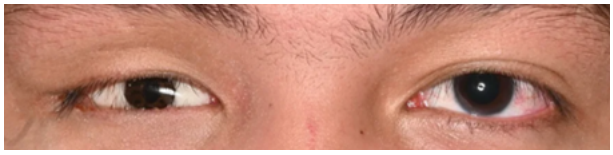

Figure 9. Control and Evaluation

figure 2, the tray was removed carefully, and the socket was inspected to ensure no residual material remained. The impression was disinfected with alcohol spray and poured with dental plaster to obtain the working cast. Finally, the impression was forwarded to the laboratory for prosthesis fabrication.

The second visit, the patient was instructed to sit upright in a relaxed position. The upper eyelid was gently lifted to insert the superior edge of the scleral shell template, followed by pulling down the lower eyelid to facilitate placement of the inferior edge. The wax-modified scleral shell template was adjusted to ensure a comfortable fit and to minimize irritation figure 3. Eyelid mobility during opening and closing, as well as the overall contour of the eyeball, was carefully evaluated from multiple angles to achieve close resemblance to the contralateral eye. Key considerations at this stage include the alignment of the eyeball shape, convexity, eyelid movement, aesthetics, stability, and retention. The size, color, and iris configuration are selected based on the natural eye on the contralateral side as a guide.

During the third visit, the acrylic sclera was tried in on the patient figure 4. The pupil position was determined by aligning the edge of a PD ruler on the sclera and marking the reference point with a pencil or permanent marker. The iris diameter of the natural eye was then measured using a sliding caliper figure 5. Afterward, the scleral shell made of polymethyl methacrylate (PMMA) was removed from the socket, and a circular outline representing the iris was drawn using a compass, centered on the previously marked pupil point, and adjusted to match the natural iris diameter. At this stage, it was crucial to ensure that the scleral shell was symmetrical with the contralateral eye, had a comparable convexity, and was comfortable without any sharp edges figure 6.

Subsequently, the anterior surface of the sclera was reduced by 1–2 mm using a round bur to provide space for clear acrylic layering and iris–pupil customization. The site for the iris and pupil was prepared in the form of a concavity. Coloring was carried out within this prepared area using brown acrylic paint for the iris and black acrylic paint for the pupil. During the following visit, the patient was instructed to sit upright and remain relaxed. The eye socket was irrigated with saline solution and gently dried with cotton pellets. The ocular prosthesis with customized iris and pupil characterization was then tried in figure 7. Esthetics, retention, and stability were carefully reassessed.

During the fifth visit, the patient was instructed to sit upright and remain relaxed. The eye socket was cleaned with saline solution and gently dried with cotton pellets. Both the right and left ocular prostheses were inserted, after which the patient was asked to perform functional movements by looking left, right, upward, and downward figure 8. At this stage, the comfort and mobility of the prostheses within the sockets, globe convexity, and eyelid dynamics were evaluated. Esthetics, retention, and stability were also reassessed.

Post-insertion, detailed instructions were provided regarding the use, limitations, and care of the prostheses. The patient was trained in insertion and removal techniques, including removal by pulling the lower eyelid downward, directing the gaze upward, and gently disengaging the lower margin of the prosthesis with a finger. Continuous wear of the prosthesis for 24 hours was recommended, with instructions not to remove it at night to avoid eyelid malposition. Prior to removal, the prosthesis should be moistened, then cleaned under running water using hypoallergenic soap, and stored in saline solution. The use of lubricating eye drops was advised to prevent dryness. A follow-up appointment was scheduled one week after insertion.

During the sixth visit, the patient reported experiencing comfort throughout the week of prosthesis use figure 9. Clinical examination of both the left and right eye sockets revealed no signs of inflammation. The socket was irrigated with saline solution and gently dried with cotton pellets. The ocular prosthesis was then reinserted, showing satisfactory retention, stability, and esthetics.

Discussion

The loss of an eye often leads to both physical and psychological challenges. Beyond reduced vision, patients commonly experience emotional distress due to social reactions to their facial disfigurement. Early replacement of the missing eye, following adequate healing after enucleation or evisceration, is essential to support physical recovery, psychological adjustment, and social acceptance.[8]

The primary purpose of an ocular prosthesis is to restore normal facial appearance, thereby enhancing self-confidence and social interaction.[1] Prostheses are generally recommended 6–8 weeks after surgery, once the socket has healed.[10] Although fabrication of a custom ocular prosthesis is a technique-sensitive procedure, it provides superior outcomes compared to prefabricated stock prostheses. Custom ocular prostheses allow replication of iris and scleral color, pupil and iris size, and contour, resulting in natural movement, correct orientation, and a more realistic, symmetrical facial appearance.[11]

One of the major challenges is achieving a natural appearance and movement. While stock prostheses are more economical, they may not conform precisely to the socket, often resulting in discomfort, irritation, and poor esthetics. Conversely, custom prostheses offer better socket adaptation, coordinated movement with the contralateral eye, and more natural color and orientation of the iris.[1,9]

In the present case, the patient initially wore a stock eye that caused socket discomfort and ulceration. After rehabilitation with a custom ocular prosthesis, the patient reported improved comfort, absence of socket injury, and enhanced esthetics due to individualized anatomical adaptation. The ability to match iris color and position to the contralateral eye is a unique advantage of custom prostheses.[12] The use of polymethylmethacrylate (PMMA) further ensures biocompatibility, esthetic integration, and comfort. For optimal function, an ocular prosthesis must provide proper eyelid support, maintain orientation in primary gaze, allow coordinated movement, and ensure retention within the socket while maintaining natural appearance.[13,14] Although custom fabrication requires more time and precision, it yields better long-term esthetic and functional outcomes than stock alternatives. Importantly, while visual function cannot be restored, custom prostheses significantly reduce psychological trauma and support social reintegration.[1,6,9]

Long-term maintenance is also critical. Over time, the surface of the prosthesis may become rough, leading to debris accumulation. Regular cleaning is recommended, and when scratches or deposits occur, repolishing should be performed. Follow-up every six months is advised to evaluate and adjust the prosthesis, ensuring sustained comfort, esthetics, and function.[1,6]

Conclusion

This case demonstrates that effective rehabilitation of anophthalmic sockets extends beyond the technical process of prosthesis construction and requires a holistic, interdisciplinary approach tailored to each patient. Careful consideration of anatomical variations, functional demands, and patient expectations is essential to achieving predictable outcomes. The integration of accurate fabrication techniques with structured aftercare supports both the stability and esthetics of the prosthesis, while also ensuring long-term comfort and adaptation. Beyond physical restoration, this comprehensive management plays a vital role in improving psychological well-being, self-confidence, and social reintegration following ocular enucleation.

References

1. Putra K, Ritonga PWU, Tamin HZ. Custom ocular prosthesis with modification in impression and iris button for rehabilitation of post-enucleation eye defect: a case report. Indonesian Journal of Prosthodontics. 2023;3(2):77–81.
2. 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.
3. Mago HC. Acute closed angle glaucoma: A case report. Indonesian Health Journal. 2023;2(4):131-7.
4. Nazar NA, Hendriati. Evisceration versus enucleation in ocular globe injury. Bioscientia Medicina: Journal of Biomedicine and Translational Research. 2022;6(6):1837–51.
5. Shetty PP, Chowdhary R, Yadav RK, Gangaiah M. An iris positioning device and centering approach: A technique. J Prosthet Dent. 2018;119(1):175–7.
6. Somkuwar K, Mathai R, Jose P. Ocular prosthesis: Patient rehabilitation - A Case Report. People's J Sci Res. 2009;22(2):21-6.
7. Bonaque-González S, Amigó A, Rodríguez-Luna C. Recommendations for post-adaption care of an ocular prosthesis: A review. Contact Lens and Anterior Eye. 2015;38(6):397–401.
8. Atmaja HJ, Wahyuningtyas E, Ruspita I. Prosthetic rehabilitation of a post evisceration patient with non-fabricated ocular prosthesis: A case report. Indonesian Journal of Prosthodontics. 2024;5(2):132-4.
9. Susilo R, Damayanti L, Mulya V, Novianti P. Prosthetic rehabilitation of anophthalmic ocular sinistra and phthisis bulbi ocular dextra: A case report. Padjadjaran Journal of Dentistry. 2025;37(1):37-43.
10. Singh KR, Chaurasia S. Ocular Implants and Prosthesis. New Delhi: Delhi Ophthalmological Society (DOS-Times); 2013.p.55–62.
11. Gupta RK, Padmanabhan T V. Prosthetic rehabilitation of a post evisceration patient with custom made ocular prosthesis: A case report. The Journal of Indian Prosthodontic Society. 2012;12(2):108–12.
12. Kaur J. Prosthetic rehabilitation of a patient with ocular defect - A case report. Dental Journal of Advance Studies. 2017;5(1):63–6.
13. Farook TH, Rahman AM, Islam Nizami MMU, Amin M, Jamayet N Bin, Alam MK. Custom made ocular prosthesis for acquired eye defect: A definitive option of rehabilitation. Bangladesh Journal of Medical Science. 2019;18(4):823–6.
14. Abdelbaky SH, El Essawy RA. Successful conjunctival socket expansion in anophthalmic patients until the age of 2 years: An outpatient procedure. Clinical Ophthalmology. 2016; Volume 10:1743–8.

DOI 10.46934/ijp.v6i2.303