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Custom ocular prosthesis: A case report

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Abstract
The loss of an eye can have profound psychological and social impacts on a patient, making the restoration of facial aesthetics and functionality a critical aspect of rehabilitation. This case report details the process of designing and fitting a customized ocular prosthesis for a 54-year-old patient who underwent enucleation following severe ocular trauma. The custom prosthesis aimed to provide a natural appearance and comfortable fit, thereby improving the patient's quality of life. The report discusses the fabrication process, challenges encountered, and outcomes achieved in the rehabilitation of this ocular defect. The use of customized fabrication and characterization techniques not only enhanced the aesthetic outcome but also reduced production time, setting a precedent for optimal workflow in ocular prosthetics.

Keywords: Ocular prosthesis, enucleation, facial aesthetics, rehabilitation

Introduction
The loss of an eye due to trauma, disease, or surgery can significantly affect a patient's physical appearance and psychological well-being. The disfigurement can lead to social stigmatization and emotional distress, underscoring the importance of timely and effective rehabilitation through the use of ocular prostheses [1]. Traditionally, ocular prostheses have been handcrafted by skilled ocularists, requiring multiple fittings and adjustments to achieve a satisfactory result. Despite advances in manufacturing technology, the art of crafting a prosthetic eye remains a meticulous process that relies heavily on the expertise and artistic skill of the ocularist [2].
This case report presents the approach of using traditional impression techniques to fabricate a customized ocular prosthesis for a 54-year-old male patient following enucleation due to severe ocular trauma. The objective was to create a prosthesis that matched the natural appearance of the contralateral eye and provided comfort and functionality. Through this report, we aim to highlight the clinical procedures, technical challenges, and psychological benefits observed in the patient. Our findings contribute to the growing body of evidence supporting the importance of skilled craftsmanship in the creation of ocular prostheses, offering insights into future directions for improving patient outcomes in maxillofacial rehabilitation [3].

Case Report: Customized Ocular Prosthesis for a 54-Year-Old Male Patient
Case History
A 54-year-old male patient reported to the Department with a chief complaint of Unesthetic appearance due to missing right eye. The patient had experienced a significant injury to his right eye in a road traffic accident 10 years ago. Following the injury, he underwent surgery, resulting in the enucleation of the right eye. Since the surgery, the patient has been concerned about the unesthetic appearance of his face, particularly the absence of his right eye.

Treatment Procedure
1. Preoperative clinical photographs were recorded to document the patient's facial appearance and assess the anophthalmic socket. (Figure 1) vaseline was applied.
2. The patients eye was irrigated with saline water and a thin layer of

1. A semi-customized impression tray was prepared to fit the anophthalmic cavity. (Figure 2).
2. The primary impression of the anophthalmic cavity was recorded using the tray and a medium body impression material. (Figure 3).
3. The primary impression was boxed and poured to create a primary cast. (Figure 4).
4. A custom tray was fabricated based on the primary cast to achieve a more precise fit. (Figure 5).
5. The final impression was recorded using polyvinyl siloxane (PVS) light body material to ensure accuracy. (Figure 6).
6. The pateitn was asked to maintaina straight gaze at a far away object during impression procedure.
7. The final impression was boxed and poured in type III dental stone to obtain a master cast. (Figure 7).
8. A wax conformer was created using molten modelling wax and pattern was fabricated on the master cast.
9. The was conformer was smoothed out and placed in the patients enucleated socket to evaluate the fit and aesthetics. (Figure 8).
10. The retention of the wax conformer was checked by asking the patient to make all eye movements.
11. Scleral shade selection was performed using a customized shade tab to match the natural eye. (Figure 9).
12. The iris was selected from stock shells that closely matched the patient's natural eye color. The selected iris was attached to the wax pattern and precisely positioned using vernier calipers for centering. (Figure 10).
13. The wax pattern was processed to obtain an acrylic shell that enclosed the iris. (Figure 11 & 12).
14. Meticulous characterization of the scleral and iris parts was performed to enhance the natural appearance of the prosthesis. (Figure 13).
15. Postoperative photographs were recorded to evaluate the final outcome and document improvements in aesthetics. (Figure 14).

Discussion

This case report highlights the successful fabrication and fitting of a customized ocular prosthesis for a patient with a long-standing enucleation. The traditional approach to ocular prosthesis fabrication, as demonstrated in this case, involves several critical steps that require precision and artistry to achieve a natural appearance and a comfortable fit [4]. Traditional methods for fabricating ocular prostheses rely heavily on the skill and experience of the clinician. These methods involve handcrafting the prosthesis through a series of impressions, castings, and artistic adjustments to mimic the appearance of the natural eye [5]. The primary advantage of this approach is the ability to tailor each prosthesis to the patient's unique anatomical and aesthetic needs, resulting in a highly personalized fit [6]. The advantages include Personalized care with attention to individual patient needs, a high level of artistic input, allowing for detailed customization and greater flexibility in adjusting for anatomical variations and achieving precise color matching [7]. Also, it is a time-consuming process due to multiple steps and adjustments, and requires significant skill and experience to achieve optimal results. In recent years, contemporary ocular rehabilitation procedures have incorporated advanced technologies, such as digital imaging, 3D scanning, and 3D printing, to enhance the fabrication process. These technologies offer the potential for increased precision, efficiency, and consistency in prosthesis production [8]. It has certain advantages like increased precision in capturing anatomical details using digital imaging and scanning, reduced production time with automated processes like 3D printing and consistent reproduction of prostheses, which can be beneficial for large-scale production. The initial costs and investment in technology and training can be high, limited ability to capture the artistic nuances required for perfect color and texture matching and dependence on technology may reduce the role of skilled craftsmanship in customization.

Conclusion

The meticulous approach to crafting a customized ocular prosthesis, as demonstrated in this case, emphasizes the value of traditional methods in achieving superior aesthetic and functional outcomes. This case report contributes to the understanding of best practices in the field of ocular prosthetics, offering insights for future cases involving similar patient needs. The balance between traditional craftsmanship and contemporary technological advancements holds the potential to further enhance patient care and satisfaction in ocular rehabilitation.

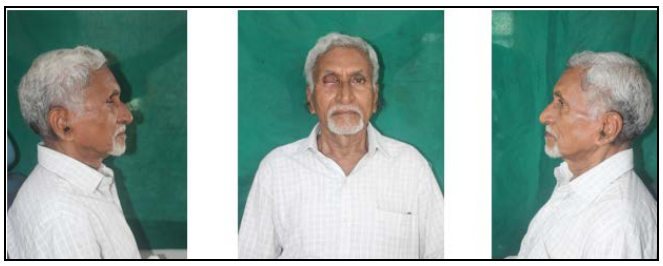

Fig 1: Pre-operative Photographs

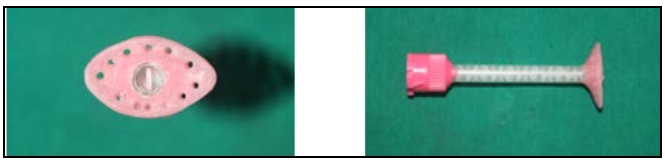

Fig 2: Semi-customized Impression Tray

Fig 3: Recording of Preliminary Impression

Fig 4: Primary Impression & its Boxing

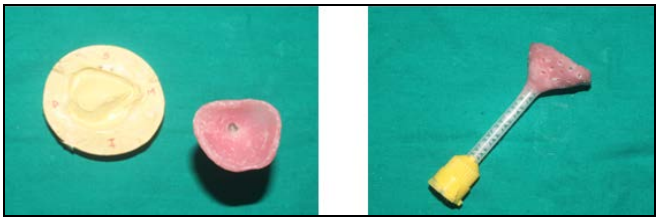

Fig 5: Fabrication of Custom Tray

Fig 6: Final Impression

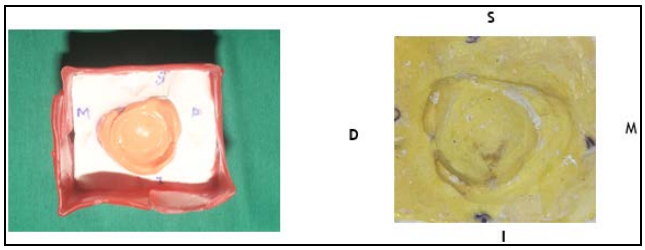

Fig 7: Boxing of final Impression and Obtaining Master Cast

Fig 8: Wax Pattern Trial

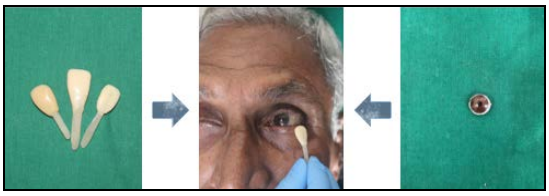

Fig 9: Shade Selection of sclera with a customised shade tab and Iris Selection

Fig 10: Iris Positioning and Centering

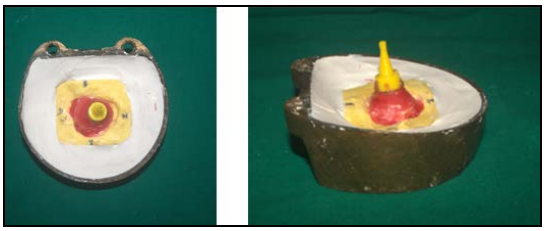

Fig 11: Attachment of a nozzle with a sticky wax to secure the Iris in place.

Fig 12: Post-processing

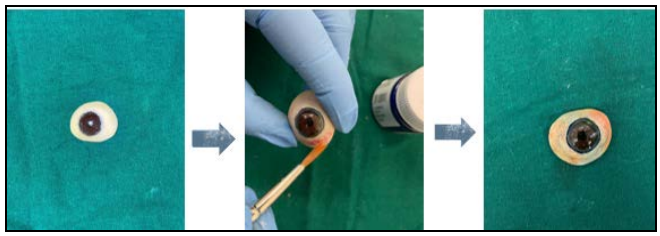

Fig 13: Characterization of Ocular Prosthesis

Fig 14: Post-operative photographs showing good resemblance of prosthesis with patient's natural eye.

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