ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at:www.ijdsir.com
Volume – 9, Issue – 1, January – 2026, Page No. : 63 – 67

Conformer-Guided Custom Ocular Prosthesis Fabrication for Children with Traumatic Eye Loss: A Case Series

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Citation of this Article: Dr. Utkarsha Kadam, Dr. Snehal Jagtap, Dr. Ritesh Kalaskar, Dr. Nupur Ninawe, "Conformer-Guided Custom Ocular Prosthesis Fabrication for Children with Traumatic Eye Loss: A Case Series", IJDSIR- January – 2026, Volume – 9, Issue – 1, P. No. 63 – 67.

Type of Publication: Case Series

Conflicts of Interest: Nil

Abstract

Traumatic eye injuries in children can lead to enucleation or evisceration, resulting in functional loss and significant psychosocial impact. Early prosthetic rehabilitation is critical to maintain orbital volume, support facial growth, and enhance esthetics. This case series presents two pediatric patients, aged 3 and 7 years, who sustained ocular trauma leading to evisceration and subsequent orbital implant placement. A conformer-guided impression technique was employed to fabricate custom ocular prostheses, improving child comfort, reducing chairside time, and ensuring accurate capture of socket anatomy. Prefabricated iris buttons were shade-matched and positioned for natural esthetics. The prostheses were inserted, polished, and instructions were provided for care and maintenance. Continuous follow-up over 1.5 years demonstrated stable socket anatomy, excellent esthetic outcomes, and high parental satisfaction, highlighting the effectiveness of a conformer-guided approach in pediatric ocular prosthetic rehabilitation.

Keywords: Eviserated eye, ocular prosthesis, Conformer, paediatric patient, Custom ocular prosthesis, Anophthalmia, Maxillofacial prosthetics, Traumatic Eye Loss

Introduction

The loss or absence of an eye in children leads to functional limitations and significant emotional and psychological stress for both the child and family. Early rehabilitation is crucial because growing orbital tissues require continuous stimulation to prevent socket contraction, orbital hypoplasia, and long-term facial asymmetry [1–3]. Delayed prosthetic replacement may result in progressive esthetic deformities that become more noticeable with age [4].

Various prosthetic options are available, including stock, modified stock, and custom-made ocular prostheses. Stock eyes are inexpensive and easily available but often show poor adaptation and compromised esthetics, making them suitable mainly as temporary solutions [5]. Custom-made prostheses, on the other hand, offer superior fit, comfort, motility, and natural appearance, making them the preferred long-term rehabilitation method for pediatric patients [6,7].

Conformers play an essential role in managing pediatric anophthalmic sockets. They help maintain fornices, prevent soft-tissue contracture, and support symmetrical orbital and facial growth [2,3]. In this case series, a custom-modified conformer was used both for socket maintenance and as an impression tray, eliminating the need for separate primary and secondary impressions. This simplified technique improves accuracy, reduces chairside time, and enhances the child's overall comfort during impression making [8].

This case series describes a simplified, child-friendly method for fabricating custom ocular prostheses that prioritizes fit, comfort, and esthetics while addressing the unique clinical challenges of pediatric patients.

Case Description

Case 1

A 3-year-old boy sustained an accidental injury to his right eye after falling while playing with his siblings and striking his eye against a sharp metal rod (Figure 1a).

Case 2

A 7-year-old boy suffered trauma to his left eye when a wooden stick struck him while playing with friends (Figure 1b).

In both cases, the trauma resulted in corneal perforation, presenting as an open, punctured corneal wound. The injuries were further complicated by secondary panophthalmitis, a severe infection involving all intraocular structures. The ophthalmology team at GMCH Nagpur performed evisceration followed by orbital implant placement in both children. After initial healing, the patients were referred to the Department of Pediatric and Preventive Dentistry for prosthetic rehabilitation.

Clinical examination confirmed well-healed sockets with no signs of infection. Prosthetic ocular replacement was planned to prevent socket collapse, maintain fornix depth, preserve orbital growth, and improve facial esthetics and psychosocial well-being.

Parents were informed that the prosthesis would be non-functional, serving only esthetic and psychological benefits, and consent was obtained.

Prosthesis Fabrication Procedure

Impression making was initiated using a conformer (Figure 2). Light-body addition silicone was injected through the conformer's central opening to record detailed internal socket anatomy. A master cast was poured, followed by fabrication of a wax pattern simulating the natural globe contour. The wax pattern was evaluated and refined to achieve natural eyelid support and acceptable appearance in both open and closed-eye positions. (Figure 3)

A prefabricated iris button was shade-matched with the contralateral eye. Its position was marked, aligned, and secured to the wax pattern. During try-in, minor deficiencies in contour adaptation were observed. Hence, A die-stone model was prepared, and iris positioning was stabilized by creating an acrylic button over the iris to ensure accurate transfer. (Figure 4)

The wax pattern was flasked and dewaxed. The mold was packed with clear acrylic resin mixed with white, yellow, and red intrinsic pigments to mimic scleral characteristics. The prosthesis was cured at 65°C for 90 minutes, then retrieved, trimmed, finished, and polished.

The final prosthesis was inserted and adjusted for comfort and esthetics. A thin coating of Monopoly sealant was applied to enhance surface smoothness and natural appearance (Figure 5a, 5b). Parents were instructed regarding insertion, removal, cleaning, and the need to store the prosthesis in water overnight.

At a 3-day follow-up, one patient reported mild dryness and irritation, which was successfully managed using ophthalmic lubricant. Both children adapted well and demonstrated improved esthetics and confidence.

Discussion

The rehabilitation of an anophthalmic socket in pediatric patients presents unique challenges due to continuous craniofacial growth, rapid tissue remodeling, and heightened emotional sensitivity. In such cases, conformers play an essential role in maintaining socket anatomy, preventing contraction, and supporting symmetrical orbital development. Raflo[9] emphasized that conformers help maintain fornix depth, reduce postoperative shrinkage, and preserve tissue health, making them indispensable during the healing and prosthetic fabrication phases.

In the present case series, a modified conformer was used both as a socket maintainer and as an impression tray, eliminating the need for multiple impression procedures. This approach significantly reduces discomfort and procedural anxiety, which is particularly beneficial for young children. Taylor [10] described conformers as structurally supportive devices that stabilize the orbital implant and surrounding soft tissues, thereby facilitating accurate impression capture and enhancing the precision of the final prosthesis.

Custom ocular prostheses fabricated using conformer-guided impressions provide superior fit, mobility, and esthetics. Aggarwal et al. [11] highlighted that accurate impression techniques lead to better socket adaptation, which ultimately improves eyelid drape and blinking mechanics. The present technique aligns with these findings by using a conformer to achieve a well-defined impression with minimal manipulation, decreasing trauma to the delicate conjunctival tissues.

The importance of early rehabilitation using conformers and custom prostheses in children has been strongly supported in the literature. Chalian et al.[12] and Yago & Furuta [13] reported that maintaining orbital volume and stimulating soft tissues through prosthetic devices plays a key role in preventing facial asymmetry and promoting normal craniofacial growth. Bentley et al.[14] further advocated for early conformer placement, followed by timely custom prosthesis fabrication, to prevent socket collapse, improve implant motility, and maintain overall facial harmony.

In this case series, the conformer-guided technique ensured improved child comfort, reduced chairside time, and enhanced impression accuracy. The resulting prostheses provided excellent esthetic integration, good eyelid support, and high parental satisfaction.

In this case series, the conformer-guided technique ensured enhanced child comfort, reduced chairside time, and improved impression accuracy. The resulting custom ocular prostheses demonstrated excellent esthetic integration, appropriate eyelid support, and high parental satisfaction, with continuous follow-up over 1.5 years confirming long-term stability and maintenance of orbital form.

Conclusion

The conformer-guided fabrication technique used in this case series proved to be a simple, efficient, and child-friendly approach for rehabilitating pediatric anophthalmic sockets. Using a conformer for impression making minimized procedural discomfort, enhanced impression accuracy, and contributed to a better-fitting

custom prosthesis. Although the prosthesis does not restore vision, it significantly improves esthetics, confidence, and social acceptance.

Given the psychosocial vulnerability of young patients with ocular defects, pedodontists play a crucial role in early identification, referral, and collaborative care. Working alongside maxillofacial prosthodontists and ophthalmologists, they help ensure timely intervention, maintain socket health during growth, and improve the overall quality of life for affected children. Early conformer use, followed by a well-designed custom ocular prosthesis, remains the cornerstone of successful pediatric ocular rehabilitation.

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Legend Figures

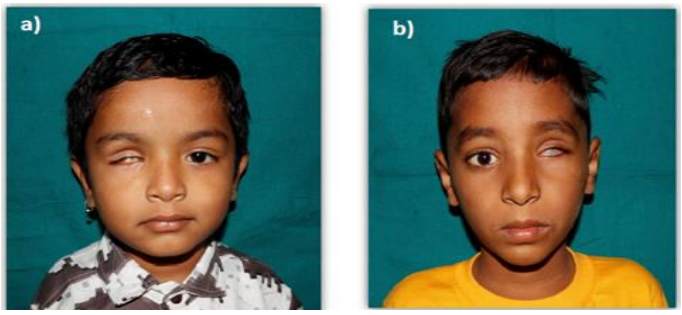

Figure 1(a): Pre-operative photographs of paediatric patients with eviscerated eyes: a 3-year-old child with right eye evisceration

Figure 1(b): Pre-operative photographs of paediatric patients with eviscerated eyes: b) a 7-year-old child with left eye evisceration.

Figure 2: Impression making using a conformer placed in the socket.

Figure 3: Wax pattern refined for natural eyelid support and appearance.

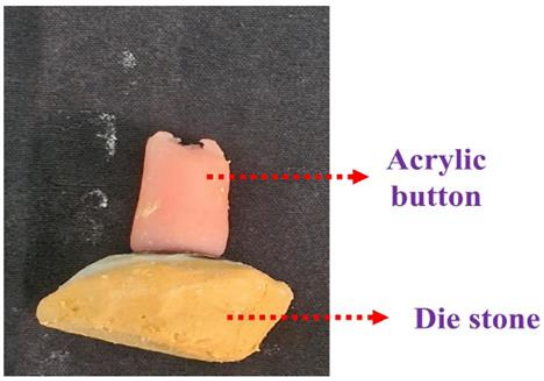

Figure 4: Die-stone model with iris position stabilized using an acrylic button.

Figure 5 (a) Post-operative photographs of 3 years old child with right eye ocular prosthesis.

Figure 5 (b): Post-operative photographs of 7 years old child with left eye ocular prosthesis.