International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(CASE REPORT)

Comprehensive oral rehabilitation in a child following accidental facial trauma by a wood-cutting machine: A rare case report

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International Journal of Science and Research Archive, 2025, 16(03), 747-751

Publication history: Received on 07 August 2025; revised on 14 September 2025; accepted on 16 September 2025

Article DOI: https://doi.org/10.30574/ijsra.2025.16.3.2598

Abstract

Pediatric facial trauma requires early diagnosis and a multidisciplinary approach to ensure optimal healing and rehabilitation. Injuries in children can have serious long-term consequences, particularly when caused by high-risk mechanical equipment. This case report presents a rare and severe pediatric facial trauma in a 11year old female child involving a wood cutting machine, highlighting the urgent need of preventive strategies and strict safety protocols in environments accessible to children. Even with significant lower facial trauma, the use of a conservative acrylic cap splint approach resulted in successful stabilization and functional recovery.

Keywords: Pediatric facial trauma; Mandibular fracture; Cap splint; Traumatic dental Injury

1. Introduction

Pediatric facial fractures account for approximately 5–15% of all facial bone fractures. Among mandibular fractures in children, condylar fractures are the most common (38.9%), followed by angle (20.6%), parasymphysis (18.3%), body (15.3%), and symphysis (5.3%) fractures [1]. Major causes of facial trauma in children include hyperactivity, falls, road traffic accidents, physical assault, and child abuse - each contributing significantly to the risk of facial bone injury in the pediatric population [2]. The approach to managing jaw fractures in children differs from that in adults due to ongoing mandibular growth, anatomical variations, faster healing capacity, and the need for greater consideration of patient compliance during treatment [3]. Non-displaced or minimally displaced fractures may be managed conservatively through observation or closed reduction. In contrast, severely displaced fractures often require open reduction with rigid internal fixation [4].

An acrylic cap splint is a conservative and effective technique commonly used in managing maxillary and mandibular fractures in children. It aids in re-establishing occlusion and function while allowing for jaw growth and dentition development. Additionally, it supports better oral hygiene and enhances patient comfort throughout the treatment process [5].

The case report presents the management of a severe mandibular body fracture in a 11-year-old female child using an acrylic cap splint, highlighting a simple yet effective approach to pediatric facial trauma rehabilitation.

2. Case Report

A 11 year old female child presented to the department of pediatric dentistry following a traumatic facial injury caused by a wood-cutting machine. The injury occurred while she was standing near her father during woodcutting; the machine accidentally slipped and struck the lower left side of her face, resulting in significant facial trauma.

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There was a positive history of bleeding, sublingual hematoma, occlusal derangement, and difficulty in mouth closure. Extraoral examination revealed a laceration on the lower left side of the face in the body region of the mandible. Intraoral examination showed avulsion of teeth 31 and 32, along with Ellis Class III fractures of teeth 11 and 21. Radiographic assessment confirmed a fracture in the left body of the mandible, extending from the superior to the inferior border (Figure 1)

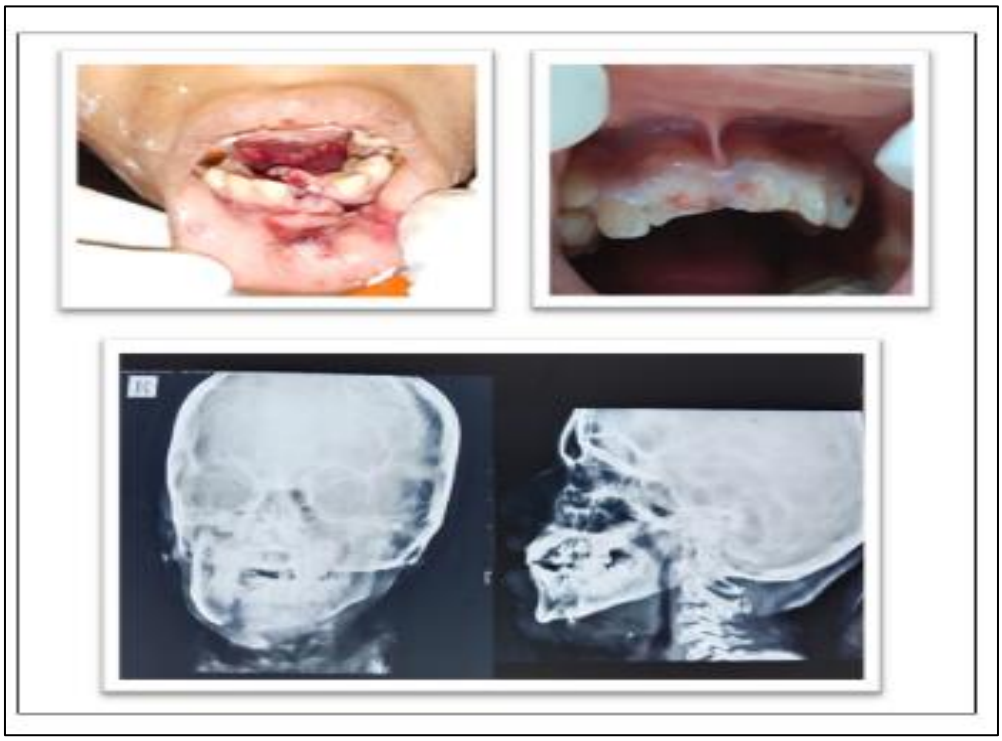

Figure 1 Pre operative image of child

Initial management involved suturing of the extraoral laceration. An alginate impression of the lower jaw was taken and poured with Type III dental stone. As the cast was aligned in a single horizontal plane, no realignment was required. An acrylic cap splint was fabricated and cemented using luting glass ionomer cement (Figure 2). The patient was instructed on oral hygiene and a soft diet and was monitored on a weekly basis.

Figure 2 Acrylic cap splint cemented in lower arch

Pulp extirpation was performed on teeth 11 and 21, followed by temporary dressing, with the intention to complete the root canal treatment at a later stage. At the six week follow-up, the splint was removed. Clinical evaluation showed no mobility in the fractured segments; however, slight occlusal deviation was noted on mouth closure. Radiographs revealed evidence of bony healing at the fracture site (Figure 3).

Figure 3 Orthopantomogram from fractured site

In the second phase of treatment, root canal therapy for teeth 11 and 21 was completed. Fiber posts were placed, followed by core buildup, and full-coverage crowns were cemented. A final impression of the lower arch was taken, and a removable partial denture was fabricated for the missing teeth 31 and 32 (Figure 4).

Figure 4 Post operative image of child

Figure 5 Orthopantomogram from fractured site after 6 months

At the six-month follow-up, the child demonstrated no occlusal derangement and no deviation on mouth opening. A follow-up orthopantomogram showed satisfactory bone healing at the fracture site (Figure 5).

3. Discussion

The management of pediatric facial and mandibular trauma presents unique challenges due to the dynamic nature of growth, anatomical differences, and developing dentition. Unlike adults, pediatric patients require more conservative approaches that preserve growth potential and minimize long-term complications. Mandibular fractures in children are relatively rare but, when present, can significantly impact facial development, occlusion, and overall function if not properly managed.

Treatment options for mandibular fractures include intermaxillary fixation (IMF), splint fixation, and open reduction with internal fixation (ORIF). However, in children, especially during the primary and mixed dentition stages, ORIF poses significant risks such as damage to developing permanent tooth buds and growth centers. Additionally, limited cooperation, the ongoing process of bone remodeling, and the compensatory mechanisms in pediatric mastication make conservative approaches more favorable [6]. Mild malocclusions that may develop during healing are often self-correcting.

Acrylic cap splints have been widely recommended as an effective and minimally invasive option for managing pediatric mandibular fractures. These splints are advantageous for several reasons: they are cost-effective, easy to fabricate, allow for quicker application, and reduce operative time. Moreover, they offer sufficient stabilization of the fractured segments while maintaining patient comfort and avoiding injury to adjacent anatomical structures. Acrylic cap splint therapy poses a lower risk of complications and morbidity, making it particularly suitable for younger patients [7].

Cap splints offer a flexible treatment approach for juvenile mandibular fractures, as they help restore both function and appearance with minimal complications. They do not interfere with jaw growth or dental development, making them suitable for use across a broad age range in pediatric patients [8].

Nowadays there are different modifications of cap splint are used as a closed reduction technique for management of fracture in pediatric patients. In the present case, despite the severity of the mandibular body fracture caused by an accidental wood-cutting machine injury, the use of a contemporary acrylic cap splint resulted in favorable outcomes. The closed reduction technique effectively stabilized the fracture without disrupting growth or development. The findings from this case support the use of an acrylic cap splint as an effective immediate treatment option, particularly when surgical intervention is challenging due to the patient's age or the extent of trauma. Post-treatment, the patient initially exhibited deranged occlusion and deviation during mouth opening and closure after the removal of the splint. However, the natural remodeling capacity of the growing facial skeleton contributed to the correction of occlusion over a six-month period. Follow-up evaluations confirmed satisfactory bone healing, restored function, and the absence of occlusal discrepancies or aesthetic deformities.

This case reinforces the importance of timely intervention, accurate diagnosis, and conservative management in pediatric mandibular fractures. Ultimately, the goal of treatment in such injuries is to re-establish occlusion, restore masticatory function, ensure normal facial growth, and achieve a favorable esthetic outcome, all of which were successfully achieved.

4. Conclusion

Pediatric facial trauma management requires a conservative approach due to the complexities of growth and dental development. In this case, a rare and severe mandibular body fracture was successfully managed using a closed reduction technique with an acrylic cap splint. The approach proved to be minimally invasive, effective in stabilizing the fracture, and allowed for preservation of the child's oral structures and facial growth potential. Six-month follow-up demonstrated complete bony healing, restoration of esthetics, and functional occlusion. This case highlights that even in complex trauma scenarios, conservative modalities like cap splints can provide excellent outcomes when selected and applied judiciously.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Funding

No external finding was received.

Statement of informed consent

Informed consent was obtained from parents of patient for participation and publication of this case report.

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