

## Case Report

### A case report on the use of acrylic open cap splint for the closed reduction of symphysis fracture in a six years old

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#### ABSTRACT:

**Background:** Dental trauma in children is a key public health problem. The most common dental trauma among paediatric patients is a mandibular fracture, which accounts for 56% of all facio-skeletal injuries, with a prevalence of 0.6% to 1.2%. The treatment of mandibular fracture in children is different from adults – this is due to permanent tooth buds. **Objective:** This case study highlights the role of a closed reduction technique that involves the use of acrylic open cap splint and circummandibular wiring in the management of symphysis fracture in a six-year old child. **Report:** Extra oral examination revealed an asymmetry of the face, swelling in the anterior region of mandible, difficulty in opening and closing of the mouth, and muscular spasm. Panoramic radiograph confirmed a mandibular symphysis fracture between the mandibular central incisors. An acrylic open cap splint was fabricated, and circummandibular wire was placed under general anaesthesia, by making a small-stab incision on the inferior border of both sides of the mandible. The patient was reviewed every week, and on the fourth postoperative week, the circummandibular wiring and splint were removed. Patient was asymptomatic with no mobility at the fracture site - occlusion was achieved satisfactorily.

**Key words:** Cap Splint, Symphysis Fracture, Closed Reduction, Paediatric Trauma

Received: 21 May, 2024

Accepted: 24 June, 2024

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**This article may be cited as:** Gaur A, Gaur A. A case report on the use of acrylic open cap splint for the closed reduction of symphysis fracture in a six years old. J Adv Med Dent Scie Res 2024;12(7):9-12.

#### INTRODUCTION

Dental trauma in children is a key public health problem<sup>1</sup>. The most common dental trauma among paediatric patients is a mandibular fracture, which accounts for 56%<sup>2</sup> of all facio-skeletal injuries, with a prevalence of 0.6% to 1.2%. Fall (64%) is the most prevalent cause of mandibular fracture in children, followed by traffic accidents (22%) and sports-related incidents (9%)<sup>3</sup>. Mandibular fractures can be detected through swellings and bruises in the soft tissue region, palpation or functional variants like occlusion, extent, and jaw movements' uniformity. A mandibular fracture diagnosis can further be confirmed through panoramic, posteroanterior mandible and localized radiography of the affected region<sup>4</sup>.

The treatment aim is to restore the function and aesthetics by maintaining the bone architecture in a

steady position in the least invasive manner. The treatment of mandibular fracture in children is different from adults – this is due to permanent tooth buds, thus discouraging treatment modalities like open reduction with rigid fixation. Closed reduction of the mandibular fracture using a cap splint is a popular alternative with benefits such as better stabilization and improved maintenance of oral hygiene without disturbing the tooth buds.<sup>5</sup> This case study highlights the role of a closed reduction technique that involves the use of acrylic open cap splint and circummandibular wiring in the management of symphysis fracture in a six-year old child.

#### CASE REPORT

A six year old boy reported to the Department of Pedodontics and Preventive Dentistry, Pacific Dental College & Research Centre (PDCRC), Udaipur,

Rajasthan with a chief complaint of pain resulting from an injury to the oral region because of a fall from the tree, two days prior to reporting to the hospital. There was no history of unconsciousness, vomiting, convulsion, nose bleeding, or head injury. The patient received emergency treatment at a local dispensary and was referred to PDCRC, Udaipur. Extraoral examination revealed an asymmetry of the face, swelling in the anterior region of mandible, difficulty in opening and closing of the mouth, and muscular spasm.

The Temporomandibular joint examination did not show any discrepancy. A minimally displaced fracture of the mandible between the two primary central incisors was detected, leading to an altered occlusion and a midline diastema (Figure 1). Panoramic radiograph confirmed a mandibular symphysis fracture between the mandibular central incisors (Figure 2).

Alginate impression material was used to take an impression of both the arches for the fabrication of an open cap splint before the reduction of mandible. An acrylic open cap splint was fabricated, and

immobilization of the fracture was done on the mandibular cast (Figure 3 and 4).

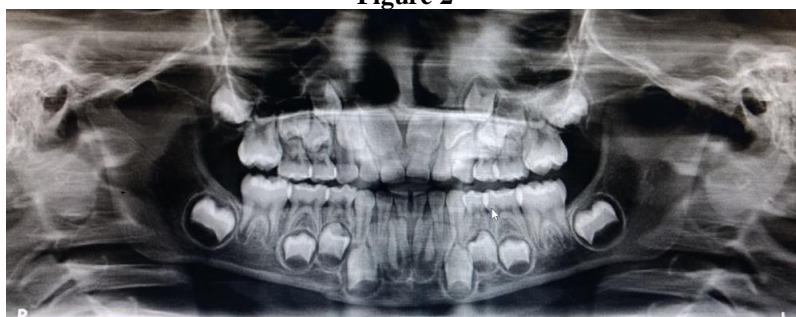
Circummandibular wire was placed with the acrylic open cap splint under general anaesthesia, by making a small stab incision on the inferior border of both sides of the mandible. The mandibular bone awl was used to enter the body of the mandible lingually. Mucosa was pierced by wire and passed onto the buccal sulcus along with the body of the mandible. The ends of the wire were held together and the stent was stabilized by winding the wire in a clockwise direction. The same procedure was repeated on the other side. Considering the young age of the patient and the low-density of the mandibular cortex, the wire was pulled through the mandible with utmost care. (Figure 5)

Postoperative Orthopantomogram (OPG) was taken after the closed reduction of the fracture with an acrylic splint and circummandibular wire (Figure 6). The patient was reviewed every week, and on the fourth postoperative week, the circummandibular wiring and splint were removed. Patient was asymptomatic with no mobility at the fracture site - occlusion was achieved satisfactorily.

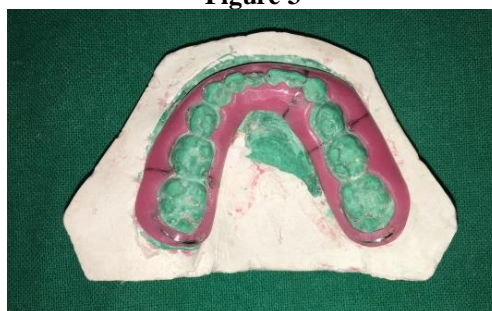
**Figure 1**



**Figure 2**



**Figure 3**



**Figure 4**



**Figure 5**



**Figure 6**



**DISCUSSION**

Several considerations have been provided by paediatric facial trauma patients, which are not easily seen in adult patients. Paediatric patients heal faster and with fewer complications than adults, mainly due to high vascularity in the oral cavity and facial areas, and additional bodily resources for growth and tissue healing.<sup>6,7</sup>

The mandibular fractures could be treated with two primary treatment approaches - open reduction or closed reduction. If done during the deciduous or mixed dentition, the former can lead to a failed eruption of permanent teeth and a narrowing alveolar ridge.<sup>8,9</sup> Additionally, placement of the circumferential wires and arch bar to achieve fixation prove to be difficult due to the anatomy of primary crowns in young patients.<sup>10</sup> The treatment approach's choice is further contingent to various other factors, including the type of injury, health of the remaining teeth, and the time duration between the trauma and treatment.

Due to these considerations, simple splinting methods are essential in paediatric trauma management. A minimally displaced fracture can be managed using

analgesic, antibiotic prophylaxis, and recommending soft diet. But this approach may be jeopardized by poor postoperative care, which is often the case amongst young children due to poor compliance to instructions. In such situations, circumferential wiring with acrylic splints onto the arch can be done for minimal to moderately displaced symphyseal fractures.<sup>3,11</sup> The acrylic cap splint may be intermaxillary, lingual, labiolingual, and a cap type covering the dental arch. Several studies have recommended the use of prefabricated acrylic splints as a treatment for pediatric mandibular fractures. These splints are cost-effective, easy to apply and remove and reduce operating time.<sup>12</sup> In this case report, we discuss the use of an open cap splint for the closed reduction in a minimally displaced symphysis fracture. The follow-up revealed that an open cap splint provided adequate stability of fractured fragments and avoided intermaxillary fixation. Because of its unique design, an open cap splint obliterated the need for occlusal coverage, reduced the repeated radiographic evaluation, provided improved masticatory efficiency, and improved patient

compliance. This case study provide a basis for future studies, that are robust in design and systematically capture, patient outcomes and compare outcomes with different approaches

### CONCLUSIONS

The clinical outcome from this case study indicates that an acrylic open cap splint is an effective method in the management of paediatric mandibular symphysis fracture. The benefits of this technique, as observed in this case study, include occlusion-guided fracture reduction, maintenance of oral hygiene, and comfort for younger patients.

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