

## Management of Mandibular Fracture Using Lateral Compression Splint in a Pediatric Patient

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**DOI:** 10.31080/ASDS.2023.07.1593

**Received:** February 20, 2023

**Published:** February 28, 2023

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### Abstract

Facial fractures are rare in children as compared to adults with mandibular fractures being the most prevalent one. However, their management can present a challenge to a clinician. Various factors have to be considered for planning the treatment in children due to their stage of anatomical, psychological, and physiological development. Lateral compression splint is a simple, reliable and effective treatment modality for the management of mandibular fractures in pediatric patients, especially during the mixed dentition stage where open reduction and rigid fixation is contraindicated. Here, we present a case of mandibular parasymphysis fracture in a male child and its management.

**Keywords:** Child; Mandibular Fractures; Mixed Dentition; Trauma; Splint

### Introduction

Facial fractures are relatively less common in the pediatric population as compared to adults with a prevalence of nearly 14% [1]. The incidence is higher in boys than girls in all age groups with mandibular fractures being the most prevalent type of facial fracture and condyle and parasymphysis the most affected sites [2]. Some of the major causes of mandibular fractures in children include fall injuries, road traffic accidents, sports-related injuries, child abuse, etc. [3]. The management in children varies than that in adults due to anatomical considerations, accelerated healing, developing dentition, level of cooperation, and growth potential [4]. This article aims to report a case of mandibular parasymphysis fracture in a child and its management.

### Case Report

A nine-year-old male child reported to the Department of Pedodontics and Preventive Dentistry with chief complain of pain in

lower front region of mouth after incurring fall injury from a bamboo tree three days back. There was no history of loss of consciousness, vomiting and bleeding from other parts of the body. The medical history of the patient was not significant for any known condition. Also, it was the first dental visit of the patient.

On extra-oral examination, facial asymmetry was evident due to swelling on the left side of lower third of the face extending from corner of mouth to pre-auricular region (Figure 1) which was tender on palpation. The patient also had pain on opening the mouth.

On intra-oral examination, bilateral sublingual hematoma, left-sided buccal vestibular hematoma and mobility of mandible between 32 and 73 could be observed. In addition, caries in relation to 16, 75, and 46; root stump of 74 and 85, and exfoliative mobility in relation to 73 and 83 were present (Figure 2).

**Figure 1:** Extra-oral photograph showing swelling on left side of face.

**Figure 2:** Intra-oral photograph showing bilateral sublingual hematoma, left-sided buccal vestibular hematoma and multiple carious teeth.

Panoramic radiograph was advised which revealed loss of continuity in the lower border of mandible around apex of 33 on left side thus, confirming the diagnosis of left sided mandibular parasymphysis fracture. Furthermore, the image in relation to 75 showed radiolucency involving enamel, dentin and pulp along with radiolucency in furcation area. Root stump of 74 and 85 was seen with developing tooth bud of 45 in Nolla's stage 7 and approximately 2 mm of bone overlying the tooth bud (Figure 3).

**Figure 3:** Panoramic radiograph revealing loss of continuity in the lower border of mandible on left side.

After taking written informed consent from the parents, upper and lower alginate impression was made under bilateral inferior alveolar nerve block. Casts were fabricated using dental stone. Lateral compression splint reinforced with 19G stainless steel wire was made using self-cure acrylic resin (Figure 4). Under local anesthesia, extraction of 74, 73, 84 and 85 was done. Also, after caries excavation, treatment restoration was given on 75. After proper isolation was maintained, the splint was cemented on the mandib-

ular teeth using glass ionomer cement (GIC) Type I (Figure 5). The patient and the patient's parents were educated regarding maintenance of oral hygiene and the patient was advised to take soft diet. Antibiotics, analgesics and 0.2% chlorhexidine mouthwash were prescribed.

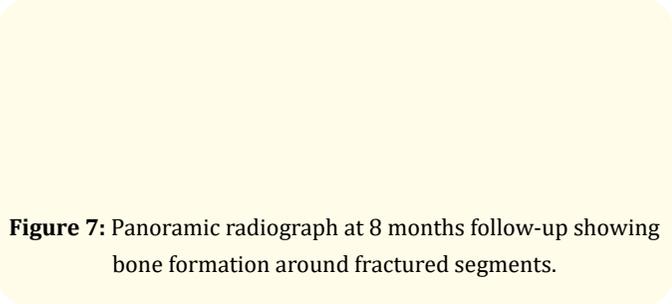
**Figure 4:** Casts fabricated and lateral compression splint reinforced with 19G stainless steel wire made using self-cure acrylic resin.

**Figure 5:** After cementation of lateral compression splint using GIC type I.

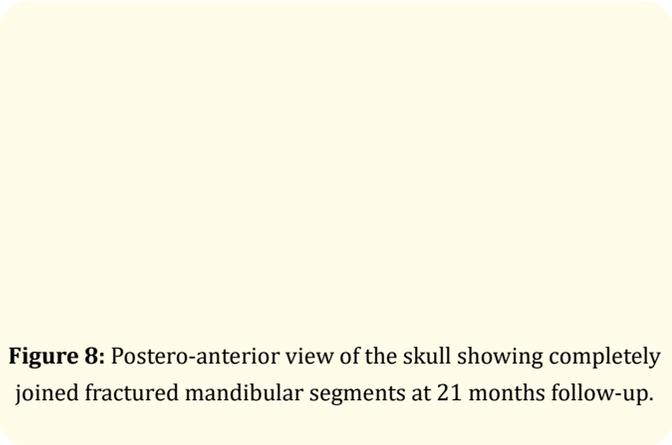
The patient was recalled after 21 days and panoramic radiograph was done which revealed bony callus formation around fractured segments. The splint was removed followed by oral prophylaxis on upper and lower arch. In addition, single visit pulpectomy was performed on 75, composite restoration was done on 16 and 46, band pinching was done on 46 for fabrication of band and loop space maintainer succeeded by topical fluoride gel (1.23% APF gel) application. In the subsequent visit, cementation of band and loop space maintainer on 46 with GIC Type I and extraction of 63 was done under local anaesthesia (Figure 6).

**Figure 6:** Panoramic radiograph at 3 weeks follow-up showing bony callus formation around fractured segments.

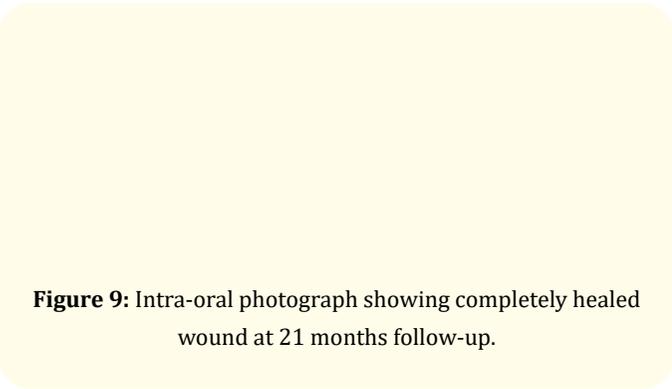
On subsequent follow-up visits at 3, 8 and 21 months, the healing was satisfactory and the occlusion was stable. Also, complete union of the fractured segments was evident on follow-up radiographs (Figure 7,8 and 9).



**Figure 7:** Panoramic radiograph at 8 months follow-up showing bone formation around fractured segments.



**Figure 8:** Postero-anterior view of the skull showing completely joined fractured mandibular segments at 21 months follow-up.



**Figure 9:** Intra-oral photograph showing completely healed wound at 21 months follow-up.

proportion of cancellous bone, smaller face in relation to cranium, and flexible suture lines [5,6]. However, the management of mandibular fractures in children can be challenging due to their stage of anatomical, psychological, and physiological development [5]. Various factors such as age and compliance of the patient, anatomic site of fracture, stage of growth and development, time between injury and treatment, complexity of the injury, and presence of any other concomitant injury must be considered for planning the treatment [7]. In addition, the immobilization period in children must be shorter i.e., 2-3 weeks as compared to 4-6 weeks in adults, as they have a higher osteogenic potential and can recover at a faster rate than adults [8]. Also, as there are chances of ankylosis due to hampering of the condylar growth, minimal immobilization is recommended [4].

Most of the fractures in pediatric patients are green stick or non-displaced fractures, thus observation alone or conservative management by means of soft diet, analgesic and antibiotic prophylaxis is recommended [4,9]. However, healing might be delayed as the young patients may not be able to cooperate in following the instructions. Thus, a lateral compression splint can be fabricated and cemented with luting cement to maintain the stability and aid in proper healing of the fracture site [9].

Lateral compression splint is a custom-made appliance made of acrylic material for the stabilization of mandibular arch [10]. It is a definitive treatment modality in pediatric mandible parasymphysis fracture which provides adequate stability of fractured segments. It is used in cases of mixed dentition where developing tooth buds are present and thus, open reduction and direct fixation is contraindicated [10]. The closed reduction using lateral compression splint can be done under local anesthesia thus, preventing the hazards of general anaesthesia in young patient. Also, it is an economical treatment option which is easy and quick to fabricate. In addition, the appliance helps to minimize the effects of delayed or no treatment such as malunion, deranged occlusion, dentofacial deformities, etc. However, the patient may have difficulty in feeding and maintaining oral hygiene while wearing splint [10].

As a pediatric dentist, our motto should be not only catering to the chief complaint of the patient but also providing comprehensive care to the child. In this patient, besides managing the mandibular fracture, the overall oral health was restored by perform-

**Discussion**

The lower incidence of facial injuries in children as compared to adults may be ascribed to the resiliency of bones in children, a thick layer of adipose tissue covering them, presence of higher

ing oral prophylaxis, fluoride application, restorations, extractions, pulpectomy, and band and loop space maintainer. Parents and concerned supervisory persons like teachers, coaches, administrators, etc. should be educated regarding the importance of protective helmets, standard seat belts, mouth guards, seat restraints, and good supervision to prevent injuries in children [8].

### Conclusion

Mandibular fractures, though uncommon in pediatric population, can be challenging for a clinician. In this case the child was treated in a simple, reliable and effective way with the lateral compression splint because the patient was in the mixed dentition stage. Comprehensive care of the patient was done for the overall improvement in the oral health.

### Bibliography

1. Tent Paul Andrei, *et al.* "The Etiology and Epidemiology of Pediatric Facial Fractures in North-Western Romania: A 10-Year Retrospective Study". *Children* 9.7 (2022).
2. Al-Tairi Nashwan Hamid and Jabr Atiq Al-Radom. "Prevalence and Etiology of Pediatric Maxillofacial Fractures in a Group of Yemeni Children and Adolescents". *Open Journal of Stomatology* 11.05 (2021): 179-187.
3. Mukhopadhyay Santanu. "A Retrospective Study of Mandibular Fractures in Children". *Journal of the Korean Association of Oral and Maxillofacial Surgeons* 44.6 (2018): 269-274.
4. Kaur DrKanwalpreet, *et al.* "Role of Cap Splints in the Management of Paediatric Mandibular Fractures- A Case Series". *European Journal of Molecular and Clinical Medicine* 07.11 (2020): 5886-5897.
5. Venugopal Priyanka, *et al.* "Custom Splint: A Conservative Approach to Pediatric Mandibular Dentoalveolar Trauma". *Scientific Dental Journal* 6.3 (2022): 146-151.
6. Hiremath Mallayya C., *et al.* "Management of Minimally Displaced Mandibular Fracture with Customized Open Cap Splint in an 11-Year Child: A Case Report". *Contemporary Pediatric Dentistry* 3.2 (2022): 80-85.
7. Garg, Ishika, *et al.* "Management of Paediatric Mandibular Parasymphysis Fracture with Open Cap Splint: A Definitive Conservative Treatment Modality". *International Journal of Health Sciences and Research* 10.7 (2020): 198-202.
8. Saskianti Tania, *et al.* "Modified Closed Cap Splint for Symphysis/Parasymphysis Mandibular Fracture Management: A Case Report". *Journal of International Dental and Medical Research* 15.3 (2022): 1320-1325.
9. Kumar Neeraj, *et al.* "Modified Closed Cap Splint: Conservative Method for Minimally Displaced Pediatric Mandibular Fracture". *Saudi Dental Journal* King Saud University 30.1 (2018): 85-88.
10. Quader Sheikh Md Shahriar, *et al.* "Lateral Compression Splint, a Guide for Stabilization of Mandibular Arch in Case of Dentoalveolar Fracture of Children". *Update Dental College Journal* 3.2 (2014): 55-60.