

## CASE REPORT

# Open Cap Splint Fixation with Circum Mandibular Wiring still best method in Management of Pediatric Mandibular Fracture

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### Abstract

Management of injuries to the facial skeleton in pediatric population is still a challenging clinical entity. Due to the lack of co-operation of the child and a growing facial skeleton with dynamic dental maturation age, it presents a lot of difficulties in making choice of appropriate treatment. Although many controversies still exists between two schools of thought i.e. whether to proceed with an open or closed reduction. This article discusses about various possible treatment modalities in managing pediatric mandibular fractures along with favouring closed reduction method as still a better method found to be associated with least complications as such.

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### Introduction

Maxillofacial fractures are less common in children. The incidence is less than 1% below age 5 and upto 8% in children younger than 12 years<sup>1</sup>. Although in hospitalized pediatric patient mandibular fractures are most common and accounts for 56%<sup>2,3</sup>. In pediatric patients

symphysis and parasymphysis fracture accounts for 15-20% while body fractures are rare<sup>4</sup>. Major cause of pediatric mandibular fractures are fall from height, road traffic accidents, child abuse, hyperactivity of child, assault etc.<sup>6</sup> Majority of symphysis and body fracture in pediatric patient are undisplaced because of the elasticity of bone and tooth buds holding the fragments together. In cases of displaced fracture, closed reduction and immobilization is performed. The following case presents the left parasymphyseal fracture and right angle fracture of mandible managed

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with open cap splint fixation with circummandibular wiring under general anaesthesia.

### Case Report-

A 8 year old patient presented to the our department with a history of fall from height. Patient had a chief complaint of pain and restriction in mouth opening. The patient was well oriented and conscious. No history of loss of consciousness, bleeding per ear, nose was reported. There was no history of vomiting and seizures. Intra oral bleeding was evident. All Hematological investigations were found to be within normal limits. Viral markers were negative. Other parameters were within normal limits at the time of operation.

### Clinical and Radiological Examination

Extraoral examination revealed the presence of a slight swelling in the mandibular left anterior region. There was limited mouth opening due to pain and muscle spasm. Clinically a displaced fracture was evident between 72 and 73. Orthopantomograph confirmed the clinical finding. All primary teeth were present. Occlusion was deranged. The primary impressions were taken with alginate and two sets of casts were subsequently poured. An acrylic cap splint was prepared after fracturing the cast and reducing the fracture.



Fig. 1:  
Preoperative  
photograph  
of child with  
deviated  
occlusion.



Fig. 2: 3-D CT Scan showing fracture left parasymphysis of the mandible.



Fig. 3:  
Fabricated  
acrylic  
open cap  
splint on  
the cast



Fig. 4: Intraoperative photograph showing reduced fracture of left parasymphysis of mandible.



Fig. 5: Intraoral photograph after fixation of acrylic cap splint with circum-mandibular wiring.

### Management

Under general anaesthesia with an extra oral approach through the lacerated wound, an incision was given to expose the left parasymphiseal fracture. The displaced fracture was reduced and cap splint was placed over mandible after reduction. A William Kelsey Fry awl was introduced through the incision. Wire was tied with the awl and gently guided into the left buccal sulcus. Next the wire was again tied and guided along the body of mandible and taken out lingually. The same procedure was repeated at the middle chin region and on the right side. The wire was tied together and was subsequently adapted in approximation of bone to prevent any soft tissue injury and also to prevent formation of any unaesthetic scar. Excessive pulling was avoided as the child mandibular cortex was found to be relatively thin.

### Discussion

Most of the pediatric fractures are greenstick type, so conservative approach is preferred as the fracture heals rapidly as the child grows normally. Other advantage of closed reduction is that it can be performed on outpatient basis under local anaesthesia so more patient compliance and cooperation is attained with fewer complications<sup>6,7</sup>. Majority of pediatric body and parasymphysis fracture are undisplaced because of elasticity of bone and tooth buds. Slight occlusal discrepancies resulting from lack of perfect reduction correct spontaneously with the eruption of permanent teeth. Non displaced body or symphysis fracture without malocclusion can be treated by close observation, soft diet and avoidance of physical activity.

Exact method employed for immobilization depends upon child's age and stage of dental development<sup>3</sup>. Under two years of age, no anchorage can be taken from teeth as they are unerupted. In mixed dentition only 6 years molars are adequate for circumdental wires. If possible an arch bar is placed and an elastic immobilisation can be done. If the number of teeth is inadequate then gunning splint can be a choice. The Splint should be left in place for three weeks. Alternatively monocortical plate short (4 mm) and broader screws (2 mm) can be used as they are more retentive. In case of pediatric angle fracture, proximal to the tooth bearing area which cannot be sufficiently immobilized with splint alone, a closed reduction and intermaxillary fixation for 3 weeks is absolutely done. When a mandibular angle fracture is present along with a fracture of condyle, the combined fracture may be significant enough to cause displacement unless ORIF at the angle is carried out. Plating may cause injury to the developing tooth buds. Another problem with internal fixation is second surgery for removal of the hardware. To prevent it, now a day's bio-resorbable plates are preferred but cost of treatment is another concern<sup>4</sup>.

Non operative management (observation, exercises, maxillomandibular fixation, elastics) are popular because of minimal; complications and good outcomes. Acrylic cap splint with circum-mandibular wiring is performed under general anaesthesia is preferred method of closed reduction in childrens. It prevents injury to the vital structures. The method is very cost effective. Minor malocclusions will correct spontaneously. In case of a severe malocclusion, short period of immobilization for 7-10 days with or

without bite opening splint is indicated which is to be followed by elastics<sup>2</sup>.

In children in primary and mixed dentition stage with unilateral condylar fracture analgesics and soft diet for 5-7 days is adequate. Bilateral subcondylar fracture in children in primary and mixed dentition with normal bite opening and stable occlusion can be managed primarily by analgesics and soft diet for 7-10 days. Bilateral fracture with severe dislocation often produces open bite malocclusion. In this case jaws should be immobilized for 7-10 days followed by guiding elastics for another 7-10 days. In permanent dentition stage with unilateral or bilateral condylar fractures especially if dislocation is found along with a persistent malocclusion even after 7-10 days of intermaxillary fixation an open reduction to restore ramus length and to prevent progressive deformity must be considered as in older children there is less capacity for bone to adapt and remodel<sup>7,8</sup>.

### Conclusion

Mandibular fractures in children most commonly occur in the condyle region followed by parasymphysis and angle region. In the majority of cases, it is minimally displaced and can be managed conservatively. A severely displaced fracture may require open reduction and rigid internal fixation. But most of

situations can be best managed with acrylic cap splint fixation with circum-mandibular wiring.

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