

# Malunited fracture of the body and condyle of the mandible : A Case Report

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## Abstract

Mandibular fractures are the most common facial fractures seen in hospitalized children and their incidence increases with age. Treatment options include soft diet, intermaxillary fixation with eyelet wires, arch bars, circummandibular wiring, or stents. Alternative options include open reduction and internal fixation through either an intraoral or extraoral approach. Many factors complicate the management of pediatric mixed-dentition mandibular fractures: tooth eruption, short roots, developing tooth buds and growth issues. One major factor is the inherent instability of the occlusion in the mixed deciduous-permanent tooth phase. This case report documents a child in mixed dentition period with a complication arising due to direct fixation of the fractured mandible.

**Keywords:** Condyle, fracture, malunion, mandible, trauma

## Introduction

Fractures of the facial skeleton in the growing child present the clinician with a number of complex problems. The mandible is the most frequent site among facial fractures.<sup>[1,2]</sup> In reports of large case series of maxillofacial trauma, children younger than 6 years contribute 1% of the fractures.<sup>[3,4]</sup> The incidence of pediatric mandibular fractures increases to 5% at the ages 6 years or older.<sup>[5]</sup> As the pediatric mandible is more malleable, a fracture involves significant force, with motor vehicle injuries consistently being the most frequent mechanism of injury.<sup>[6,7]</sup> All such injuries demand the application of basic fracture management principles, namely diagnosis, reduction, fixation, and rehabilitation.

The treatment of mandibular fractures in children before puberty is generally of a conservative nature because of the rapidity of healing and the adaptive potential of the bone and its contained dentition. If the severity and displacement of the fracture are of sufficient degree to warrant immobilization of the mandible, some modification of technique is required because of the presence of deciduous teeth of variable mobility, partially erupted and unerupted teeth of the permanent dentition.

The temptation to perform open reduction and direct fixation in an attempt to minimize the adverse effects on mandibular growth that an extended period of intermaxillary fixation may have, must be balanced with the potential surgical damage to the developing structures encountered such as

the periosteum, soft tissues as well as the presence of tooth germs.<sup>[8]</sup> In patients below the age of 10 years, the body of the mandible is congested with developing teeth. It is unsafe to apply transosseous wires or to insert bone pins or plates in these circumstances. In exceptional instances, such as gross displacement of the fractured fragments, the lower border may be either wired with caution or a miniplate applied with the shortest possible screws. This case report documents a child in the mixed dentition period with a complication arising due to direct fixation of the fractured mandible, and highlights the difficulties in managing mandibular fractures at such a young age.

## Case Report

An 8-year-old male child patient presented with a swelling and pus discharge in relation to the right side of his mandible since 1 month. Past history revealed that the patient had met with a motor vehicle accident 3 months ago and was subsequently treated for fracture of the mandible on the right side. Extra oral examination revealed an obvious swelling of 1 × 1.5 cm in size on the right side of the mandibular region with the overlying skin showing a crusty appearance [Figure 1]. There was a sinus opening along with pus discharge over the swelling. Intra oral examination revealed inter dental wiring done from 73 till 83 [Figure 2]. Dental abnormalities included missing 31, rotation of 41, 42 and 32; anterior open bite and posterior open bite on the left side. Orthopantomogram revealed presence of bone plate along with 4 screws in the region of 43 and 45, which were in close approximation with the developing roots of 43 and 45 and the plate was oriented in an oblique direction [Figure 3]. A fracture line on the right side of the mandible extending from interdental area of 42 and 83 vertically and horizontally along the lower border of the mandible was also observed on this radiograph. There was a step deformity in the lower border of the mandible indicating improperly reduced fracture. An associated malunion of the subcondylar fracture on the left side was also noted [Figure 4]. Based on history, clinical features, and radiographic features this case was diagnosed

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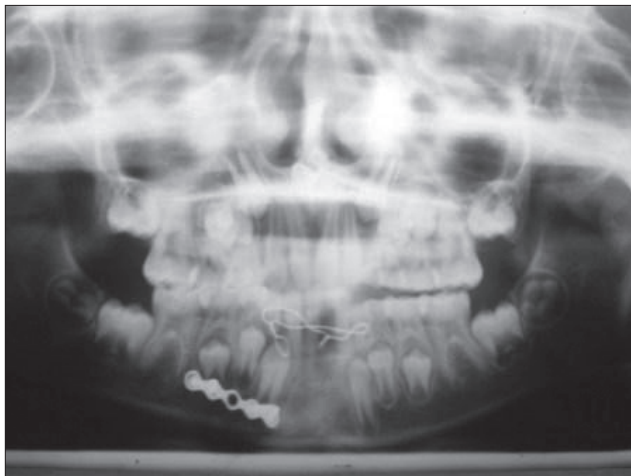
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**Figure 1:** Photograph showing extra oral swelling with the overlying skin crusty in appearance



**Figure 2:** Intra oral photograph showing interdental wiring from 73 till 83



**Figure 3:** Orthopantomogram showing bone plates and screws in close approximation of roots of 43 & 45 and step deformity in the lower border of the mandible on the right side



**Figure 4:** Orthopantomogram showing malunited sub-condylar fracture of the left side

as malunited fractures of the body and the condyle of the mandible on the opposite sides. Under local anesthesia the interdental wiring was removed and a crevicular incision was made from 41 till 46, thus exposing the fracture site. The screws along with bone plate were retrieved carefully [Figure 5]. Prophylactic extraction of 83, 84, and 85 was done to facilitate the eruption of underlying permanent teeth and to evaluate whether any damage had occurred to these teeth in the process of bone plating. Post-operative period was uneventful and after 45 days of follow-up, the extra oral swelling had subsided and the sinus was completely healed [Figure 6]. Intraorally and radiographically there was evidence of eruption of 44 and 43 [Figure 7]. There was considerable evidence of occlusal adjustment both in the anterior and posterior regions throughout the follow-up period [Figure 8].

## Discussion

Facial fractures in children comprise less than 15% of all

the facial fractures as compared to adults.<sup>[9]</sup> The most common fracture in children requiring hospitalization and/or surgical intervention involves the mandible, in which the angle, condyle, and the sub-condylar region account for approximately 80% of mandibular fractures. Symphysis and parasymphysis fractures account for 15-20% and body fractures are rare.<sup>[10]</sup>

Condylar fractures are more common in children than in adult's i.e. 5:3<sup>[11]</sup> as the highly vascularized pediatric condyle and thin neck offer poor resistance to impact forces besides having a large amount of medullary bone surrounded by a thin rim of cortex. Children have a great osteogenic potential and faster healing rate than adults and hence anatomic reduction in the children should be accomplished earlier and the immobilization time should be shorter, i.e., 2-3 weeks as compared to 4-6 weeks in adults. The high osteogenic potential in children allows rapid union within three weeks and non-union or fibrous union is almost never seen. These



**Figure 5:** Retrieved bone plate and screws



**Figure 6:** Extra oral photograph showing healed sinus



**Figure 7:** Orthopantomogram showing continued eruption of 44 and 43



**Figure 8:** Intra oral photograph showing occlusal adjustment in the anterior and posterior regions

fractures allow for a much greater potential to remodel even in imperfectly reduced fractures.

Indications for closed reduction of mandibular fractures remains controversial, but may include fractures in the presence of mixed dentition, non displaced, or grossly comminuted fractures and fracture of coronoid or condyle. Indications for open reduction and internal fixation of mandibular fractures include most symphyseal and parasymphyseal fractures, displaced body and angle fractures, and certain condylar fractures. Reduction can often be achieved with the application of intermaxillary fixation. If open reduction is considered then it should be attempted with the utmost care being paid to the presence of unerupted teeth, with the lower border of the mandible being the safer place for application of plates or wires. Mono cortical plates are preferred than compression plates because of higher rates of complications, especially infections with the latter.<sup>[12]</sup>

Eppley<sup>[13]</sup> reported the use of resorbable polylactic and polyglycolic acid plates and screws in pediatric patients with displaced fractures of the symphysis, parasymphysis, body and ramus. The role of absorbable plates and screws in the treatment of mandibular fractures continue to evolve and has implications in the treatment of the child's growing mandible. Young children provide a difficult treatment pathway for those clinicians shouldered with the responsibility of restoring health. By embracing the anatomical and developmental potential of the facial tissues, both hard and soft, then the majority of these cases can be managed conservatively, thus negating the disadvantages of such interventional surgeries.

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