

## Case Report

# Pediatric Mandible Fractures Management at District Hospital

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## ABSTRACT

Fractures in children are rare. The mandibular fracture incidence among children ranges between 0.6% and 1.4%. We report a case of a six-year-old with left chin pain. The patient had a history of falling from a motorcycle in a single accident that was not accompanied by bleeding from the mouth, nose, or ears. The patient's father reported that the child did not experience syncope, vomiting, or drowsiness. Upon physical assessment, the child's vital signs were within normal ranges, and they were completely conscious. A mandibular fracture-like abnormality was discovered during a craniofacial assessment. The patient was treated with interdental wiring and intermaxillary fixation under general anesthesia. The child underwent interdental wiring and intermaxillary fixation under general anesthesia. The management was carried out in a district hospital, where limitations in resources and facilities necessitated the selection of a simpler and less invasive treatment approach. Even with these problems, the treatment plan that was worked for this child with a broken mandible.

Keywords: child; mandibular fractures; pediatrics

## INTRODUCTION

Pediatric fractures are uncommon.<sup>1</sup> Social and anatomical causes primarily support this assertion, as children spend most of their time under adult supervision in a safe environment. It minimizes their vulnerability to severe trauma, accidents, and interpersonal aggression, typical causes of facial fractures in adults.<sup>2</sup> Additionally, because children's bones are more elastic and have more protective tissue, the prevalence is lower in children under ten.<sup>3</sup> There are several different approaches to treating pediatric mandibular fractures. Conservative treatment generally involves a soft diet and monitoring, maxillomandibular fixation (MMF), and open reduction internal fixation (ORIF).<sup>4</sup>

The prevalence of mandibular fractures among children is between 0.6% and 1.4%.<sup>5</sup> Its incidence is rare below the age of ten years.<sup>6</sup> The most frequent causes of fractures were falls (64%), accidents (22%), and sports accidents (9%).<sup>1</sup> In children, under

15% of facial fractures are maxillofacial fractures.<sup>7</sup> Boys are twice as likely to have a mandible injury as girls.<sup>5, 8, 9</sup> Mandibular fractures in children exhibit a similar anatomical clinical pattern to that of adults. This similarity extended to the standard methods for managing facial fractures, such as reduction, fixation, and immobilization.<sup>9</sup> Computed tomography (CT) is the primary imaging modality for assessing traumatic mandibular injuries.<sup>10</sup>

Various methodologies exist for the treatment of pediatric mandibular fractures. Conservative management typically includes a soft diet and observation, maxillomandibular fixation (MMF), and open reduction internal fixation (ORIF).<sup>4</sup> Age, the extent of fracture fragmentation, and concomitant traumas can affect the treatment of mandibular fractures.<sup>11</sup> Significantly displaced fractures may be eligible for ORIF contingent upon specialized expertise and facility availability.<sup>4</sup> Challenges encompassed the accessibility of surgical instruments, diagnostic apparatus, and therapeutic modalities for pediatric patients. The patient had intermaxillary fixation and interdental wire implantation while under general anesthesia.

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## CASE PRESENTATION

A 6-year-old child arrived at the emergency room of a general hospital with left chin pain due to falling from a motorcycle in a single accident in the past hour. The child did not wear a helmet. There is no history of bleeding from the mouth, nose, or ears, and the father reported that the child did not experience any syncope, vomiting, or drowsiness. On physical examination, the child did not lose consciousness, and vital signs were within normal levels.

The clinical examination showed a laceration on the left chin, misaligned teeth, and severe step deformities. The left bottom border of the jaw was modified to elicit mobility.



Figure 1: 3D computed tomography showed fractures of the left corpus mandibular and the left maxillary

The results of the CT scan and physical examination indicated a fracture in the left mandibular body. They left the maxillary bone (Fig.1). The patient was treated with interdental wiring and intermaxillary fixation under general anesthesia. During a five-month follow-up period, there were no signs of pathological movements in the fracture line and no restriction in mouth opening. No indications of abnormal displacement of the fracture line or restriction of mouth opening were noted throughout the five-month follow-up period. A repeat CT scan was not conducted post-procedure due to ethical and safety concerns, as repeated radiation exposure in juvenile patients is inadvisable unless absolutely essential. This characteristic also constitutes a limitation in this case report.

## DISCUSSION

Pediatric mandible fracture is uncommon. Despite the rarity of a child's fractured mandible, this

condition requires a thorough explanation because it could have severe consequences for the patient.<sup>12,6</sup>

Different injury mechanisms, including vehicle accidents, falls, and sports-related injuries, significantly contribute to fracture series. Regarding location, mandibular condyle fractures are the most common in children, accounting for 55% of all cases.<sup>1</sup> It is then followed by parasymphysis, corpus, and angular fractures. Based on the calcium-to-water ratio and the medullary-to-cortical bone ratio, a child's mandible is more elastic and stable than that of adults, making it more trauma-resistant.<sup>13</sup> Children with mandibular fractures will undergo different treatment than adults, mostly due to the possibility of growth restriction. In addition to early treatment, the prognosis for the children depends on the development of form and function. The primary goal of mandibular fracture treatments is to recover pre-injury shape and function with the least impairment, harm, and the shortest recovery time.<sup>14</sup>

A mandibular fracture treatment aims to restore the bone structure to its pre-injury form with minimum visual and functional degradation; however, there is no established procedure for treating mandibular fractures in children. In fact, mandibular fractures in children can damage both function and appearance.<sup>14</sup> The treatment options for mandible fractures in children include physical therapy without the utilization of maxillomandibular fixation (MMF), a short duration of MMF lasting 7-14 days, accompanied by physical therapy, and open reduction and internal fixation (ORIF). When considering intermaxillary fixation (IMF) for children in the primary or mixed dentition, it is recommended to avoid utilizing screw-retained devices due to their potential to cause damage to the developing permanent dentition. Methods for achieving intermaxillary fixation (IMF) in children may involve the utilization of ivy loops, Risdon cables, Erich arch bars, sutures, or dental splints. Similarly, the placement of internal fixation should consider the presence of developing permanent teeth. Plates should be placed toward the bottom border of the mandible in the regions where teeth are present, utilizing screws that penetrate only a single side of the bone.<sup>15</sup>

In this case, an IMF was performed to restore accurate occlusion and fracture reduction in the

patient's care. Bracing was performed using IMF, the most common jaw immobilization method for facial trauma. Intraoperative techniques for IMF generally entail the insertion of eyelet wires, facilitating precise restoration of occlusion. Eyelet wires are deemed less complex than Gilmer wires owing to their expedited application. Patients receiving treatment with eyelet wires exhibit superior tooth hygiene compared to those treated with Gilmer wires<sup>14</sup>. The goal of immobilizing the fractured bones is to minimize motion along the continuity disruption, which is necessary for promoting rapid healing or unification.<sup>15</sup> The criteria for clinical success included a maximum mouth opening of at least 35 mm, no deviation or deflection during mouth opening, lateral jaw movement of at least 7 mm, restoration of pre-trauma occlusion,<sup>16</sup> absence of pain or clicking in the temporomandibular joint,<sup>17</sup> absence of post-procedure infections or wound complications,<sup>18</sup> and sustained mandibular growth without facial asymmetry or progressive deformity.<sup>4</sup>

The absence of a follow-up CT scan constrained the evaluation of complete radiographic bone union. To mitigate the child's elevated radiation exposure, which may pose numerous cumulative risks to tissue development, this action was undertaken.<sup>19</sup> Postoperative care included oral physiotherapy, analgesics, prophylactic antibiotics, and a soft diet to prevent temporomandibular joint movement limitations. Physiotherapy is essential for mitigating the risk of joint ankylosis and restoring normal masticatory function.<sup>20</sup> The IMF is considered safer owing to its non-invasive characteristics, cost efficiency, and the capability to be performed using standard methods without requiring advanced specialized knowledge.<sup>21</sup> This technique is particularly appropriate for patients with significant dental problems, as the use of screws or plates has a risk of damaging the developing permanent tooth follicle.<sup>18</sup> Simultaneously, a resorbable plate is anticipated to provide improved structural stability and eliminate the need for surgical removal of the implant, as it undergoes natural deterioration. However, it may result in increased expenses, require specialized equipment, and jeopardize mandibular development if incorrectly situated near the tooth. Consequently, the implementation of an IMF is the most suitable option in secondary healthcare facilities with constrained resources.<sup>4</sup>

## CONCLUSION

Fractures in pediatric populations are rare, particularly mandibular fractures. Meticulous care is essential due to its impact on long-term craniofacial development. This case study describes a 6-year-old child with a history of a laceration on the left chin, dental malocclusion, and significant step deformity. After five months of therapy, the patient achieved significant fracture reduction and occlusion management, along with the restoration of mandibular function without severe complications, facilitated by the effective application of interdental wires and intermaxillary fixation (IMF). Therefore, IMF is recommended as the primary method for treating mandibular fractures in pediatric patients at regional hospitals, considering the limitations of facilities and resources.

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