

Combined case of midline fracture of mandible with Greenstick fracture of left coronoid process and right condylar head dislocation in child 5 years old

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Abstract

Objective: Maxillofacial trauma is uncommon in paediatric population. All maxillofacial trauma in pediatric population, usually comprises of soft tissues and dento-alveolar trauma whereas the maxillofacial bones fractures is rarely seen. Usually, maxillofacial trauma is associated with severe body injuries, and in pediatric cranio-maxillo-facial injuries is around 12% of the total pediatric emergency cases. This number of injuries are challenging in management due to the injury, impaction to esthetic and function of growing facial bones in children.

Case Report: We present a 5 years old boy presented to the Emergency Department of King Abdullah Hospital, Bisha, with history of fall from terrace in his house. According to the parents, the child did not lose consciousness and was oriented and responding without any history of vomiting or convulsions after the fall. On examination the child was in pain when he was encouraged to open his mouth. Extra-oral examination revealed cut wound in the lower lip due to fall and homeostasis was achieved. In the Intra-oral examination, upper deciduous teeth 51,61 was impacted due to the dentoalveolar trauma and lower gingival wound in the anterior teeth area. Bilateral preauricular regions was palpated and shows swelling and tenderness in both sides. 3D Maxillofacial Computerized Tomograph (CT) shows mid line fracture of mandible, and Greenstick fracture of the left coronoid process. CT shows also, falling of the head of condylar from the glenoid fossae in the right side. The patient was successfully managed at King Abdullah Hospital, Bisha, KSA

Conclusion: Maxillo-facial trauma is not very common in paediatric age. Due to growing nature of bone it is not very easy to manage such cases specially if they are associated with poly trauma

Keywords: maxillo-facial trauma, mid line fracture of mandible, greenstick fracture of the left coronoid, 3D Maxillofacial computerized tomograph, poly trauma

Introduction:

Trauma is resulting when an external force causing an injury or damage to a part or parts of the body. Between all kinds of maxillo-facial trauma in pediatric population, soft tissues and dento-alveolar trauma considered to be the most frequent injuries whereas the maxillo-facial bones fractures is low in rate.¹ Cultural, social and environmental factors added to the age-related activities are associated with the incidence of maxillo-facial trauma in children.² Usually, maxillofacial trauma is associated with severe body injuries, and in pediatric cranio-maxillo-facial

injuries is round 12% of the total pediatric emergency cases. This number of injuries are challenging in management due to the injury impaction to esthetic and function of growing facial bones in children.³ Mandible bone fracture is the common fracture in the pediatric maxillofacial trauma.⁴ McLennan 1956, and Rowe's 1969 reported that 1% of mandibular fractures occurred in children younger than 6 years, while Thoren 1992 stated that 1 to 2% mandibular fractures occur in patients with same age in general population.⁴ The major cause of morbidity and mortality in children is trauma, despite the

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fact that incidence of craniomaxillofacial fracture is lower compared with adults.⁵ Anatomical and physiological characteristics during the developmental facial stages in children differ the nature of their facial injuries from adults.⁵

Children are different from adult in many aspects, they have higher cardiac output, higher oxygen demand, metabolic rate, and high surface to body volume ratio. On the other hand, children are lower in regards of blood and stroke volumes. These unique features, increase the risk of hypoxia, hypotension, and hypothermia after losing blood between children. Also, airway can be easily compromise in the incidence of swelling or partially airway obstruction. Therefore, resuscitation of pediatric patient in emergency situations is more critical and time dependent.⁶ Size and proportions of the facial skeleton change significantly Through the early years of life.⁴ Ratio between cranial volume and facial volume is approximately 8:1 at birth, and mandible is noticeably smaller and round 2.5:1 after the completion of growth. Later on, facial bones size start increasing and mandible is getting larger by re-modeling with a spontaneous development of sinuses and dentition to reach round 2.5:1 after the completion of growth.^{4,6} The smaller volume and retruded position of face to the skull is explaining the lower incidence of midface and mandibular fractures comparing to the significant high rate of injuries to the cranium.^{6,7} The cranial injuries decreased comparing to higher rate of injuries in midface and mandible when the facial growth completed due to the prominent position of midface and mandible.⁶ As a result of the thicker layer of tissue which covering the flexible suture lines and elastic bones, the presence of tooth buds in the jaws, and insufficient sinus development. The incident of facial fractures in children is less in rate and minimally displaced in nature than in adults.⁶ Growth stages, can improve the long term results like in injuries during the deciduous and mixed dentition stages and in the incident of condylar fractures. This role occurs when shading of deciduous teeth is helping in readjustment of occlusion and when the condylar growth compensate the condylar fractures.^{6,7}

In population, facial fractures in the children accounts less than 15% from the total facial injuries.^{2,5,8,9} Only about 0.87-1.0% of facial fractures occur in children younger than five years.^{5,9} While the fractures of the mandible are common, Mid-face fractures are rare.^{8,9} Mandibular fractures are classified anatomically as, condylar, angle, body, symphysis, and parasymphysis.¹⁰ The angle, condyle and the sub-condylar region fractures account for approximately 80% of mandibular fractures, while symphysis and parasymphysis fractures account for 15-20% and body fractures are rare.²

Boys has the greater number of facial fracture incidence than girls globally. This high rate of facial fractures between boys referred to their intense physical activates compared to girls.^{5,6} Many authors state the ratio between boys and girls in facial fractures is 2:1.⁴

CASE REPORT:

A 5 years old boy presented to the Emergency Department of King Abdullah Hospital, Bisha, with history of fall from terrace in his house. According to the parents, the child did not lose conscious and was oriented and responding without incidence of vomiting or convulsions after the fall. The Emergency Department (ER) doctor did the dressing on a cut wound in the upper lip, and called oral and Maxillo-facial surgery team to examine the patient.

During examination, child was crying and it was obvious that, he has difficulty and felt pain when he was encouraged to open his mouth. Extra-oral examination revealed cut wound in the lower lip due to fall and homeostasis was achieved. In the Intra-oral examination, upper deciduous teeth 51,61 was impacted due to the dentoalveolar trauma and lower gingival wound in the anterior teeth area. Bilateral preauricular regions was palpated and shows swelling and tenderness in both sides.

3D Maxillofacial CT shows mid line fracture of mandible, and Greenstick fracture of the left coronoid process. CT shows also, falling of the

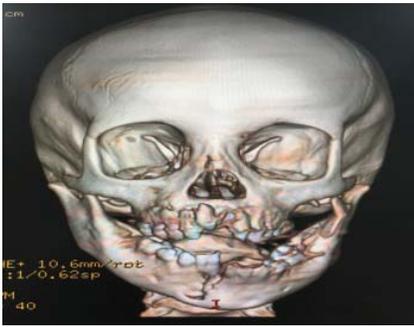


Figure 1: initial Maxillofacial 3D CT scan



Figure 2: During the first visit

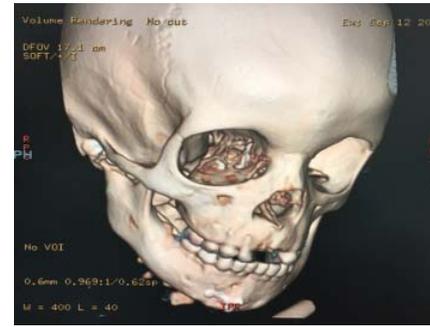


Figure 3: Maxillofacial 3D CT scan after one month

head of condylar from the glenoid fossae in the right side. As shows in figure1.

Management:

Patient was prepped for General Anesthesia and consent and documentation was done. In Operating Room department and under General Anesthesia, extraction of upper impacted deciduous teeth 51,61 was done. Then, open reduction with internal fixation with double Y shape titanium plate was carried out in the mandible symphyseal fracture. After that, wound was sutured. Greenstick fracture of the left coronoid process and the right dislocation of the head of the condylar was treated conservatively. Patient get appointment and follow ups in physiotherapy department and appointment for follow up after 2 weeks in Oral and Maxillo-facial surgery clinic. Later on during the follow ups, patient gradually gain the normal mouth functions and appearance.As in Figure 2 and 3 .

Discussion:

Identification and management of mandible fractures in the pediatric patient population can present numerous encounters to the oral and maxillofacial surgeon. There are certain principles that essential to be addressed when dealing with pediatric mandible fractures. Pediatric mandible is an active structure that endures remarkable changes during growth stages. In order to prevent unwanted results, management of mandibular trauma demands knowledge of these changes over time.¹¹ The occurrence of facial fractures rate in pediatric population is lower than adults which counts 15% of the facial fractures in general population.⁹ The explanation for this low rate incorporate, little volume of facial

mass with respect to the cranium, the relative flexibility of the pediatric skeleton bones and the secured place in which kids live, prompting less introduction to same component of damage.⁹

Most of pediatric fractures are greenstick type and non-displaced fractures. These kinds of fractures are not indicating to the open reduction style because of the nature of fracture and also, to avoid disturbance of the teeth development in the jaw. Generally, the conservative approach (close reduction with observation) is the best choice in mandible fractures between children. This approach can allow the normal growth of mandible to take place.^{9,12} On the other hand, open reduction and internal fixation (ORIF) is better to be used in the displaced mandible fractures.^{12,13} Although, mandible bone consist of a few weak points, includes both sides of mentum, the angle, and the condylar process which is susceptible to be the fracture side, kids when comparing to adults, tend to have one fracture site in the facial injury.^{5,10,14} Also, due to the weak and thin neck and highly vascularized condyle in children with age of 6 years and younger, condylar fractures are more occur in pattern of intra-capsular than extra-capsular in location.⁵

Our case shows a pediatric patient with an unusual facial injury of three types of mandibular fractures in three different sites which need to be treated in different styles of treatment approach. An open reduction with internal fixation approach for the mandible symphyseal fracture and greenstick fracture of the left coronoid process with a right dislocation of the head of the condylar which was treated in a conservative approach. Such kind of combination fractures pat-

terns and fracture sites is rare and can eliminate the chances to achieve the purpose of treatment. In many situations and in spite of the rapid healing process, the well vascularized face tissues, the ability to adapt and re-modeling, and the appropriate re-generation of orofacial tissue after damage, a number of obstacles can occur.¹³ These obstacles are related to limitation of clinical understanding of diagnosis and treatment and also, the logistic readiness. Unfortunately, Sometimes the management of mandibular fractures can cause an obvious effects to the future growth of craniofacial bones, appearance, and function. Well understanding of facial anatomy and developmental phases, the availability of pediatric surgical instrumentation, and broad clinical experience in understanding the features of different facial trauma and management style for each, can results in restoring the function and appearance while avoiding the side effects which may exist during the mandible growth.¹⁵

Conclusion:

Overall population, facial fractures in children is uncommon and occur mostly in major trauma. Though, they are able to heal and recover better than adults, the treatment of their facial fractures requires more consideration to many factors than adults. The special features of pediatric facial fractures need a detailed and particular knowledge in the diagnosis, management, and follow-up. Also, the current principles of treatment in pediatric facial fractures require modification, development, and enhancement as experience increase.

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Role and contribution of Authors:

Dr. Mohammed A. Baraka, Oral and maxillofacial surgeon, conceived the idea and reviewed the initial references.

Dr. Abdullah M. Alshahrani, Oral and Maxillofacial surgery resident, collected the data and references and wrote the report.

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