
A retrospective Study of Mandibular Fracture in Children

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ABSTRACT

Background and Objectives: A retrospective study was done to report the incidence of mandibular fractures in children up to fifteen years of age seen in Rizgaree teaching hospital /Erbil / Kurdistan region of Iraq.

Methods: The patient's records of 62 injured child aged 0-15 years, from 1/1/ 2002 to 31/12/2008 were retrieved and relevant data was recorded and analysed. A data collection sheet was designed to record patient's name, sex, age, site of fracture, the etiology of the injury and the method of treatment and complications.

Results: The total number of patients who presented with mandibular fracture in children was 62 (78.5%). The ratio of boys to girls was 43 (69.4%) boys and 19 (30.6%) girls (2.2:1). Most of the trauma reported in age group 12-15years (46.8%). Regarding the site of fracture, condylar fracture (46.7%) was most common followed by symphysis (27.4%), dentoalveolar (14.5%), angle (8.1%) and body (3.3%). The main etiology of fracture was fall from height (54.8%). Most of the patients were treated by closed reduction (88.7%) and fixation.

Conclusions: The incidence and etiology of mandibular fracture in children differs among different populations. In our study, the incidence was not very common, fall was most common cause, condylar fracture was most common. Most of the cases can be treated conventionally.

Key words: Mandibular fracture, children, incidence

INTRODUCTION:

Trauma is the leading cause of morbidity and mortality among children, although fractures of the facial skeleton are less common in children than in adults.¹⁻⁵

Trauma-induced maxillofacial injuries in children may affect function as well as esthetic appearance, and they must be diagnosed promptly and accurately and managed appropriately to avoid disturbances of future growth and development.⁶ Children have a higher resistance to facial fractures and a greater susceptibility to greenstick fractures than adults do, in part because of the structure of bone in the pediatric facial skeleton. The abundance of cartilage and cancellous bone, low mineralization, and

more flexible suture lines and indistinct corticomedullary junction, confer greater elasticity and flexibility on the pediatric facial skeleton.^{1,3,7} The thick layer of adipose tissue that overlies much of the pediatric facial skeleton, and the fat pads that surround the upper and lower jaws, also help protect these bones.^{1,3} Prior to the eruption of permanent dentition in children, the body of the mandible is almost entirely filled with teeth. This leaves the remaining bone weakened and unable to resist external forces. Problems peculiar to the treatment of maxillo- mandibular fractures in children are created by the necessity for continuing growth of the child, jaws filled with the teeth, and management difficulties including noncompliance.⁸ The

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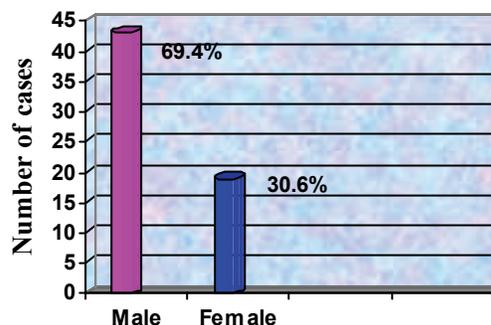
frequency of facial fractures in children is much lower than that in adults: Approximately 5%–15% of all facial fractures occur in children. The incidence of pediatric facial fractures is lowest in infants and increases progressively with increasing age.¹⁻⁵ The etiology of facial fractures in children is age-dependent and the prevalence differs from adults. The major causes include falls, sporting accidents, MVA (motor vehicle accidents), assaults, and animal kick.^{5,9,10,11} To the author knowledge, no previous studies have been done in this regard in Hawler city .

METHODS:

In a retrospective study the patient's records of 62 injured child aged 0-15 years, were retrieved from Department of Oral and Maxillofacial Surgery/ Rizgaree Teaching Hospital, from 1/1/ 2002 to 31/12/2008, and relevant data was recorded and analysed. Most of the patients were referred from Health Care Centers and all Hospitals of Hawler Governorate, as the only Department of Oral and Maxillofacial Surgery is in Rizgaree Teaching Hospital. A data collection sheet was designed to record patient's name, sex, age, site of fracture, the etiology of the injury and the method of treatment and complications. The patients were divided into four age groups (0-3, 4-7, 8-11, and 12-15), as the etiology of trauma varies with age-related activities and exposures, and the significant variations in the ratio between cranial volume and facial volume at different ages.

RESULTS:

Among a total number of 415 patients with maxillofacial fracture, only 78 (18.8%) patients were children. Mandibular fracture in children accounted for 14.9% of the total number of patients (415). Among these 78 children, 62 (79.5%) cases had mandibular fracture. The ratio of boys to girls was 43:19 (2.2:1) as shown in (Figure 1). Most of the trauma as shown in (Figure 2) was reported in age group 12-15years (46.8%).



Figure(1): Gender distribution of fracture mandible in children.

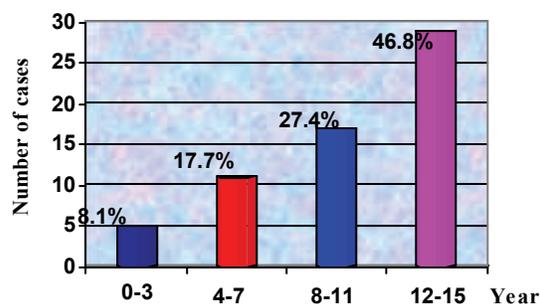


Figure (2): Age distribution of children with mandibular fracture.

Figure (3) shows the site of fracture. Condylar fracture seen in 29 (46.7%) of the cases and was most common followed by symphysis 17 (27.4%), dentoalveolar 9 (14.5%), angle 5 (8.1%) and body 2 (3.3%). The main etiology of fracture was fall from height (54.8%), as shown in Figure 4. Patients with green stick fracture of the condyle, 29 (46.7%), were treated by observation and follow up. In patients with symphysis fracture 17 (27.4), those with non displaced fracture 7 (11.28%) were treated by observation and follow up. Open reduction with intraosseous wiring placed in the inferior border of the symphysis supported by simple interdental wiring (without inter-maxillary fixation) were used for the remaining cases 10 (16.12%) of symphysis fracture.

One patient that had non displaced body fracture was managed by observation and follow up (soft diet). Whereas the case with displaced body fracture was treated by closed reduction using eye let and inter-maxillary fixation for 2 weeks duration. Mandibular angle fractures (5 cases) were treated by open reduction, intraosseous wiring, and inter-maxillary fixation using

eye let for two weeks duration, Table (1). Regarding complications, no fibrous healing was seen, in 2cases with mandibular symphesis fracture tooth bud of permanent canine was destroyed during bone preparation for wire placement, in 1 case permanent lateral incisor displaced during fracture site manipulation. No malocclusion reported in all cases.

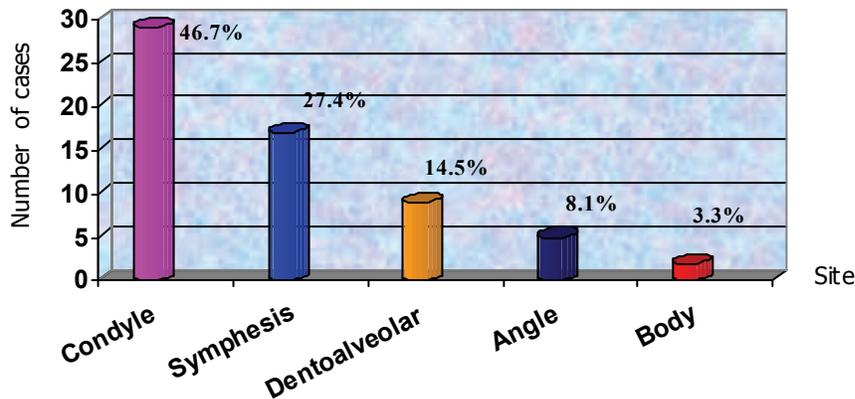
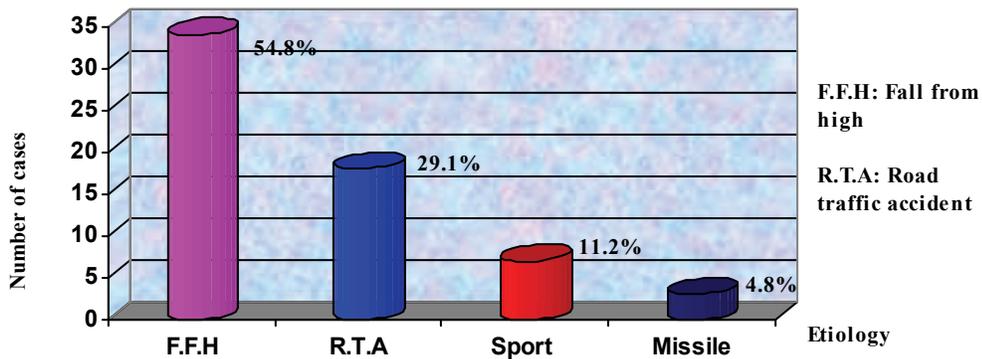


Figure (3): Distribution of mandibular fracture site in children



Figure(4) : Etiology of mandibular fracture in children.

Table (1): Treatment modalities of mandibular fracture in children

Location of fracture	No.	Closed reduction with dental fixation	Intraoral open reduction with internal fixation	Extraoral open reduction With internal fixation	Observation
Condyle	29	-----	-----	-----	29
Symphysis	17	-----	10	-----	7
Dentoalveolar	9	9	-----	-----	-----
Angle	5	-----	-----	5	-----
Body	2	-----	-----	1	1
Total	72				

DISCUSSION :

The Department of Oral and Maxillofacial Surgery at Rizgaree teaching Hospital is the main unit treating adult and pediatric facial fractures in Hawler governorate. The pediatric facial trauma patient provides several different considerations that are not present in the adult. First, the pediatric patient has the tremendous advantage of an accelerated ability to heal in a very short time with few complications, aided by the well vascularized tissues of the face. Second, through the assistance of growth and an inherent ability to adapt, recovery of damaged orofacial tissues and function is much better than in the adult.¹² Our results showed that boys are more prone to injury than girls and this has been seen in many studies¹⁻²³. A possible explanation for this could be that girls mature earlier than boys,¹¹ they are less involved in outdoor activities¹⁶ and contact sports¹⁷. We found that the incidence of mandibular fracture in children increases with the increased age of the children. Thirteen to fifteen years age

group accounted for most of the presentations, which correlates closely with other studies.^{11,14} This could be due to the significant variations in the ratio between cranial volume and facial volume at different ages, and these variations may influence fracture patterns. The frontal cranium is prominent in the very young; whereas the mandible becomes more prominent with increasing age.¹⁴ It may also be due to the fact that as children get older, they are increasingly active with less adult supervision. This results in a greater likelihood of sustaining trauma¹⁸. While accidental falls were found to be the most common cause of mandibular fractures in our study and many other published studies,^{1,10,11,13,15} others reported road traffic accidents as the main cause.^{6, 19,20,21} Published data from different studies on the etiology tend to vary from one country to another, perhaps because of the differences in social, cultural and environmental factors¹. Among the sites of fracture, condylar fracture was the most common and the least common was

Similar results have been reported in all previous studies.¹⁻²¹ A possible explanation for the high percentage of condylar fracture is that during infancy and early childhood, compression fractures of the mandibular condyle are commonly associated with the presence of a short, thick condylar neck as well as a high ratio of cancellous to cortical bone. As a child grows and the neck of the condyle elongates, so does the risk of condylar neck fracture rather than condylar head fracture¹⁸. Regarding treatments, non displaced fractures were treated by observation and follow up. Displaced symphysis, body and angle fractures were treated by open reduction and intermaxillary fixation for two weeks because of rapidity of healing in children. This view has been supported by many authors.^{1,11,18,19,22} Management of mandibular fracture in children differs from that of adults because of anatomic variation, rapidity of healing, degree of cooperation and the potential for interference with the mandibular growth.²³ In addition, children in the deciduous and mixed dentition stages demonstrate some capacity for spontaneous occlusal readjustment, after injury and treatment, as deciduous teeth are shed and permanent teeth erupt¹. This study reported a higher incidence of mandibular fracture in our children than some previous studies^{1-5,11,25} and lower incidence than some other reported studies.^{13,15,26,27} Published data from different studies on the incidence of mandibular fractures tend to vary from one country to another, perhaps because of the differences in social, cultural, and environmental factors.^{13,15}. There may be some sort of bias since some of the patients were treated in private hospitals. This study aimed to provide preliminary data base about the incidence of mandibular fracture in children and form a

CONCLUSION :

base for future studies .
The incidence and etiology of mandibular fracture in children differs among different

not very common, falls are most common cause, condylar fracture is most common. Most of the cases can be treated conventionally.

REFERENCES:

1. Zimmermann CE, Troulis MJ, Kaban LB. Pediatric facial fractures: recent advances in prevention, diagnosis and management. *Int J Oral Maxillofac Surg* 2006; 35(1):2-13.
2. Haug RH, Foss J. Maxillofacial injuries in the pediatric patient. *Oral Surg Oral Med Oral Pathol Radiol Endod* 2000; 90(2):126-134.
3. Ferreira PC, Amarante JM, Silva PN, et al. Retrospective study of 1251 maxillofacial fractures in children and adolescents. *Plast Reconstr Surg* 2005; 115(6):1500-1508.
4. Holland AJ, Broome C, Steinberg A, Cass DT. Facial fractures in children. *Pediatr Emerg Care* 2001; 17(3):157-160.
5. Anderson PJ. Fractures of the facial skeleton in children. *Injury* 1995; 26(1):47-50.
6. Galiano A.A., Garcia I.J., Pérez M.A., Romance A., Moreno J.J. et al. Pediatric facial fractures: Children are not just small adults. *RadioGraphics* 2008;28:441-461.
7. Pachigolla R. Pediatric facial trauma. Grand rounds presentation, Department of Otolaryngology, University of Texas Medical Branch, Galveston, Tex. <http://www.utmb.edu/otoref/Grnds/Ped-facial-trauma-9905/Ped-facial-trauma-9905.pdf>. Published May 12, 1999. Accessed April 2, 2007.
8. Posnick JP, Costello BJ, Tiwana PS. Pediatric craniomaxillofacial fracture management. In *Peterson's principles of oral and maxillofacial surgery*, 2004, 2nd Edition, BC Decker Inc London.527-545.
9. Posnick JC, Wells M, Pron GE. Pediatric facial fractures: evolving patterns of treatment. *J Oral Maxillofac Surg* 1993; 51:836-844
10. Eggenesperger Wymann N.M, Holzle A, Zacbariou Z, Lizuka T. Paediatric craniofacial trauma. *J Oral Maxillofac Surg* 2008; 66: 58-64.
11. Kotecha S., Scanell J., Monaghan A., Williams R.W. A four year retrospective study of 1,062 patients presenting with maxillofacial emergencies at a specialist paediatric hospital. *British Journal of Oral and Maxillofacial Surgery* 2008; 46: 293-296
12. Eppley B.L. Use of resorbable plates and screws in pediatric facial fractures. *J Oral Maxillofac Surg* 2005; 63:385-91.
13. Scariot R, Oliveira I.A, Passeri L.A, Rebellato N.L.B, Muller P.R. Maxillofacial injuries in a group of Brazilian subjects under 18 years of age. *J Appl Oral Sci*. 2009; 17(3): 195-8.
14. Thoren H, Kungas P, Lizuca T, Lindqvist C, Tornwall J, et al. Changing trends in causes

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- Surg Oral Med Oral Pathol Oral Radiol Endod 2009 ; 107:318-324
15. Qudah M.A, Bataineh A.B. A retrospective study of selected oral and maxillofacial fractures in a group of Jordanian children. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002; 94: 310-14.
 16. Iida S, Matsuya T. Paediatric maxillofacial fractures: their aetiological characters and fracture patterns. J Craniomaxillofac Surg 2002; 30:237-41.
 17. Saroğlu I, Sönmez H. The prevalence of traumatic injuries treated in the pedodontic clinic of Ankara University, Turkey, during 18 months. Dental Traumatol 2002; 18:299-303.
 18. Costello B.J, Papadopoulos H, Ruiz R. Pediatric craniomaxillofacial trauma. Clin Ped Emerg Med 2005; 6: 32-40.
 19. Rahman RA, Ramli R, Rahman NA, Hussaini HM, Idrus SM, Hamid AL. Maxillofacial trauma of pediatric patients in Malaysia: a retrospective study from 1999 to 2001 in three hospitals. Int J Pediatr Otorhinolaryngol. 2007 Jun; 71(6):929-36
 - 20.. Holland AJ, Broome C, Steinberg A, et al: Facial fractures in children. Pediatr Emerg Care 2001; 17:157.
 - 22.. Gassner R, Tuli T, Hachl O, et al: Craniomaxillofacial trauma in children: A review of 3,385 cases with 6,060 injuries in 10 years. J Oral Maxillofac Surg 2004; 62:399.
 - 23.. Smartt J.M, Low D.W, Bartlett S.P. The pediatric mandible: II. Management of traumatic injury or fracture. Plas. Reconstr. Surg. 2005; 116:28e.
 24. Hogg NJ, Stewart TC, Armstrong JE, Girotti MJ: Epidemiology of maxillofacial injuries at trauma hospitals in Ontario, Canada, between 1992 and 1997. J Trauma 2000; 49: 425-432
 25. Kalia V, Singh A.P. Greenstick fracture of the mandible: A case report. J Indian Soc Pedod Prev Dent 2008;26:32-5
 26. Ogunlewe MO, James O, Ladeinde AL, Adeyemo WL. Pattern of paediatric maxillofacial fractures in Lagos, Nigeria. Int J Paediatr Dent. 2006 Sep; 16(5):358-62.
 27. Lieger O, Zix J, Kruse A, Iizuka T. Dental injuries in association with facial fractures. J Oral Maxillofac Surg. 2009 Aug; 67(8):1680-4.
 28. Eghtedari F, Khezri S. A Cross-Sectional Study of Mandibular Fracture in Southern Iran: 1997-'98. IJMS 2003 Dec.; 28 (4): 173-5
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