

Original Research Article

Fractures Mandible in Sudanese Subjects: Descriptive Cross Sectional Study

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ABSTRACT

Objective: The study aim to determine the most common sites of the mandible bone prone to fracture, in Sudanese subjects.

Materials and methods: It's a descriptive cross sectional study, in 36 Sudanese patients, who sustained mandibular fractures seen and treated at the Dental and Maxillofacial unit, in Alribat teaching hospital, Khartoum state, Sudan, in 2013, their age arranged from 5 to 55 years, the patients are divided into four age groups. The data were obtained manually from the patients using check list provided in the designed questionnaire, mandibular examination followed by X-rays conformation, then the data analyzed using SPSS program version 17.

Results: mandibular fractures are more common in the male and the middle age of the patients, and the body, especially the part in front of the attachment of masseter muscle is most common parts label to fracture followed by median parasympphyseal. The coronoid process is rear to be fractured; because it protected by zygomatic arch and the muscles attachment. The most common etiological factor for mandibular fracture was road traffic accident.

Conclusion: It is concluding that the fracture sites at the tooth-bearing higher in compression to the rest of the bone parts, and body of the mandible is significantly more affected part. Road traffic accident significantly cause higher rate of the fractures. Recommendations, while the mandible being the most involved bone of the facial region, it must put in consideration in any case of facial trauma, should full examined and following by X-rays conformation to check for any fractures site and types.

Key words: Mandibular fractures, in Sudanese subjects, descriptive cross sectional study.

INTRODUCTION

The head injuries is very high compared to injuries of other parts of the trunk, because the head is move freely over the vertebral column by synovial joints, and the facial injuries tends to be high compared to injuries of other head region, because the face is without protective covering. The mandible is a prominent bone and only moveable one in head; that it more common one labeling to fracture in case of the head trauma; however the presence of teeth is the most important anatomical factor which

makes the mandibular fracture different from elsewhere in the facial bones.⁽¹⁾ The impact of the trauma depends either the mandible is closed or open, as the teeth play an important factor which effect occlusion of the mandible.^(1,2) The presence of teeth makes the mandibular fracture positively unique as they help the surgeon to manipulate the bone to restore the occlusion during reduction.^(1,2) Mandibular fractures when occur form a significant part of facial bone fractures encountered by the practicing Dental surgeon, and depending on the

direction and force of the trauma, and commonly occur at different sites. ⁽³⁻⁶⁾ The mandible is a horse-shoe shaped bone, consist of horizontally curved body which convex forwards, with two rami which ascend from the posterior part of the body. ^(1,2) The body supporting the teeth within the alveolar process, and rami bear the coronoid and condylar processes, the condyles articulate with the temporal bones forming temporomandibular joints. ⁽¹⁾ The mandible is largest strongest and lowest bone in the face; the strength started at the midline of the mandible and progressively decrease towards the condyles, this strength is derived from the dense cortical plates that encase variable amounts of cancellous marrow spaces. ^(5,7) This study is aim to investigates clinically the most common anatomical sites of the mandible prone to fracture, and the effect of factors such as age, gender, etiology, in the Sudanese subjects.

MATERIALS AND METHODS

This study is a descriptive cross sectional study, was carried out in 36 Sudanese patients, who sustained mandibular fractures seen and treated at the Dental and Maxillofacial unit, in Alribat teaching hospital, Khartoum state, Sudan. Inclusion criteria: Patients underwent surgical management of fracture mandible within period from January to December 2013. Exclusion criteria: Patients with medical conditions and drug therapy that have adverse effect on bone physiological status were been excluded from the study. The age of patients in this study were arranged 5 up 55 years, which divided into four age groups, group A age less than

15yaers, group B age arranged form 16 up 30 years, group C age arranged form 31 up 45 years and group D age arranged form 46 up 60 years. The mandible was carefully examined to check for the fracture, and the data was obtained manually from the patients, using check list provided in the designed questionnaire after mandibular examination and followed by X-rays conformation for the fracture site and type. The data was analyzed using SPSS program version 17. Detailed information on the aims of the study was given to the patients, guardian and parents of the under-aged. Wrote informed consent for participation in the study was obtained from patients or guardian where applicable while institutional consent was obtained from the Ethics Committee of the Hospital.

RESULTS

Out of all patients, 32(88, 9%) were males and 4(11, 1%) were females, table (1). of all the mandibular fractures, 31 (86.1%) were occur due to rood traffic accident (RTA), 4 (11.1%) were associated with the falls and 1(2.8%) were occur due to assault, table (2). of all patients, group A were 4 (11.1%) patients, group B were 18(50%) patients, group C were 12 (33.3%) patients and group D were 2 (5.6%) patients, table (3). of the fracture site, body lateral fracture were about 11 (30.4%), parasympyseal and angle fracture were 1 (2.8%), median symphyseal fracture were 3 (8.3), median parasympyseal fracture were 8 (22.2), ramus condylar fracture were 5 (13.9), Angle 4 (11.1), lateral and parasympyseal 2 (5.6) , lateral and angle 1 (2.8%), lateral, parasympyseal and angle 1(2.8%), table (4) and figure (1).

Table (1). Shows the frequency and percentage of the patients gender.					
Gender		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	Male	32	88.9%	88.9	88.9
	Female	4	11.1%	11.1	100.0
	Total	36	100%	100.0	

Table (2). Shows the frequency and percentage of mandible trauma types.					
Types of trauma		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	RTA	31	86.1%	86.1	86.1
	Falls	4	11.1%	11.1	97.2
	Assault	1	2.8%	2.8	100.0
	Total	36	100%	100.0	

Table (3). Shows age groups of the patients with mandibular fractures

Groups	Age in years	Frequency	Percentages
A	Less than 15	4	11.2%
B	16 – 30	18	50%
C	31 – 45	12	33.2%
D	more than 46	2	(5.6%)
	Total	36	100%

Table (4). Shows the frequency and percentage of the mandibular fracture site

Valid	fracture site	Fracture frequency	Percentage	Valid Percent	Cumulative Percent
	body lateral	11	30.6%	30.6	30.6
	parasymphyseal and angle	1	2.8%	2.8	33.3
	median symphyseal	3	8.3%	8.3	41.7
	median parasymphyseal	8	22.2%	22.2	63.9
	ramus condylar	5	13.9%	13.9	77.8
	Angle	4	11.1%	11.1	88.9
	lateral and parasymphyseal	2	5.6%	5.6	94.4
	lateral and angle	1	2.8%	2.8	97.2
	lateral, parasymphyseal and angle	1	2.8%	2.8	100.0
	Total	36	100%	100.0	

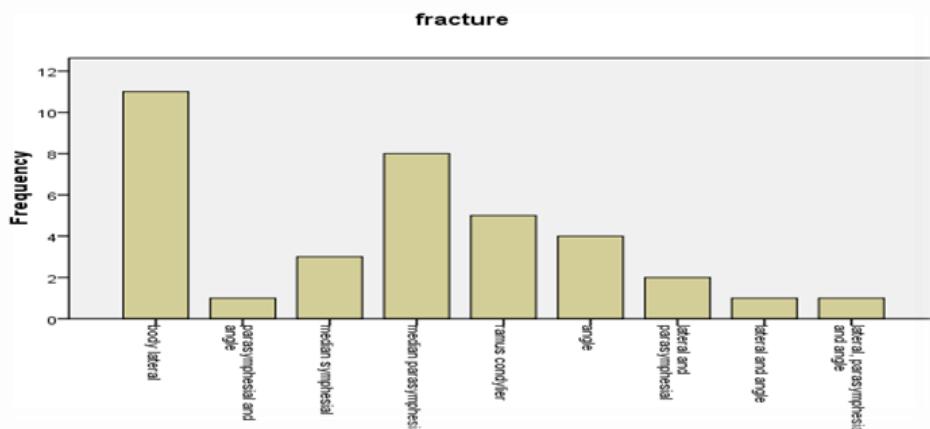


Figure (1). Shows the comparison between different sites of fractures

DISCUSSION

The mandible is a horse-shoe shape bone; its strength is derived from the dense cortical plates that encase variable amounts of cancellous marrow spaces. The functional processes of the mandibular bone, such as the angle, condyle, coronoid and the alveolar border, modify the basic shape of this bone. The strength of this bone starts from the midline and progressively less towards the condyles.⁽⁶⁾ Like other bones in the body, the mandible fractures occur at sites of tensile strain, the amount of force required to make mandibular fracture depends on many factors such; age of, anatomical site and severity of the trauma, or whether the mouth was open or closed at the time of injury.⁽⁶⁾ Also the bone neoplasm, hyperparathyroidism, osteoporosis and prolonged medical

conditions; such as, steroid therapy which will have their mandible weak and liable to fracture.^(6,7)

Mandibular fracture occurs either at the site of direct application of force or in some other distant sites when the force is indirect. If the force is severe enough, both the site of application and the other distant sites may fracture. In other instances, especially following road traffic accidents, fractures may occur at sites of impact irrespective of the thickness of the bone or the presence of muscles. However, if the force is less severe as in blows of the fist, the bones will fracture at its weakest point.⁽⁶⁾

Anyanechi CE and saheeb BD⁽⁵⁾ In (2007) and (2008), they study mandibular fractures in University of Calabar teaching Hospital, Nigeria, their results show that mandibular fractures are more common in male

than in female, and they described that, the region of the mandible that most frequently fractures is the body, The present study shows similar observation, of the Anyanechi CE and Saheeb BD.⁽⁵⁾ The present study showed that body of the mandible especially in front of the attachment of masseter muscle is most common parts label the fractures followed by median parasymphysis, because this parts of the bone is less protected, and covered by thin facial muscles, while the parasymphysis is more prominent part of this bone, and shows mental foramen. Present of the mental foramen make breaking the bone here, moreover the mentalis muscles which related to this area are very thin enough to protect the bone. So any frontal facial trauma from anterior either lateral trauma may affect these areas and leads to fractures. The results in the present study shows that the coronoid process rear to be fractured, because it protected laterally by zygomatic arch and covered medial and lateral by muscles, thus the presence of zygomatic arch and muscles, makes cushion like mechanism protecting the bone from the forces. This result was in agree to report of Akama, *et al.* (1993),⁽⁸⁾ and Roode, *et al* (2007),⁽⁹⁾ home found similar results, but it is differs to the results obtained by Asadi SG and Asadi Z (1996),⁽⁸⁾ whom recorded that, the more common mandibular fracture parts is the angle, they attributed that to the violent nature of the society in which their study was carried out where assault was the commonest cause of mandibular fracture. this study shows that mandibular fractures are more common occurs in middle age of individual, age between 20 to 40 years and less in age below 10 years or over 40 years; the results in the present study is in according of the finding of Adeyemo WL (2008)⁽⁹⁾ who found similar results. Akama Mk, *et al* (1993)⁽¹⁰⁾ and Roode GJ (2007),⁽¹¹⁾ they reported that, the most common etiological factor for mandibular fracture was road traffic accident (RTA), and the most common site of the mandibular fracture is

lateral aspect of the body, similar results were found in the present study. This is possibly because the patients more often as reflex turn to their sides when there is a sudden impact directed to the face, thus presenting the lateral side to the injuring force.^(10,11)

It is conclude that tooth-bearing portion form two-third of the mandible while the non-tooth bearing portion forms the one-third, thus the fracture sites at the tooth-bearing higher in compression to the rest of the bone parts, while body is significantly more affected part. Road traffic accident significantly cause higher rate of the mandibular fractures. Recommendations, while the mandible being the most involved facial bone it must put in mind in any facial trauma and should full begins examined and following by X-rays conformation to check for any fractures site and types.

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