

A retrospective study of the epidemiology of maxillofacial trauma in Jeddah, Saudi ArabiaAhmed MA Jan¹; Mohammed Alsehimy¹; Maisa Al-Sebaei¹; Fatima M Jadu²¹Oral and Maxillofacial Surgery Department, Faculty of Dentistry, King Abdulaziz University
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Abstract: Introduction: Maxillofacial injuries are a worldwide public health problem. The epidemiology of these injuries differs from one region to another depending on many factors. This study was undertaken to elucidate the nature of maxillofacial fractures in the Jeddah of Saudi Arabia. Materials and methods: After ethical approval, data was retrospectively collected from the record and images of trauma patients who had sustained maxillofacial fractures. A total sample size of 853 patients was included in the study. Results: Maxillofacial fractures were common among males and females in the third decade of life. However, males were much more frequently affected than females at a ration of 6:1. Mandibular fractures were more common than maxillary ones. The most frequent cause of maxillofacial fractures was by motor vehicle accidents. Conclusion: Maxillofacial fractures are frequently seen in young males as a result of motor vehicle accidents. More strict traffic regulations should be put in place and implemented to prevent these devastating injuries.

[Ahmed MA Jan, Mohammed Alsehimy, Maisa Al-Sebaei and Fatima M Jadu. **A retrospective study of the epidemiology of maxillofacial trauma in Jeddah, Saudi Arabia.** *J Am Sci* 2015;11(1):57-61]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 9

Keywords: Maxillofacial injuries, Jaw fractures, Mandibular injuries

1. Introduction

Maxillofacial injuries are a serious health problem worldwide.(1) Due to the numerous vital structures in the maxillofacial area, injury to this area carries a significant risk of morbidity and other complications such as disfigurement, sensory impairment and loss of function.(2, 3) Maxillofacial injuries also pose a public health problem because of the associated high treatment cost, work time loss and potential associated psychological consequences.(1)

The epidemiology of maxillofacial injuries differs from one part of the world to the other.(2) Factors such as the culture, socioeconomic status and environment all play a role in the incidence and etiology of maxillofacial injuries. (1, 2) Numerous authors in several countries in Asia, Africa and the Middle East have reported motor vehicle accidents as the most common cause of maxillofacial fractures. (1, 4) While investigators from countries such as Bulgaria, Canada, Republic of Korea, UK, have reported assault as the most common cause.(4-7)

Understanding maxillofacial injuries will aid health care providers in identifying and managing such injuries more efficiently. It will also aid health care policy makers in funding and implementing more effective prevention and treatment plans.

The aim of the current study was to determine the frequency of maxillofacial fractures with regards to age and gender, to report the causes of

maxillofacial fractures, to examine the locations of these fractures and to report the frequency and nature of post treatment complications.

Recently, two studies have revisited the epidemiology of maxillofacial trauma in Saudi Arabia. Abdullah *et al.* in 2012 examined the etiology and pattern of maxillofacial fractures in Riyadh, Saudi Arabia[central region].(8) Then in 2013, Almasri reported on the causality and severity of maxillofacial trauma in the Aseer, Saudi Arabia [Southern region]. To our knowledge, there are no published reports on the nature of maxillofacial fractures in Jeddah, Saudi Arabia [Western region] and therefore this study was undertaken.(9)

2. Material and methods

After ethical approval was obtained. The records and images of trauma patients presenting at one of the three major hospitals in Jeddah, Saudi Arabia between January 1, 2009 and January 30, 2014 were retrospectively reviewed. Only patients who have sustained maxillofacial fractures were included in the study. Collected data included basic demographics such as age and gender. Other data included cause of the injury, location and number of fractures, presence of other concomitant injuries, treatment modality, date of treatment initiation, length of hospital stay, and post treatment complications.

Collected data was then analyzed for relevance using the SPSS version 8.0 [SPSS Inc., Chicago, IL] statistical software.

3.Results

A total of 853 patients were treated for maxillofacial fractures during the duration of the study. They ranged in age between 3 years and 87

years with a mean of 45 years of age. The majority of patients were males [728, 85%] and only 125 patients [15%] were females. The frequency of maxillofacial fractures was higher for males of all age groups except those older than 71 years of age. The peak incidence of fractures in both males and females occurred in the third decade of life. These results are summarized in Fig 1.

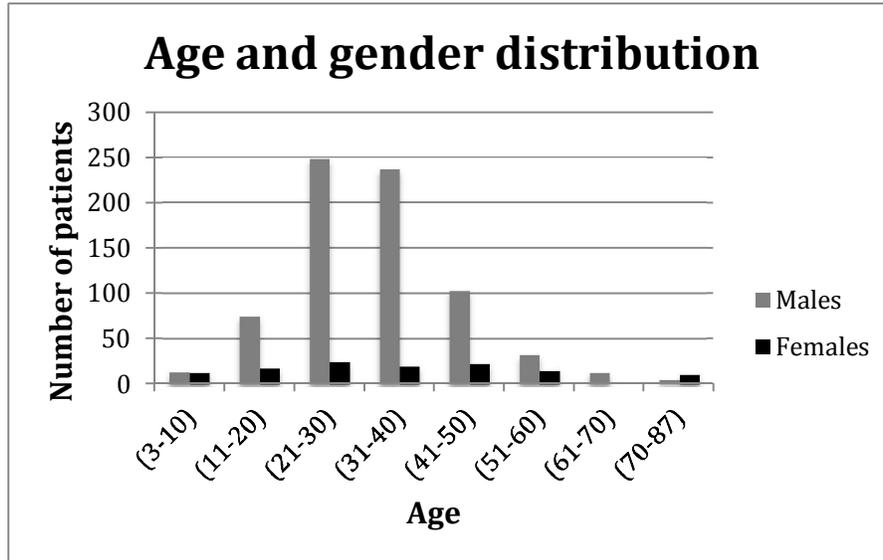


Fig 1 Frequency of maxillofacial fractures in relation to age and gender of patients.

For the 853 patients included in this study, 1650 fractures were documented. Of these fractures 956 were mandibular, 412 were midface fractures and 282 were combined mandibular and midface fractures or

what is commonly referred to as panfacial fractures. The distribution of these fractures according to location is shown in Fig 2 and Fig 3.

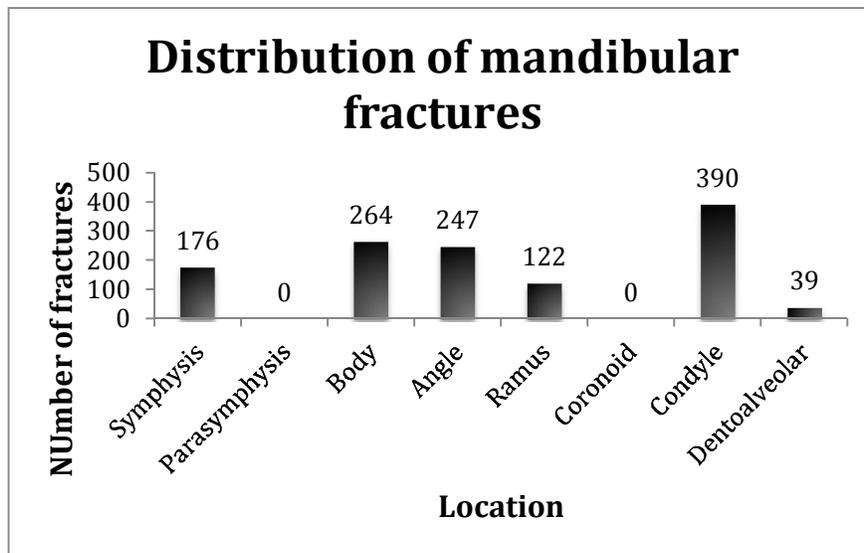


Fig 2 Frequency of mandibular fractures by location

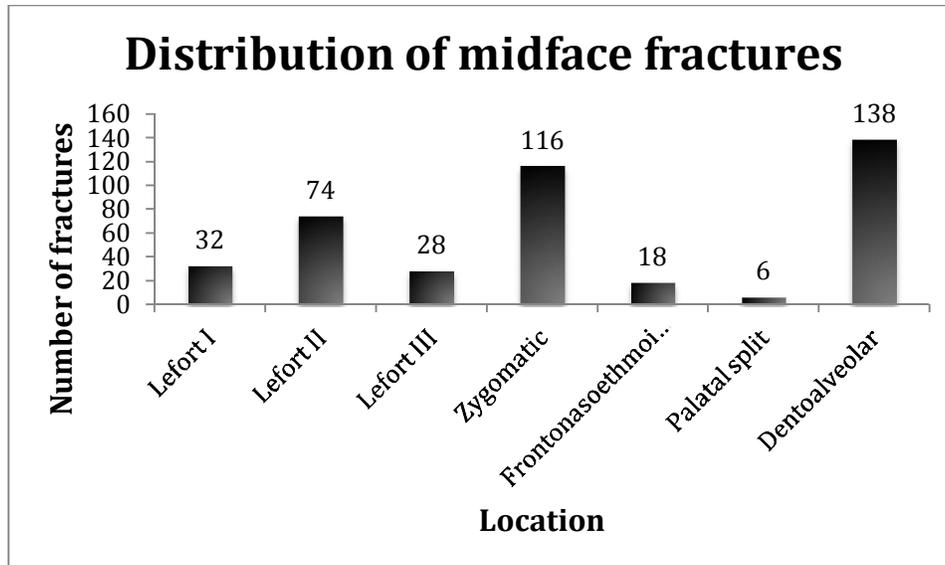


Fig 3 Frequency of midface fractures by location

The causes of the maxillofacial fractures in this study varied but by far the most common cause was motor vehicle accidents accounting for 1106 fractures [67%]. Next were domestic accidents responsible for 145 fractures [9%] then industrial accidents causing

125 fractures [8%]. Other causes included: sports injuries, animal assaults, fights and assaults and gunshot injuries. These results are summarized in Fig 4.

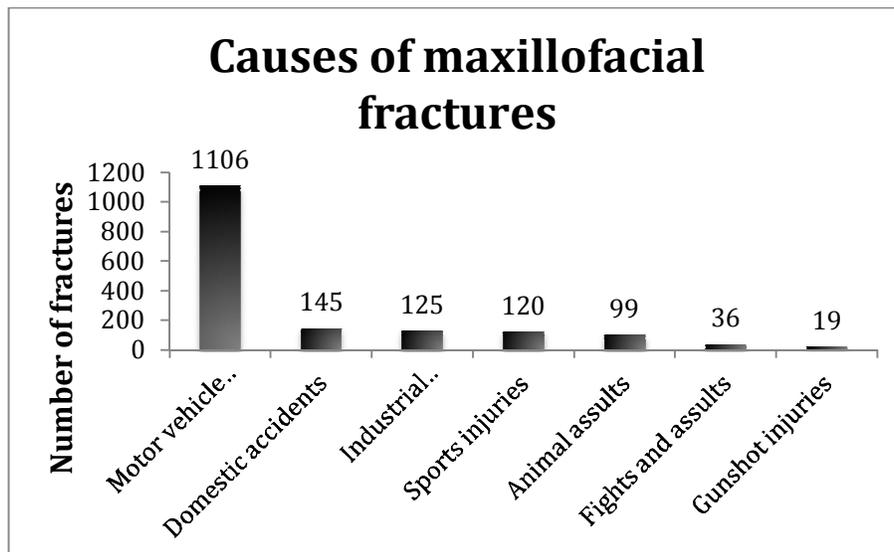


Fig 4 Frequency of causes of maxillofacial fractures

Since motor vehicle accidents were the most common cause of maxillofacial fractures, approximately 59% of patients presented with other substantial injuries. Head injury was the most common affecting 375 patients. Fractures of other bones was the second most common concomitant injury recorded for 65 patients, 47 patients suffered facial burns and 20 patients sustained abdominal injuries.

Management of the maxillofacial fractures also varied widely depending on many factors. Some cases were managed with open reduction and rigid internal fixation while others were managed more conservatively with closed reduction and non-rigid fixation. Unfortunately, there was on average a 5.7 days delay in treatment of the maxillofacial fractures until other more serious injuries were dealt with or until the patient was referred to the maxillofacial

trauma team. Hospital stays after management were on average 10.4 days. Complications following treatment were observed in 157 patients [18%]. The most common complication was aesthetic deformity, followed by sensory disturbances, infection and malocclusion. Other less common complications

included: limited mouth opening, delayed healing and motor nerve weakness [Fig 5]. Interestingly there was no correlation between the occurrence of complications and the duration of delay in treatment or the choice of treatment method.

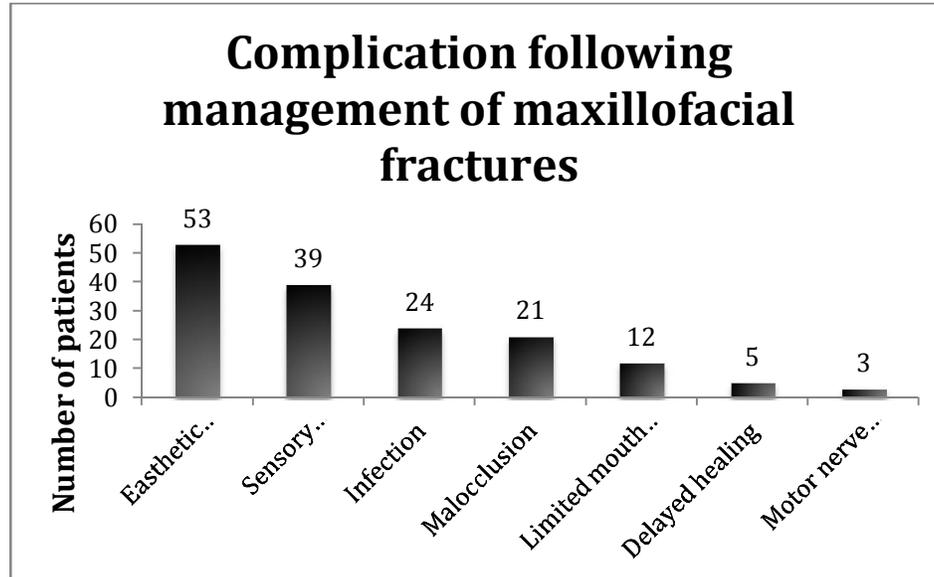


Fig 5 Frequency of complications following the management of maxillofacial fractures.

4. Discussion

The results of this retrospective study are in agreement with previously reported results for other countries, cities, or institutions around the world. This is especially true with regards to the age and gender distribution. Most maxillofacial fractures occur in the 21-30 year old group regardless of gender. Males, however, are much more commonly affected than females with a ratio that ranges between 3:1 and 20:1.(1, 4, 8) In the current study the ratio was 6:1 which is similar to the data from the Riyadh population, however, the ratio increases to 10:1 in the Aseer region of Saudi Arabia.(8, 9)

Mandibular fractures are more frequent than midface fractures. A finding that is consistent across similar studies.(8) This is most likely due to the anatomy of the mandible that allows it to act as a shock absorber to protect the cranial base. The chin position also makes the mandible the first part of the face to hit the steering wheel during motor vehicle accidents.(2) Of note is that mandibular fractures are usually bilateral, hence, it is essential to thoroughly examine the contralateral side.(3) Condylar fractures were by far the most commonly encountered fracture location followed by the mandibular body, angle and symphysis. In other reports, the condyle was the second most frequently injured location after the symphyseal and parasymphyseal areas.(2, 8) Both

types of injuries are common with motor vehicle accidents.

Lefort II was the most frequent maxillary fracture type but once again this was not in agreement with other studies where Lefort I fractures and zygomatic fractures were more common.(2, 8) Dentoalveolar fractures were not common in the mandible but were the most frequent type of midface fractures. This is likely due to the nature of occlusion where the normal overjet puts the maxillary teeth anterior to the mandibular incisors. It is important to carefully examine dentoalveolar injuries for tooth fragments that might have been displaced or aspirated especially in unconscious patients and thus must be ruled out by making a chest radiograph.(3)

Most studies report motor vehicle accidents as the most common cause of facial injury and this is consistent with the findings of this study as well.(1, 2, 8, 10) Although other studies have reported assault as the most frequent cause or the second most common cause, in the current study, assault was not a common cause.(4, 11) It accounted for only 4% of cases and was preceded by domestic accidents, industrial accidents, sports injuries and even animal assaults. Based on this finding, we encourage governmental agencies to enforce the wearing of seat belts, the use of car seats and booster seats and to impose strict speed limits.

Management of trauma patients should follow the ATLS algorithm which starts with a quick initial assessment followed by prompt stabilization before a detailed history is obtained.(3) Vital information includes the mechanism of injury and any history of unconsciousness.(3) Next the airway must be assessed and secured followed by appropriate fluid resuscitation and circulation stabilization.(3) When examining trauma patient, one must look for signs of fractures such as asymmetry, step deformity and hematoma.(3) Computed tomography without contrast is the imaging modality of choice for facial trauma patients due to the complexity of the anatomy in the maxillofacial area.(3)

The rate of post treatment complications was 18% which is slightly higher than other reports. In a similar Canadian study of mandibular fractures, the rate of post treatment complications was only 5.3% and the most common complication was infection followed by malunion and malocclusion.(4) In another similar study based in Iran, the most common complication was damage to the sensory nerves seen in 16% of patients whereas infection was noted in only 1% of patients. This variation in postoperative complication is a function of many factors that involve the resources available and the protocols implemented at the treating facilities.

In conclusion, maxillofacial fractures are a major health problem that is predominantly seen in young males following motor vehicle accidents. Mandibular fractures are more common due to their anatomy. Despite the delay in treatment, the rate of post treatment complications is generally low.

Acknowledgement

The authors wish to thank the Deanship of Scientific Research [DSR] at King Abdulaziz University, Jeddah, KSA for financially funding this project under grant no. [136/165/1433].

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1/13/2015

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