

Patterns of Maxillofacial Fractures Associated with Assault Injury in Khamis Mushait City and Related Factors

Ali Mohammed Alqahtani

College of Dentistry, King Khalid University

ABSTRACT:

Objective: The objective of this study was to explore the patterns of maxillofacial fractures associated with assaults among male patients in Khamis Mushait, Saudi Arabia.

Methods: This study was a retrospective study conducted in Armed Forces Hospital Southern region (AFHSR) in Khamis Mushait City. The patients' records were investigated and full-detailed records were included. Demographic data as well as type, location and cause of the maxillofacial fractures were obtained.

Results: A total of 215 patients' records were recruited for this study. Patients with age from 15 to 25 years were more than other age groups. Most of the patients were not Saudi citizens. About 68% of patients completed their primary school or were illiterates. Nearly half of the fractures (49%) were found in the dentoalveolar site. Mandible was more affected than maxilla. Left side was more affected than right side. Blunted injuries were more frequent among patients than penetrated injuries. Patients with age ≤ 35 years were more suspected to have fractures than those with older ages.

Conclusion: Assault and violence can result in considerable maxillofacial traumas. Dentoalveolar fractures were the most common fractures. Young patients were more affected than elders. This problem should be taken as a general health problem and the actions should be taken to prevent further problems.

Keywords: Maxillofacial Fractures, Assault Injury, Khamis Mushait City.

INTRODUCTION

Incidence of maxillofacial fractures is not the same among all countries; it varies widely due to different factors⁽¹⁻³⁾. The management of such fractures is still a challenge for the oral and maxillofacial surgeons because it requires a high level of skill and expertise⁽⁴⁾. In general, the main causes of maxillofacial injuries which have been recognized globally are road traffic accidents, followed by assaults, falls, and sports^(5, 6). Some authors have reported that road traffic accidents are the most frequent cause of maxillofacial injuries^(7, 8). However, some others, in more recent researches, have reported that assaults, specifically in developed countries, are the most frequent cause of maxillofacial injuries followed by road traffic accidents⁽⁹⁻¹¹⁾. Nasal fractures followed by zygomatic arch fractures have been reported as the most common facial fractures. Some factors can contribute in increasing the maxillofacial fractures incidence such as: increasing populations, socioeconomic activities, and increase road transportations^(7, 12).

Exploring the trend and identifying the patterns and types of maxillofacial fractures is valuable as it provides important information about fractures and causes which in turn can help in the prevention programs. Armed Forces Hospital Southern region (AFHSR) in Khamis Mushait was established in 1964; it is among the major hospitals in Saudi Arabia. It provides emergency and regular treatment and

management of almost all cases including the maxillofacial fractures.

The aim of this study was to identify the trend of maxillofacial fractures among male attendants and to identify the main associated risk factors.

METHODS

The hospital records of male patients with maxillofacial fractures in Armed Forces Hospital Southern Region (AFHSR) were retrieved for the period 2000-2015. Patient was included if the record highlighted assault injury as the cause of maxillofacial fractures. Unfilled or incomplete records were excluded. The records with different causes were also excluded even if they included assault as one of the causes. Patients' records were included in this study to identify pattern, site, type, and side of fracture. Moreover, presence of combined fractures, mechanism of injury and other serious complications were reported. The demographic characteristics include age, nationality, educational level, and occupation were also collected from patients' records. Study protocol was approved by the Ethics Committee at the AFHSR. Data were entered into the master sheet and were then analyzed using the software program SPSS V.22. A P value less than 0.05 was detected as statistically significant.

The study was done after approval of ethical board of King Khalid University.

RESULTS

The study comprised 215 male patients with age 15 years and older. More than half of patients (53%) were within the age group 15-25 years followed by patients within the age group 26-35 years, then age group 36-50 years, and the least were within the age group >50 years. Patients who completed primary school were 99 (46%) while, patients who completed secondary school were 41 (19%), and patients who completed

university level were 28 (13%). However, there were 47 (22%) patients who were illiterate. With regard to the nationality, most of the patients (63%) were Non-Saudis while, 37% were Saudis. Approximately one third of the patients (33%) were drivers, 28% were manual workers, 24% students, 7% were office employee and professionals, equally, and only 3 (1%) patients were non-employee (Table 1).

| 1: Demographic characteristics of the study subjects | | | |
|---|------------------|------------------|----------------|
| | | Frequency | Percent |
| Age group | 15 - 25 | 114 | 53% |
| | 26 - 35 | 67 | 31% |
| | 36 -50 | 26 | 12% |
| | > 50 | 8 | 4% |
| Educational level | Illiterate | 47 | 22% |
| | Primary school | 99 | 46% |
| | Secondary school | 41 | 19% |
| | University | 28 | 13% |
| Nationality | Saudi | 80 | 37% |
| | Non-Saudi | 135 | 63% |
| Occupation | Manual workers | 60 | 28% |
| | Drivers | 71 | 33% |
| | Students | 51 | 24% |
| | Office employee | 14 | 7% |
| | Professionals | 16 | 7% |
| | Non-employee | 3 | 1% |

As shown in Table 2, nearly half of the evaluated fractures (49%) were found in the dentoalveolar site while, 27% were found in the mandible only, 8% were in the maxilla only, 5% in the zygomatic complex, and 11% were combination fractures. Most of fractures (65%) were observed in the left side while, 26% were in the right side, and 9% were bilateral. Regarding the mechanism of the injury, most fractures (71%) were mainly resulted from blunt forces while, 29% were mainly resulted from penetrating forces.

| Table 2: Characteristics of the maxillofacial fractures among subjects | | | |
|---|---------------------------|------------------|----------------|
| | | Frequency | Percent |
| Site of fracture | Dentoalveolar | 105 | 49% |
| | Isolated mandible | 58 | 27% |
| | Isolated maxilla | 17 | 8% |
| | Zygomatic complex | 11 | 5% |
| | Combination fractures | 24 | 11% |
| Side of fracture | Left | 140 | 65% |
| | Right | 56 | 26% |
| | Bilateral | 19 | 9% |
| Mechanism of injury | mainly blunt forces | 153 | 71% |
| | mainly penetrating forces | 62 | 29% |

Risk factors of the evaluated fractures were only explored for the dentoalveolar fractures because it comprised most of the fractures. As presented in Table 3, Saudi patients who had dentoalveolar fractures were significantly (P= 0.001) more than Non-Saudis who had the same type of fracture (57% and 35%, respectively). Patients with age ≤35 years had significantly less dentoalveolar fractures than those with age >35 years (P< 0.001). Fractures resulting from blunt forces were significantly (P= 0.001) more than fractures resulting from penetrating forces (56% and 31%, respectively).

| | | Dentoalveolar (%) | | Chi-square | P value |
|---------------------|------------------|-------------------|-----------|------------|---------|
| | | Yes | No | | |
| Nationality | Saudi (80) | 46 (57%) | 34 (43%) | 10.5 | 0.001 |
| | Non- Saudi (135) | 47 (35%) | 88 (65%) | | |
| Age group | ≤35 (181) | 62 (34%) | 119 (66%) | 24.1 | 0.001 |
| | >35 (34) | 27 (79%) | 7 (21%) | | |
| Mechanism of injury | Blunt (153) | 86 (56%) | 67 (44%) | 11.5 | 0.001 |
| | Penetrating (62) | 19 (31%) | 43 (69%) | | |

DISCUSSION

The study aiming at evaluating the pattern and types of maxillofacial fractures among male participants who attended AFHSR in Khamis Mushait, Saudi Arabia. Since the sample of this study was only male patients the comparison with the comparable results from the literature will be limited. In the current study, the results revealed that patients with age from 15 to 25 years were the most subjects found with maxillofacial trauma. This result is partially accords with some previous studies who found that the peak age of maxillofacial trauma incidence is 21-30 years⁽¹³⁻¹⁵⁾. This might be because the sample recruited for this study was exclusively males. Another reason might be related to the type of the assault and the cause of the trauma. More than half of the patients were illiterate or only completed the primary school. This might be because the public schools and education countrywide has been just spread during the few previous decades. Another reason might be related to the customs and traditions as men tend to work in business with earlier ages. Non-Saudi patients were found more than Saudi patients. This result might be due to the nature of the work of those foreign patients. Free work and/or working with subjects with different nationalities might result in misunderstanding which in turn may result in more conflict and violence. This point could be also supported by the occupation of subjects as more than half of them were drivers or manual workers.

In the present study, dentoalveolar traumas were the most dominant. This is in accordance with the study of **Gassner et al.** in a large survey in Austria⁽²⁾, who found that dentoalveolar trauma was the most common type. **Tan et al.** in his retrospective study in Jeddah⁽¹³⁾ also found a considerable dentoalveolar trauma types among 853 surveyed patients. The isolated fractures found in this study were more in the mandible than in maxilla. This is in agreement with the study of **Akinbami and Udeabor**⁽¹⁴⁾ who found that mandible was more affected than maxilla. However, this is not similar to the study of **Le et**

al.⁽¹⁶⁾, who found that the isolated maxilla was more affected than mandible. This difference in prevalence of the trauma might be related to the cause of the injury. Zygomatic fractures accounted for only 5% which is less than that found by **Jan et al.**⁽¹³⁾ which was 28%, but more than that found by **Akinbami and Udeabor**⁽¹⁴⁾ which was 0%. This variation might be due to the differences in the sample size, only 21 patients were recruited in the study of **Akinbami and Udeabor**. The results of the present study revealed that the left side was more affected than the right side which is in the same line with the results of **Le et al.**⁽¹⁶⁾ who found more fractures on the left side. Blunt force traumas were more common than penetrating force traumas which can explain the nature of the force used for violence and assault. It is not surprise that younger patients (specifically those ≤35 years of age) were more affected with violence than others because at this age subjects are more able to work. It was also observed that blunted injuries were more than penetrated injuries. This might be due to the fact that carrying of gun, knife or any other type of weapons is banned and prohibited in this country.

Gender specificity of this study, as it was conducted among male patients only, is one of its limitations. Another limitation is that the details of trauma causes were not explored. In addition, severity of the trauma was not mentioned or if it was on the maxillofacial region only or it was accompanied with other trauma(s) on the body. Future studies among both genders with a comparison of maxillofacial traumas and other traumas on the body are recommended.

CONCLUSION

Within the limitations of this study it concluded that assaults and domestic violence can result in considerable maxillofacial trauma. This should be taken into consideration as a general health problem especially because young adult subjects were more affected than others. Preventive programs are also highly recommended.

CONFLICT OF INTERESTS

Authors had no conflict of interests and no financial support was obtained.

REFERENCES

1.Motamedi MH, Dadgar E, Ebrahimi A, Shirani G, Haghighat A and Jamalpour MR (2014): Pattern of maxillofacial fractures: a 5-year analysis of 8,818 patients. *J Trauma Acute Care Surg.*, 77(4):630-634.

2.Gassner R, Tuli T, Hachl O, Rudisch A and Ulmer H (2003): Cranio-maxillofacial trauma: a 10-year review of 9,543 cases with 21,067 injuries. *J Cranio-maxillofac Surg.*, 31(1):51-61.

3.Van Hoof RF, Merckx CA and Stekelenburg EC (1977): The different patterns of fractures of the facial skeleton in four European countries. *Int J Oral Surg.*, 6(1):3-11.

4.Hopper RA, Salemy S, Sze RW (2006): Diagnosis of midface fractures with CT: what the surgeon needs to know. *Radiographics*, 26(3):783-793.

5.Telfer MR, Jones GM, and Shepherd JP (1991): Trends in the aetiology of maxillofacial fractures in the United Kingdom (1977-1987). *Br J Oral Maxillofac Surg.*, 29(4):250-255.

6.Bataineh AB (1998): Etiology and incidence of maxillofacial fractures in the north of Jordan. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.*, 86(1):31-35.

7.Adekeye EO (1980): The pattern of fractures of the facial skeleton in Kaduna, Nigeria. A survey of 1,447 cases. *Oral Surg Oral Med Oral Pathol.*, 49(6):491-495.

8.Khalil AF and Shaladi OA (1981): Fractures of the facial bones in the eastern region of Libya. *Br J Oral Surg.*, 19(4):300-304.

9.Brown RD and Cowpe JG (1985): Patterns of maxillofacial trauma in two different cultures. A comparison between Riyadh and Tayside. *J R Coll Surg Edinb.*, 30(5):299-302.

10.Adi M, Ogden GR, and Chisholm DM (1990): An analysis of mandibular fractures in Dundee, Scotland (1977 to 1985). *Br J Oral Maxillofac Surg.*, 28(3):194-199.

11.Kumar G B, Dhupar V, Akkara F, and Kumar SP (2015): Patterns of maxillofacial fractures in goa. *J Maxillofac Oral Surg.*, 14(2):138-141.

12.Klenk G and Kovacs A (2003): Etiology and patterns of facial fractures in the United Arab Emirates. *J Craniofac Surg.*, 14(1):78-84.

13.Jan AM, Alsehaimy M, Al-Sebaei M, and Jadu FM (2015): A retrospective study of the epidemiology of maxillofacial trauma in Jeddah, Saudi Arabia. *J Am Sci.*, 11(1):57-61.

14.Karunasree P (2017): A Review on Bioterrorism and Biological Warfare. *Biochem Mol Biol Lett.*, 3(2):85-94.

15.Akinbami BO and Udeabor SE (2013): An Analysis of Maxillofacial Injuries due to Assault from Non Projectile Weapons in Patients Reporting to the Tertiary Care Hospital in Port Harcourt. *J Trauma Trea.*, 2(4):178-180.

16.Obimakinde OS, Ojoje VN, and Fasola AO (2012): Pattern of Assault-induced Oral and Maxillofacial Injuries in Ado-Ekiti, Nigeria. *Niger J Surg.*, 18(2):88-91.

17.Le BT, Dierks EJ, Ueek BA, Homer LD, and Potter BF (2001): Maxillofacial injuries associated with domestic violence. *J Oral Maxillofac Surg.*, 59(11):1277-1283.