

Facial injuries in Khartoum State

Abubakr H M Elawad¹, Osama Murtada Ahmed², Ahmed Saeed³, Ahmed Mahgoub³

1 Faculty of Medicine, University of Khartoum,

2 Omdurman Teaching Hospital,

3Khartoum Teaching Hospital

Abstract

Introduction: Facial injuries are a common cause for presentation to the Emergency Department (ED) across all ages. Whilst there is a combination of major and minor injuries, the significant ones require complex reconstructive surgery and rehabilitation. Even minor facial injuries which cause scarring can be costly and have a personal impact on the injured person. Recent advances in reconstructive surgery and in the management of trauma patients have significantly improved the morbidity and mortality of patients with traumatic facial injuries. The purpose of this study was to analyze the patterns of facial injuries in three major hospitals in Khartoum.

Method: Two hundred and eighteen patients were enrolled in this study by direct interview with structured questionnaire aided with imaging studies e.g. (X ray, CT scan, MRI) in three major centers in Khartoum. Data were analyzed by SPSS program version 17.

Results: Patients in the 20-29 years age-group amounted to 27.9%. There was an obvious male preponderance. The majority of injuries were due to road traffic accidents (39.4%), followed by assault (24.8%), and falls (15.5%). There was a higher incidence of assault injuries in the age group 10 – 19 years with an obvious male preponderance.

The frequency of facial injuries in various parts of the face was as follows: forehead (20.2%), lips (14.6%) eyelids (12.4%), cheek (10.7%), ear (9.8%), chin (8.7%), nose (7.3%), eyebrow (5.9%), scalp (5.3%), and eyeball (4.3%). Thirty three facial skeletal fractures were encountered mainly in the nasal bone (36%) mandible (21%), zygomatic bone (18%).

Most of the soft tissue injuries were treated by primary closure of the lacerations under local anesthesia; few cases had to be taken to the operation theatre for general anesthesia for skin graft and local flaps. Five patients underwent open reduction and internal fixation of facial skeletal fractures.

Conclusion: Traffic accident was the main cause for facial injuries followed by assault and falls. Male predominance was observed in this population. Young males sustained more severe facial injuries. Many patients sustained injuries to other parts of the body e.g. limbs, head, abdomen and chest.

**Corresponding author: Faculty of Medicine, University of Khartoum E.mail: abubakr23@gmail.com*

Introduction

The human face constitutes the first contact point in several human interactions and no other part of the body is as conspicuous, unique, or aesthetically significant as the face. The position and anatomy of the face make it particularly vulnerable to trauma. Because an individual's self-image and self-esteem are often derived from his or her own facial appearance, injuries and/or mutilations of the facial structures may

have a disastrous influence on the affected person and require particular attention.

Historically, severe facial trauma often resulted in cosmetic and functional defects; however, recent advances in the science of reconstructive surgery and in the management of trauma patients have significantly improved the morbidity and mortality of patients with facial traumatic injuries. There have

been many reports on the epidemiology of facial injuries. Previous studies reported traffic accidents and falls as the main causes of facial injuries,⁽¹⁻⁴⁾ although recently many studies have reported a shift in the cause from traffic accidents and falls to blunt assault⁽⁵⁻⁷⁾

As many as 50–70% of people who survive traffic accidents have facial trauma. In most developed countries, violence from other people has replaced vehicle collisions as the main cause of maxillofacial trauma; however in many developing countries traffic accidents remain the major cause. Increased use of seat belts and airbags has been credited with a reduction in the incidence of maxillofacial trauma, but fractures of the mandible have not decreased by these protective measures. The risk of maxillofacial trauma is decreased by a factor of two with the use of motorcycle helmets. A decline in facial bone fractures due to vehicle accidents is thought to be due to driving laws, strictly enforced speed limits and use of seatbelts and airbags. In vehicle accidents, drivers and front seat passengers are at highest risk for facial trauma.⁽⁸⁾

Facial fractures are distributed in a fairly normal curve by age; with a peak incidence occurring between ages 20 and 40; children under 12 suffering from 5 to 10% of all facial fractures⁽¹⁰⁾. Most facial trauma in children involves lacerations and soft tissue injuries.⁽⁹⁾

In Egypt the most common causes of facial injuries were road traffic accidents, followed by activity of daily life and assaults. Gender distribution showed that males were at a higher risk than females with a ratio of 5.5: 1.⁽¹⁰⁾

In Kenya Road Traffic Accidents (RTAs) were a major cause of morbidity and mortality. Akama et al found that 89.6% of casualties presented with soft tissue injuries (STIs) involving the craniofacial region with facial cuts being the majority (69.2%)⁽¹¹⁾.

In the United States, approximately 3 million people present to the emergency departments for treatment of traumatic facial injuries each year. Most of these injuries are relatively minor soft tissue injuries that simply require first-aid care or primary closures. A small percentage of facial traumas (0.04-0.09%)

require major repair with possible bony reconstruction.⁽¹²⁾

In Australia, Queensland, there was an average maxillofacial injury incidence of 4.8/100,000 per year, 53.5 per cent in males and 46.5 per cent in females. A peak incidence was found for both sexes aged 18 to 22 years. In males, 57 per cent of facial injuries occurred in this age group.

Patients and methods

This is a cross-sectional descriptive hospital based study conducted in three major hospitals in Khartoum state, Omdurman Teaching Hospital, Khartoum Teaching Hospital, and Khartoum Dental Teaching Hospital.

The study population included trauma patients admitted to emergency rooms in the three major hospitals in Khartoum during the 12 months (From 12th August 2010 to 12th August 2011). These included all cases that sustained facial injury on presentation to emergency rooms (ER). The data was collected through a questionnaire which was completed by trained doctors working in the emergency room including the patient's demographics, the presentation and mechanism of injury, radiographic findings and operative procedures. Statistical analysis was performed using the SPSS software for windows version 17, using the χ^2 method and a $p < 0.05$.

Results

Of the total 218 patients, 174 were males (79.8%) and 44 were females (20.2%). The male to female ratio was 4:1. The majority of the patients were in the 20-29 years age-group (27.9%) (Table 1). The average age of the sample was 25.5 years.

The majority of the injuries were due to road traffic accidents (39.4%), followed by assault (24.8%), falls (15.5%), burn (8.2%), sport injuries (0.9%) (Table 2). Out of 86 patients who sustained road traffic accidents, 69 (80%) were male and 17 (20%) were female. Most of the RTA victims were passengers (36%), followed by pedestrians (33%) and drivers (31%) (figure 1). Out of the 27 drivers who had facial injuries, 21 did not use the seatbelt or helmet.

The distribution patterns of facial soft tissue injuries found in these patients were as follows: forehead (20.2%), cheek (10.7%), ear (9.8%), upper lip (9.5%), chin (8.7%), nose (7.3%), upper eyelid (7.3%), lower eyelid (5.1%), lower lip (5.7%), eyebrow (5.9%), scalp (5.3%), and eyeball (4.3%). The distribution of facial skeletal fractures is shown in figure 2.

One hundred and six patients had concomitant injuries affecting other parts of the body. The distribution of these patients with concomitant injuries is shown in table 3. 42.7% of the soft tissue injuries were treated by primary closure of the lacerations under local anesthesia. 18.3% required simple dressing as they were trivial injuries. 2.5% patients had to be

taken to the operation theatre for general anesthesia for skin graft (1.4%) and local flaps (1.1%) as they had extensive facial lacerations. Out of the total 218 patients, 33 had bony injuries. Five patients underwent open reduction and internal fixation for facial bony fractures on the same admission, while the remaining 28 were either treated conservatively or planned for elective surgery depending on the fracture site and the general condition of the patient.

Table 1: Age and sex distribution of patients with facial injury

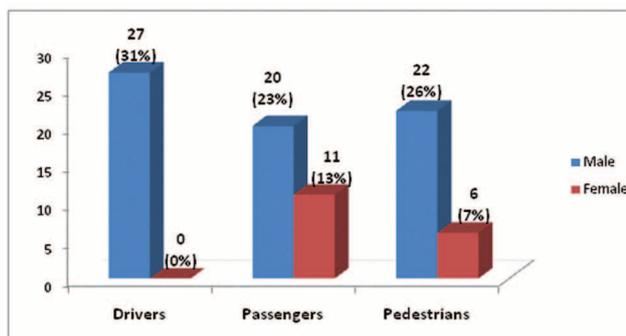
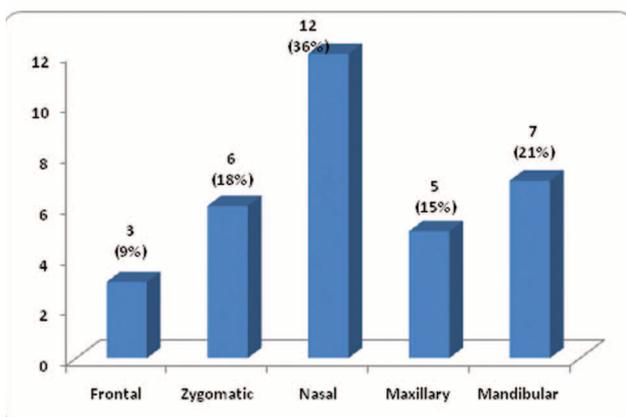
Age Group (Years)	Sex				Total n=218 (100%)	
	Males n=174 (79.4%)		Females n= 44 (21.6%)			
<10	20	(9.2%)	8	(3.7%)	28	(12.9%)
10 – 19	42	(19.3%)	10	(4.6%)	52	(23.9%)
20 – 29	46	(21%)	15	(6.9%)	61	(27.9%)
30 – 39	27	(12.4%)	6	(2.8%)	33	(15.2%)
40 – 49	18	(8.3%)	1	(0.5%)	19	(8.8%)
50 – 59	10	(4.6%)	2	(0.9%)	12	(5.5%)
60 – 69	7	(3.2%)	0	(0%)	7	(3.2%)
>70	4	(1.8%)	2	(0.9%)	6	(2.7%)

Table 2: Distribution of patients according to the cause of injury

Causes	Sex				Total n= 218 (%)	
	Males n=174 (%)		Females n= 44 (%)			
RTA	69	(31.7%)	17	(7.7%)	86	(39.4%)
Fall	25	(11.4%)	9	(4.1%)	34	(15.5%)
Assault	44	(20.2%)	10	(4.6%)	54	(24.8%)
Sport	2	(0.9%)	0	(0.0%)	2	(0.9%)
Burn	14	(6.4%)	4	(1.8%)	18	(8.2%)
Others	3	(1.4%)	2	(0.9%)	5	(2.3%)

Table 3: Distribution of patients with concomitant other injuries

Location	sex		Total
	Male	Female	
Upper limbs	33(31.1%)	5(4.7 %)	(% 35.8)38
Lower limbs	21(19.8%)	4(3.8 %)	(% 23.6)25
Chest	14(13.2%)	2(1.9%)	(% 15.1)16
Head	9(8.5%)	2(1.9 %)	(% 10.4)11
Abdomen	5(4.7 %)	2(1.9 %)	(6.6%)7
Neck	4(3.8%)	2(1.9 %)	(% 5.7)6
Pelvis	2(1.9%)	1(0.9%)	(2.8%)3
Total	(83%)88	(% 17)18	106(100%)

**Figure 1: The status of injured patients involved in the RT****Figure 2: The distribution of fractures in patients with facial injuries**

Discussion

Despite the growing burden of injuries worldwide, Sudan and many other countries still lack population-based estimates of different types of injuries. The present study assessed the patterns of facial injury in

three of the major trauma centers in Khartoum State. The vast majority of facial injuries (79.8%) in our study were experienced by males. Patients aged 20 to 29 constituted the group with the highest frequency of facial injury. These findings are consistent with previous Studies¹⁴.

The reported ratio of males to females in previous studies ranged from 3:1 to 5.4:1⁽¹⁵⁾ which is similar to the ratio observed in this study (4:1). This reflects the predominant male workforce in a male-dominant society. The male-to-female ratio is found to be in direct relation to the industrialization of the societies. The highest male preponderance associated with facial injuries was found in Arab countries where females are prohibited to enter the majority of social activities⁽¹⁶⁾. Traffic accident was the main cause of facial injuries. This is in agreement with studies reported by Convington⁽¹⁷⁾ and Afzeliud⁽¹⁸⁾ but differs from the trend shown by Huges⁽¹⁹⁾. Assault and falls are deemed to be the second most common causes of the facial injuries. Recent studies in the United States identify assault as the major cause of facial skeletal injuries⁽²⁰⁾ in contradistinction to Japan where road traffic accidents are being identified to be the major cause⁽²¹⁾. General surgical injuries (intra-abdominal and thoracic) were also a common finding and emphasize the necessity for multidisciplinary care in these patients.

Injuries to the face can be life-threatening, causing

airway obstruction or provoking severe hemorrhage. The facial injury may cause permanent derangement of functions such as vision, smell, taste mastication and swallowing. Facial appearance is important in all societies. Therefore, even minor alterations in the patient's facial appearance after trauma may cause severe psychological morbidity. The psychological legacy of the facial injury can persist long after the injury. The low self-esteem generated by the patient's perception of their own deformity limits their ability to achieve their full potential in society.

The management of facial injuries remains a challenge for plastic and maxillofacial surgeons, demanding both skill and a high level of expertise. A clearer understanding of the patterns of facial injuries will assist health care providers to plan and manage the treatment of traumatic facial injuries. Such epidemiological information can also be used to guide the future funding of public health programs geared towards prevention.

Conclusion

Traffic accident was the main cause for the majority of our patients followed by assault and falls. Male predominance is observed in this population. Young males sustained more facial injuries which were severe. Protective measures were not observed by the majority of drivers, which could have prevented the facial injuries. Many patients suffered injuries to multiple organ systems particularly limbs, head, abdominal and chest.

References

1. Ginny FO, Faxed OO, Akinwande JA, Arole GF, Odusanya SA. Pattern of soft tissue injuries to the oto-facial region in Nigerian children attending a teaching hospital. *Int J Paediatr Dent* 2002;12:201.
2. Magennis P, Shepherd J, Hutchison I, Brown A. Trend in facial injuries: increasing violence more than compensates for decreasing road trauma. *BMJ* 1998;316:325-6.
3. Shapiro AJ, Johnson RM, Miller SF, McCarthy MC. Facial fractures in a level I trauma center: the importance of protective devices and alcohol abuse. *Injury* 2001;32:353-6.
4. Haug RH, Foss J. Maxillofacial injuries in the pediatric patient. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90:126-34.
5. Sojat AJ, Meisami T, Sándor KB, Clokie CM. The Epidemiology of Mandibular fractures treated at the Toronto General Hospital: A Review of 246 Cases. *J Can Dent Assoc* 2001;67:640-4.
6. Ong TK, Dudley M. Craniofacial trauma presenting at an adult accident and emergency department with an emphasis on soft tissue injuries. *Injury* 1999;30:357-63.
7. Shaikh ZS, Worrall SF. Epidemiology of facial trauma in a sample of patients aged 1-18 years. *Injury* 2002;33:669-71.
8. Shapiro AJ, Johnson RM, Miller SF, McCarthy MC. "Facial fractures in a level I trauma centre: the importance of protective devices and alcohol abuse". *Injury* 2001; 32: 353-56.
9. Neuman MI, Eriksson E. "Facial trauma". Textbook of Pediatric Emergency Medicine: Lippincott Williams & Wilkins; 2006 p. 1475.
10. Hassan NA, Kelany RS, Emara AM, Amer M. Pattern of craniofacial injuries in patients admitted to Tanta University Hospital--Egypt *J Forensic Leg Med.* 2010; 17:26-32.
11. Akama MK, Chindia ML, Macigo FG, Guthua SW. . Pattern of maxillofacial and associated injuries in road traffic accidents. *East Afr Med J* 2007; 84:287-95.
12. Karlson TA. The incidence of hospital-treated facial injuries from vehicles. *J Trauma.* 1982; 22:303-10.
13. Wood EB, Freer TJ. Aust Dent J. Incidence and aetiology of facial injuries resulting from motor vehicle accidents in Queensland for a three-year period. 2001;46:284-8.
14. Ugboko VI, Odusanya SA, Fagade OO. Maxillofacial fractures in a semi-urban Nigerian teach-

- ing hospital. A review of 442 cases. *Int J Oral Maxillofac Surg* 1998;27:286-9.
15. Marker P, Nielsen A, Bastian HL. Fractures of the mandibular condyle. Part 1: Patterns of distribution of types and causes of fractures in 348 patients. *Br J Oral Maxillofac Surg* 2000;38:417-21.
 16. Al Ahmed HE, Jaber MA, Abu Fanas SH, Karas M. The pattern of maxillofacial fractures in Sharjah, United Arab Emirates: a review of 230 cases. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod* 2004;98:166-70.
 17. Covington DS, Wainwright DJ, Teichgraeber Jf, Parks DH. Changing patterns in the epidemiology and treatment of zygoma fractures: 10- year review. *J Trauma* 1994;37:243-8.
 18. Afzeliud LE, Rosen C. facial fractures: a review of 368 cases. *Int J Oral surg* 1980;9:25-32.
 19. Haug RH, Prather J, Indresano AT. An Epidemiologic survey of facial fractures and concomitant injuries. *J Oral Maxillofac surg* 1990;48:926-32.
 20. Ogundare BO, Bonnick A, Bayley N. Pattern of mandibular fractures in an urban major trauma center. *J Oral Maxillofac Surg* 2003;61:713-8.
 21. Tanaka N, Tomitsuka K, Shionoya K, et al. Aetiology of maxillofacial fracture. *Br J Oral Maxillofac Surg* 1994;32:19-23.

