

## Retrospective Analysis Of Maxillofacial Injuries In The Dental Department Of A Medical College

### Abstract

**Aims :** The present retrospective study was undertaken to evaluate maxillofacial injuries treated in the dental department of a medical college for demographic profile of the patients (age and gender), etiology, frequency and type of injuries, management and complications. The data was compared with other national and international studies to identify current trends in these injuries for planning optimal preventive and treatment strategies.

**Methods and Material :** A retrospective analysis of the case records of 410 patients with maxillofacial injuries who had presented to the department of Dentistry of the medical college from May 2003 to March 2006 was done. The data on age and gender of the patients, etiology, frequency and type of injuries as well as treatment modalities and complications were analysed statistically and compared with data from other studies.

**Results :** A total 410 case records were evaluated. There were 298 male patients and 112 female patients. Their age ranged from 1.5 years to 72 years. Majority of the injuries were due to road traffic accidents (n=269, 65.6%). The most common fracture site was of the Mandibular parasymphysis (n=259, 63.1%). Of the midface and mandibular fractures 139 were treated by open methods of reduction and fixation, 225 by closed methods and 46 by observation. Post surgical complications were observed in 4% of the cases.

**Conclusions :** A comparative analysis with other studies indicate that trends in maxillofacial injuries vary from one country to another and depend upon various factors and treatment modalities available. The complication rate in the present study was low.

### Key Words

facial fractures, maxillofacial injuries, patterns maxillofacial injuries, mandibular fractures, analysis maxillofacial injuries.

<sup>1</sup> Rupinder Kaur

<sup>2</sup> Gurvanit Lehl

<sup>1</sup> Professor,  
Dept of Oral & Maxillofacial Surgery  
BRS Dental College and Hospital,  
Panchkula, Haryana.

<sup>2</sup> Professor and HOD,  
Dept. of Dentistry,  
Government Medical College and Hospital,  
Sector 32, Chandigarh.

### Address For Correspondence:

Dr. Rupinder Kaur  
House no.6336-B,  
Rajiv Vihar, AWHO,  
Manimajra,  
Chandigarh, India.  
Tel : 9915322711  
E mail : dr.rupinder@hotmail.com

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### Introduction

A rise in the incidence of maxillofacial injuries over the past decade is due to an increase in road traffic accidents and physical assaults. Epidemiological and statistical data on maxillofacial injuries and their management reveal that the demographic trends, patterns and outcome vary with geographic region, socio-economic status, culture, religion and era<sup>1,2</sup>. This variation is also attributed to differences in mechanism of injury, gender, age and treatment facilities available. A descriptive and retrospective analysis of maxillofacial injuries reporting to the dental department of a medical college and hospital from the period of May 2003 to March 2006 was done by evaluating the case records.

### Subjects and Methods

A total of 410 patient records from the period May 2003 to March 2006 were evaluated for age, gender, etiology, site of fracture, treatment and complications. All the patients, whether admitted or treated as outdoor patients in the dental

clinic, were included in the study. Isolated frontal bone injuries, nasoethmoidal fractures and isolated nasal fractures were excluded from the study as they were referred to the Department of Otorhinolaryngology for treatment. Fractures were classified as delineated by Kruger and Schilli<sup>3,4</sup>. In outdoor patients closed methods of reduction and fixation were used under local anesthesia. Displaced zygomatic complex, maxillary and mandibular fractures were treated with open methods under general anesthesia or sedation. Pre and post operative complications were recorded. A comparison of the data with other studies was done.

### Results: Age and Gender distribution

A total of 410 patients with 697 fracture sites were treated during the study period. The age of the patients ranged from 1.5 years to 72 years with a mean of 34 ±14.99 years. There were 298 male and 112 female patients with a male: female ratio of 2.7:1. Majority of the injuries were sustained in the 21-30 years age

group. **Table 1.**

### Etiology of Fractures

In the present study, road traffic accidents

Table 1: Age-based distribution of patients

Age in years	Number of patients	Percentage
0-10	18	4.4
11-20	28	6.8
21-30	145	35.3
31-40	108	26.4
41-50	51	12.5
51-60	28	6.8
61-70	24	5.9
71-80	8	1.9
Total	410	100

Table 2: Etiology of maxillofacial fractures

Etiology	Number of patients	Percentage
Road Traffic Accidents	269	65.6
Assaults	85	20.7
Accidental falls	41	10.0
Occupational injuries	6	1.46
Sports injuries	4	1.0
Others	5	1.2

were the major cause of injuries followed by assaults, accidental falls, occupation-related, sports-related and other causes as tabulated in **Table 2**.

### Anatomic Site of Fracture

The anatomic site of the fractures observed in the present study are presented in **Table 3**

The mandible was the most common bone to be fractured followed in frequency by the zygomaticomaxillary complex, maxilla and alveolar process. Of the 410 patients 106(26%) had panfacial fractures. In the 259 mandibular fractures, a total of 391 fracture lines were seen. The distribution of mandibular fractures by site is shown in **Table 4**

The commonest mandibular fracture site was the parasymphysis followed by the condyle, angle and the body. The symphysis and ramus were infrequently involved.

### Management and Complications

Of the 130 midface fractures(maxillary and zygomatic complex fractures), 56 were treated with closed reduction and fixation and 28 with open reduction and internal fixation. 46 cases of undisplaced zygomatic complex fractures were treated conservatively with regular follow-up. Among the mandibular fractures, 148 cases were treated with closed methods and 111 cases with open reduction and fixation. 21 cases with dentoalveolar fractures were managed with arch bars and splinting. Different treatment modalities were used for the closed treatment of midface and mandibular fractures including intermaxillary fixation and circummandibular fixation. In open methods of fixation, mini plates were used to fix the fractured fragments. In the treatment of zygomatic complex fractures Gilles temporal approach was used for elevation of zygomatic bone. Maxillofacial fractures in children were treated by closed methods like eyelet wiring, Gilmer's wiring, arch bar wiring and circummandibular wiring. Pre and post operative antibiotics were used

Table 3: Anatomic fracture site

Site	Number of cases	Percentage (%)
Mandible	259	63.1
Maxilla	58	14.2
Zygomatic complex	72	17.6
Dentoalveolar	21	5.1
Total	410	100

Table 4: Sites of mandibular fractures

Fracture site	Number of fractures	Percentage
Body	45	11.5
Angle	62	15.8
Ramus	4	1
Condyle	120	30.7
Symphysis	8	2
Parasymphysis	152	39
Total	391	100

whenever clinically indicated.

The results of the treatment were judged to be satisfactory if full form and function were achieved postoperatively. Post operative complications were noted in 17 cases. These complications included infection, hypertrophic scar, disturbances of sensation, facial asymmetry, delayed union, unphysiological occlusal interferences and trismus. Infection was seen in 9 patients. Offending factors contributing to infection were removed, antibiotics were started and intermaxillary fixation was done depending upon the individual case. Unphysiological occlusal interference was observed in 16 patients. Those with minor discrepancies were managed with selective occlusal grinding and others with inter-arch elastics. Disturbances of sensation (anaesthesia, paraesthesia) were observed in 8 cases. Hypertrophic scar was noted in 4 patients and trismus in 7 patients. Facial asymmetry was seen in 5 cases. 11 cases had more than one complication. Delayed union (mobility after five weeks of treatment) was observed in 4 cases. This was due to infection at fracture site in 3 cases and inadequate immobilization in 1 case. In these cases infection was controlled and intermaxillary fixation was done for a further period of 3-4 weeks. Satisfactory results were obtained thereafter. Wound dehiscence occurred in 8 cases. In these

cases, daily wound irrigation was done to prevent infection.

### Discussion:

**Table 5** shows the comparative data of studies from 1981-2006 with regard to region, age, gender, etiology and site of fracture. Studies from Jordan<sup>1</sup>, Nigeria<sup>7</sup> and India (Trivandrum)<sup>8</sup> showed that road traffic accidents were the most frequent causes of facial fractures while a recent study from Malmo indicated interpersonal violence in males and falls in females to be the leading etiological factor<sup>9</sup>. However, road traffic accidents remain the most frequent factor in many developing countries<sup>10</sup>. This may be attributed to the availability of motor vehicles to young people, influence of alcohol and other drugs, high speed driving, insufficient stress on the use of safety belts and less enforcement of traffic rules<sup>12</sup>.

That maxillofacial injuries occur predominantly in men is a consistent finding in most of the studies<sup>5,6,7,8,11,12,13</sup>. In the present study, male : female ratio is 2.7:1 but some studies including the one from Trivandrum have shown a much higher ratio of 13:1 which is unique when compared with other published studies<sup>8</sup>. Similar to the observation in earlier studies, the present study also indicated that mandibular fractures are more prevalent than maxillary fractures<sup>3,14,15</sup>. The most common fracture site observed was the parasymphysis whereas body and condyle were the predominant sites noted in other studies<sup>13,14,16</sup>. In our study we have noted that there has been rising incidence of zygomatic fractures especially in patients with head injury and nasoethmoidal fractures. This is in contrast to the studies conducted by Anwar B. Bataineh (1998)<sup>1</sup> and Aboise B.O (1996)<sup>7</sup> which reported very less incidence of zygoma fractures. Interpopulation differences in the sites of maxillofacial fractures may be related to diverse etiologic factors involved. Of the 410 patients 106 had panfacial fractures, 259 cases had mandibular fractures, 130 had midface fractures and 21 cases had

Table 5: Comparative analysis with other studies

1	Anwar Bataineh (1997)	Randal James (1981)	Pantelis Bochlogyros (1985)	Nair and Paul (1986)	B.O Aboise (1986)	Mohammed Motamedi (2003)	Present study (2003-2006)
Region	Jordan	New Orleans	West Germany	Trivandrum, India	Nigeria	Tehran	Chandigarh, India
Age	5-73 years	1.5 - 87years	6 weeks - 82 years	2nd, 3rd decade	3rd decade	3-73 years	1.5 - 72 years
Gender ratio Male:Female	3:1	2.3:1	3.2:1	13:1	6:1	8:1	2.7:1
Major Cause	RTA* (55.2%)	Assault (53%)	RTA* (52.5%)	RTA* (40.3)	RTA* (81%)	RTA* (54%)	RTA* (65.6%)
Most common fracture site	Body (32%)	Angle (18.8%)	Body (41.5%)	Body (30.2%)	Body (49%)	Condyle (32%)	Parasymphysis (39%)

\*RTA- Road Traffic Accidents

dentoalveolar fractures. Closed as well as open methods of reduction and fixation were used. Olson et al (1982)<sup>17</sup> and Hill et al (1984)<sup>11</sup> supported the view that most mandibular fractures were amenable to treatment by closed reduction and fixation. In Nigeria simple methods of reduction and fixation were used<sup>7</sup>. Miniplate-osteosynthesis is a preferred choice these days. In the present study, we used open methods of reduction and fixation for 139 cases and closed methods for 225 cases whereas 46 cases were treated conservatively. Smith and Teenier (1996)<sup>18</sup> advocated open reduction and fixation of comminuted fractures whereas Finn (1996)<sup>19</sup> suggested closed methods for the treatment of mandibular fractures. In this study we preferred closed methods for comminuted fractures and achieved good results. Majority of the undisplaced and minimally displaced zygomatic complex fractures were treated by conservative management and observation. Postoperative complications were observed in 17 patients. These included infection, delayed union, disturbances in sensation, unphysiological occlusal interferences, hypertrophic scar, trismus, facial asymmetry. In compound fractures, infection can occur due to many factors like delay from the time of trauma to the time of treatment, teeth in fracture line, poor oral hygiene, inadequate fixation of fractured fragments. Jennifer et al (2003)<sup>20</sup> observed a higher complication rate with open methods whereas Jose C Moreno (2000)<sup>21</sup> concluded that postoperative complication rate depends on severity of fracture rather than type of treatment. In our study complications and morbidity were less and overall results achieved were quite satisfactory. The present study and a comparison with other studies revealed that while results of epidemiological surveys on the etiology and incidence of maxillofacial fractures tend to vary with geographic region, socio-economic status, culture, religion, era<sup>1,2,5,6</sup> the major etiological factor remains the same i.e., road traffic accidents. Parasymphysis was the most common site to be affected in our study. This could be due to the fact that this is the site of high strain as a result of directly applied forces and an area of anatomical weakness due to long root of canine. An increasing trend in fractures of the zygomatic complex was observed which could be attributed to increase in the interpersonal violence in the society.

Stringent laws to curb vehicular traffic accidents need to be enacted and enforced to reduce these injuries. Further, there is a rising trend in assault cases or interpersonal violence especially in young male adults with alcohol as a chief contributing factor for which more awareness in general population is required<sup>22</sup>.

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