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## **The Pattern of Maxillofacial Fractures in Golestan Province, Iran: A 3 Year Study of 221 Cases (2003-2005)**

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**Abstract:** This retrospective study was performed to assess the pattern of maxillofacial fractures in 221 patients admitted to Panj-Azar Educational-Medicinal Center (PAEMC), Gorgan, Golestan, Iran over a 3 year period (2003-2005). Of these patients, 84.1% are males and 15.9% females. The dominant age group involved in this study was 21-30 years old. The most common cause of maxillofacial injuries in the patients was traffic accidents (72.8%) followed by falling down (15.4%) and others including major traumas (11.8%). Of traffic accidents, the motor vehicles accidents were dominant (60.9%). The main site of fractures was mandible bone (78.7%). Simple associated injuries were observed mostly (77.2%). With open reduction as a main therapy, no mortality was seen in the patients. Considering traffic accidents, especially motorcycle accidents as a single major causative factor, there is a great need to apply driving rules extensively and use safety belt and helmet.

**Key words:** Maxillofacial fractures, etiology, treatment, Golestan province

**INTRODUCTION**

Development of technology and hygiene causes improvement of human life in recent century. However, conditions such as traffic accidents, physical assaults, occupational events, battling sports and wars have enhanced body injuries, especially maxillofacial traumas considerably (Malara *et al.*, 2006).

In recent years, fractures of facial bones (especially mandible because of its protrusion) have had a significant increase and they are of common injuries in patients admitted to the emergency units of hospitals, so that mandible fracture occupies the second most frequent incidence of facial bone fractures, with incidence of about 38% (Patrocinio *et al.*, 2005).

The face is one of the most vulnerable parts of the body, so that damaging events result in serious complications due to adjacency of it to vital organs (such as brain and meninges, spinal cord and eyes) and also due to physiological issues (including control of airway and breathing) and cosmetic and psychological problems (Ansari, 2001). Prevalence and etiology of maxillofacial injuries vary from country to country, depending on socio-economical, cultural and environmental factors. Traffic accidents are the most common causes and reasons for 34.42 to 90.15% of all the injuries of the face (Malara *et al.*, 2006).

In this retrospective study, variables including etiology, prevalence, associated injuries and therapeutic procedures of maxillofacial injuries were surveyed in the patients with maxillofacial fractures admitted to Panj-Azar Educational-Medicinal Center (PAEMC), Gorgan, Golestan province, Iran during 2003-2005.

**MATERIALS AND METHODS**

This is a case series and retrospective study. The records of all patients who were admitted to PAEMC from 2003 to 2005 with diagnoses of maxillofacial fractures were retrieved. Patients were included in the study if diagnosis of fracture was documented. Data on demography, etiology, associated injuries and therapeutic procedures of 221 patients were entered in special information forms and was analyzed by SPSS 11.5.

**RESULTS**

Of 221 patients, 186 (84.1%) were males and 35 (15.9%) females with male/female ratio of 5.3/1 (Table 1).

The dominant age group involved in this study was 21-30 years old that consists 38.4% of all patients (Table 2).

The most frequent cause of fractures was traffic accidents (72.8%) followed by falling down (15.4%) and others (including major traumas, sports and occupational injuries) (11.8%) (Table 3).

Of traffic accidents that resulted in fractures, motorcycle accidents were dominant (60.9%) followed by car accidents (36%) and bicycle accidents (3.1%) (Table 4).

Anatomically, fractures of mandible with/without fractures in other parts of the face were occurred in 174 patients including 77.8% of all patients (Table 5).

Associated injuries occurred in 70 patients (31.6%) either as simple (77.2%) or as multiple (22.8%) ones. Of associated injuries, orbital fractures, head injuries, orthopedic traumas and abdominal injuries were observed in 41.4, 40, 47.1 and 9.9% of patients, respectively (Table 6).

The most common therapeutic procedure was open reduction with 73.8% (Table 7).

Complication after surgery was observed in one patient (0.45%) as non-union at Le Fort III. There was no mortality in the patients.

Table 1: Sex distribution of patients with maxillofacial fractures

Sex	No.	Percentage
Male	186	84.1
Female	35	15.9
Total	221	100.0

Table 2: Age range and sex distributions of patients with maxillofacial fractures

Age range (year)	Male	Female	Total No.	Percentage
0-10	14	9	23	10.4
11-20	64	10	74	33.5
21-30	76	9	85	38.4
31-40	18	5	23	10.4
41-50	7	1	8	3.6
51-60	4	1	5	2.3
61-70	3	0	3	1.4
Total	186	35	221	100.0

Table 3: Etiology of maxillofacial fractures in patients with maxillofacial fractures

Etiology	No.	Percentage
Traffic accidents	161	72.8
Falling down	34	15.4
Others (including major traumas, sports and occupational accidents)	26	11.8
Total	221	100.0

Table 4: Distribution of vehicles type resulted in traffic accident injuries (n = 161)

Type of vehicle	No.	Percentage
Motorcycle	98	60.9
Car	58	36.0
Bicycle	5	3.1
Total	161	100.0

**Table 5: Sites of fractures in patients with maxillofacial fractures**

Sites of fractures	No.	Percentage
Maxilla	24.0	10.9
Maxilla+mandible	23.0	10.4
Maxilla+mandible+zygoma	8.0	3.6
Maxilla+zygoma	9.0	04.1
Mandible	132.0	59.7
Mandible+zygoma	11.0	5.0
Zygoma	14.0	6.3
Total	221.0	100.0

**Table 6: Associated injuries found in patients with maxillofacial fractures (n = 70)**

Type of associated injury	No	Percentage
Head injury	19	27.2
Head injury+orthopedic trauma	3	4.3
Head injury+orthopedic trauma+orbital trauma	1	1.4
Head injury+orthopedic trauma+orbital trauma+abdominal injury	5	7.1
Orthopedic trauma	17	24.3
Orthopedic trauma+orbital trauma	6	8.6
Orthopedic trauma+abdominal injury	1	1.4
Orbital trauma	17	24.3
Abdominal injury	1	1.4
Total	70	100.0

**Table 7: Therapeutic procedures in patients with maxillofacial fractures**

Therapeutic procedure	No.	Percentage
Closed reduction	046	020.8
Open reduction	163	073.8
Observation	012	005.4
Total	221	100

## DISCUSSION

Prevalence of maxillofacial fractures is not same in different countries. It depends on many factors including culture, social life, traffic accidents, industrial events, assaults, battling sports and so on. The type of vehicle is important in causing these injuries.

In our study, the prevalence of maxillofacial fractures in male and female were 84.1 and 15.9%, respectively. This finding is corresponding to that of Patrocínio *et al.* (2005), Ansari (2001), Adebayo *et al.* (2003), Dongas and Hall (2002) and Buchanan *et al.* (2005).

The dominant age group of our study was 21-30 years old, corresponding to other studies that were performed previously by Sakr *et al.* (2006), Patrocínio *et al.* (2005), Qudah *et al.* (2005), Al-Ahmad *et al.* (2004) and Sojat *et al.* (2001). The male/female ratio of maxillofacial injuries in our study was 5.3/1 that is in agreement with researches of Al-Ahmad *et al.* (2004) and Sojat *et al.* (2001).

We found traffic accident as the main cause of injuries (72.8%) followed by falling down (15.4%) and other injuries (11.8%). These findings are in agreement with the studies of some researchers such as Patrocínio *et al.* (2005), Ansari (2004), Adebayo (2003), Al-Ahmad (2004), Erol *et al.* (2004), Ferreira *et al.* (2004),

Klenk and Kovacs (2003) and Abbas *et al.* (2003). The main cause of injuries in developed countries is assault. The rates of maxillofacial fractures due to assaults have been reported 75, 53.3, 50 and 55% in Ogundare *et al.* (2003), Sojat *et al.* (2001), King *et al.* (2004) and Dongas and Hall (2002), respectively.

In review article by Oikarinen *et al.* (2004), etiological differences of maxillofacial fractures were compared in Kuwait, Canada and Finland. They found that traffic accidents were the cause of 55, 33 and 7% injuries in Kuwait, Finland and Canada, respectively. The correspondence of present findings with that of Kuwait researchers shows that traffic rules in eastern countries are disobeyed, whereas injuries due to assaults were less in Kuwait (12%) than Canada (54%) and Finland (37%).

We found traffic accidents as a main cause of injuries in 60.9, 36 and 3.1% due to motorcycles, cars and bicycles accidents, respectively. These findings are corresponding to Ansari (2004) and Motamedi (2003). The reason is simple: There are many village and farms around the Golesten Province cities, so that rural people and farmers use the motorcycles for transportation. This can probably increase the injuries due to motorcycle accidents.

In this study, the most common site of fractures was mandible (59.7%), multiple bones (23.1%), maxilla (10.9%) and zygoma (6.3%), that is corresponding to findings of Ferreira *et al.* (2005), Al-Ahmad *et al.* (2004) and Motamedi (2003).

In this study, associated injuries were seen in 31.6% of all patients that include simple traumas with 77.2%. These findings are corresponding to that of Ozgenel *et al.* (2004) with 24% and Hussain *et al.* (2003) with 32% and Pappachan and Alexander (2006) with 20%. Dignosis of associated injuries in maxillofacial fractures can prevent irreversible morbidities and mortalities.

Therapeutic procedures in our patients include open reduction (73.8%), closed reduction (20.8%) and observation (5.4%). These findings are corresponding to that of Dongas and Hall (2002) with open reduction in 41.4%, closed reduction in 25.9% and observation in 19.1% of patients. Closed reduction was the most common therapeutic procedure in studies of Ansari (2003), Al-Ahmad *et al.* (2004), Erol *et al.* (2004) and Motamedi (2003). Progress of technology, developing newer therapeutic procedures and presence of different types of injuries can reflect differences in therapeutic procedures.

## CONCLUSIONS

Traffic accidents are the most common cause of maxillofacial fractures in our study. Therefore it is necessary to apply driving rules, especially for

motorcycle drivers and compel them to use helmet and fasten safety belt for decreasing maxillofacial fractures.

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