



Prevalence of Maxillofacial Fractures and Related Factors: A Five-Year Retrospective Study

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Abstract

Objectives: The aim of the current study was to assess the prevalence and causes of maxillofacial fractures in a five-year period among patients referring to Taleghani Hospital, Tehran, Iran.

Methods: This retrospective study was conducted on patients with maxillofacial fractures from the beginning of 2013 until the end of 2017. Demographic factors, fracture site, fracture type, the cause of fracture, and performed treatment were recorded.

Results: There were 708 patients with maxillofacial fractures; most cases were in men (85.2%) and in the second and third decades of life (53.8%). The majority of the fractures were in the mandible with the incidence rate of 64.7%. In addition, the most causes of maxillofacial fractures were due to car accident (CA) (29.4%), motor vehicle accident (MVA) (28.7%), and falling down (FD) (21%). No significant difference was observed in the type of fracture between the sex and age groups ($P > 0.05$).

Conclusions: Maxillofacial fractures were associated with serious health problems, specifically in young males following CA and MVA.

Keywords: Maxillofacial Fractures, Trauma, Nasal Bone Fractures, Zygomaticomaxillary Complex Fractures, Lefort Fractures, Palatal Fractures

1. Background

The human face is the foundation of interpersonal communications and any damage to its components will have undesirable and long-term effects on the quality of life, particularly with the modern-day overemphasis on facial beauty (1). Maxillofacial fractures are a major health condition in the world and include 7.4 to 8.4% of all emergency proceedings (2-4). In addition, maxillofacial fractures create a major challenge to health specialists due to the adjacency of the face to vital organs, such as the brain, and probable deformity, dysfunction, and high treatment cost.

The frequency pattern and cause of maxillofacial fractures in various regions vary with geography, socioeconomic status of communities, and study duration (3, 5). In the majority of studies, mandibular fractures represent the most cases of maxillofacial fractures (5-7). Moreover, Rocca et al. showed that dental injuries accounted for 13.1% of all maxillofacial injuries (8). Most studies have reported the road traffic accident (RTA) as the main cause of such injuries (9). However, some studies have mentioned as-

saults as the leading cause of these injuries (10). Moreover, Boffano et al. showed that the causes of maxillofacial injuries are changing in Europe and fractures caused by assaults and falling down are now more common than those caused by RTA (5).

2. Objectives

Regarding the important knowledge of the pattern and frequency of maxillofacial fractures and their causes, this study intended to investigate the prevalence and causes of maxillofacial fractures in a five-year retrospective study in a hospital in Iran.

3. Methods

This retrospective study was conducted on patients with maxillofacial fractures with complete medical records, referring to the Oral and Maxillofacial Surgery Department of Taleghani Hospital, from the beginning of 2013 until the end of 2017. Data pertaining to age, sex,

fracture site, fracture type, the cause of fracture, and performed treatment were recorded.

The mean, standard deviation, and frequency of data were calculated. The occurrence of fractures was compared between genders using the student's t-test and between age groups with One-way ANOVA. In this study, $P < 0.05$ was considered significant.

4. Results

In a five-year period, 708 patients had maxillofacial fractures; 85.2% ($n = 602$) of the patients were male and 14.8% were female. The age distribution of the patients is demonstrated in Figure 1. It can be illustrated that most of the patients (35%) were in the third decade of their lives and 134 patients (18.8%) were in the second decade (Figure 1). The incidence of different types of fractures is shown in Figure 2. In fact, the majority of the fractures were reported in the mandible with the incidence rate of 64.7%. ZMC fractures were in second place with the incidence rate of 21.1%.

According to Figure 3, the most common causes of maxillofacial fractures were car accident (CA) (29.4%), motor vehicle accident (MVA) (28.7%), and falling down (FD) (21%), in sequence. In addition, the frequency of different fractures by the cause is presented in Table 1. No significant difference in the type of fracture was observed between the sex and age groups ($P > 0.05$).

In addition, 579 patients (81.4%) were treated under general anesthesia induction and the others were treated under local anesthesia induction (14.9%) or intravenous sedation (3.6%). In addition, treatment with open reduction and internal fixation (ORIF) was used for 549 maxillofacial

fractures (77.2%) and 135 fractures (19%) were treated with closed reduction. Treatments for different types of fractures are presented in Table 2.

5. Discussion

In the current study, the prevalence of maxillofacial fractures was investigated from the beginning of 2013 to the end of 2017 in Taleghani Hospital, Tehran, Iran, based on the injury cause, fracture type, performed treatment, and relationship with demographic information of the patients. According to the literature, there are many studies on the prevalence of maxillofacial fractures and their

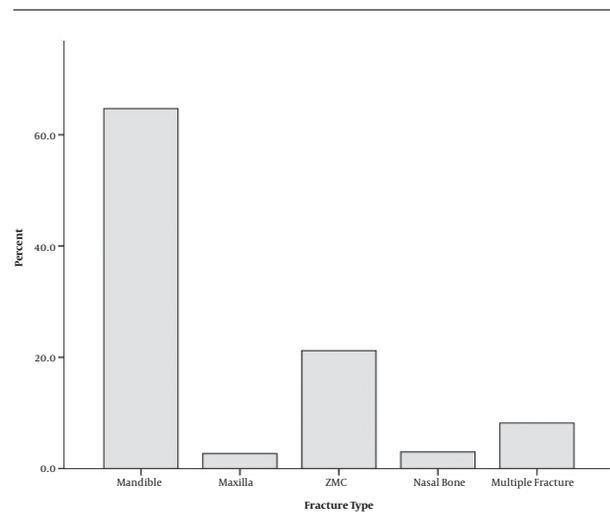


Figure 2. The prevalence of different types of maxillofacial fractures

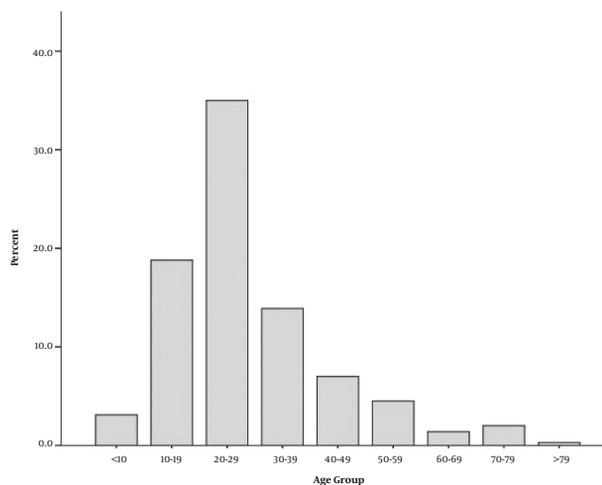


Figure 1. The prevalence of maxillofacial fractures regarding age groups

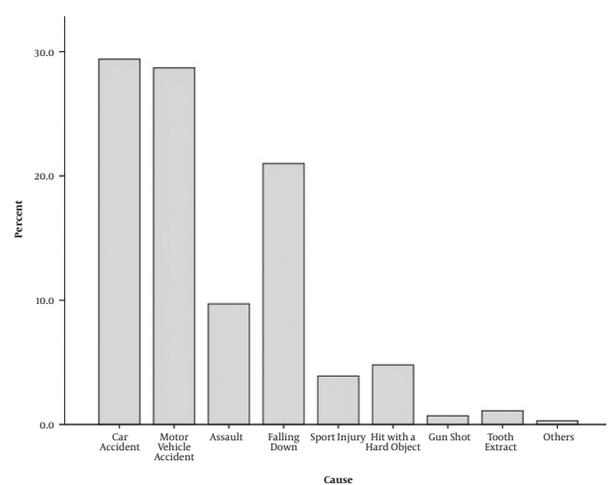


Figure 3. The prevalence of different causes of maxillofacial fractures

Table 1. The Prevalence of Different Fracture Types Regarding the Causes^a

	Fracture Type					Total
	Mandible	Maxilla	ZMC	Nasal	Multiple Fractures	
Car accident	113 (24.7)	10 (52.6)	58 (38.7)	11 (52.4)	17 (29.3)	209 (29.6)
Motor vehicle accident	116 (25.3)	8 (42.1)	48 (32.0)	2 (9.5)	30 (51.7)	204 (28.9)
Assault	52 (11.4)	0 (0.0)	15 (10.0)	1 (4.8)	1 (1.7)	69 (9.8)
Falling down	115 (25.1)	1 (5.3)	21 (14.0)	4 (19.0)	8 (13.8)	149 (21.1)
Sport injury	26 (5.7)	0 (0.0)	2 (1.3)	0 (0.0)	0 (0.0)	28 (4.0)
Solid encounter	24 (5.2)	0 (0.0)	6 (4.0)	2 (9.5)	2 (3.4)	34 (4.8)
Gun shot	5 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (0.7)
Tooth extract	7 (1.5)	0 (0.0)	0 (0.0)	1 (4.8)	0 (0.0)	8 (1.1)
Total	458 (100.0)	19 (100.0)	150 (100.0)	21 (100.0)	58 (100.0)	706 (100.0)

^aValues are expressed as No. (%).**Table 2.** The Prevalence of Different Fracture Types Regarding Different Treatments of ORIF or CR^a

Treatment	Fracture Type					Total
	Mandible	Maxilla	ZMC	Nasal	Multiple Fractures	
ORIF	328 (74.2)	18 (94.7)	146 (98.7)	6 (30)	51 (92.7)	549 (80.3)
CR	114 (25.8)	1 (5.3)	2 (1.3)	14 (70)	4 (7.3)	135 (19.7)
Total	442 (100)	19 (100)	148 (100)	20 (100)	55 (100)	684 (100)

^aValues are expressed as No. (%).

causes. Consistent with previous studies, the majority of the fractures in the current study were observed among men and people in their second, third, and fourth decades of their lives (3, 6, 11-15). For example, the majority of patients in a six-year study in South India were 18-40 years old and the incidence of fractures was higher among men (6). Moreover, in a three-year retrospective study in Germany, the incidence of fractures was higher among men aged 20 - 29 years (14).

In the current study, the majority of the fractures were observed in the mandible. Similar to the current study, other studies showed that mandibular fractures were the most common type of maxillofacial fractures (5, 6, 10-13, 15). For example, the incidence rates of 41.1% (6) to 65.1% (12) have reported for mandibular fractures in previous studies. Furthermore, a study conducted in China showed that mandibular fractures were more prevalent among children than in adults (10). Moreover, FD was the leading cause of fractures in children, but serious fractures were more prevalent among adults (10). However, two studies reported the orbital (3) and midface fractures (14) with the highest incidence rates.

In the current study, MVA, CAM, and FD were reported as the major causes of most maxillofacial fractures. According to the literature, RTA is the major cause of maxillofa-

cial fractures in most studies (3, 6, 11-13, 15, 16). For example, the incidence of CA in India was reported as 73.6% (6). Nevertheless, it has been demonstrated that assault is the major cause of maxillofacial fractures in Europe (5, 14). For instance, according to a study conducted by Boffano et al. on medical records of 3,396 patients referring to several oral and maxillofacial surgery centers in Europe in one year, assaults were the main causes of most maxillofacial fractures (5). In fact, they found that the major causes of the fractures shifted from road accidents to assault and FD. However, a five-year retrospective study in the Netherlands reported road accidents, particularly among bicycle riders, as the leading cause of maxillofacial fractures. Moreover, a five-year retrospective study in Greece reported road accidents as the leading cause of maxillofacial fractures with a prevalence of 50.8% (15).

In the current study, the majority of the fractures were treated with ORIF (77.2%) and under GA (81.4%). It should be noticed that post-treatment complications have been reported as neurosensory disorders of inferior alveolar nerve with the highest prevalence, followed by neurosensory disorders of infraorbital nerve, neuromotor disorders of facial nerves, blurred vision, diplopia, limited eye movement, exophthalmos, blindness, infection, and chronic osteomyelitis [12]. In addition, brain damage was observed in

71% of the patients (3).

5.1. Conclusions

In conclusion, maxillofacial fractures are associated with serious health problems, specifically in young males following CA and MVA. In addition, the mandibular fractures are the most common type of such fractures. The results of this study can be useful for both health specialists and policymakers.

Footnotes

Conflicts of Interests: The authors declare that they have no conflict of interests.

Ethical Considerations: According to the basic principles of the Helsinki Declaration (ethical principles of medical research on humans), patients' information was recorded confidentially.

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