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Frequency of Maxillofacial Fractures among Patients with Head and Neck Trauma Referred to Shahid Beheshti Hospital in Babol, 2018-2019

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ABSTRACT

BACKGROUND AND OBJECTIVE: Head and neck trauma and related injuries account for a high rate of mortality and neurological defects. Since maxillofacial trauma occurs alone or in combination with other severe injuries, this study was performed to determine the frequency of maxillofacial fractures in patients with head and neck trauma referred to Shahid Beheshti Hospital in Babol.

METHODS: This cross-sectional study was performed among all patients with maxillofacial trauma who referred to the Oral and Maxillofacial Surgery Center of Shahid Beheshti Hospital in Babol in 2018-2019. Necessary information was collected via history, clinical examinations, facial radiographs and hospital records. CT scan was performed in patients with decreased level of consciousness, neurological symptoms or clinical signs of skull fracture. Data about age, gender, cause of injury, pattern of facial or head injuries, loss of consciousness and GCS score were recorded in the questionnaire and evaluated.

FINDINGS: The mean age of patients was 30.55±15.82 years. 44 patients (18.6%) were female and 192 patients (81.4%) were male. Out of 236 patients with head and neck trauma, the rate of upper face, midface, and lower face fractures were 3.4, 53.5 and 29.6%, respectively. The most common areas that were fractured were the Condyle (7.8%) and the Angle (7.3%) of the mandible.

CONCLUSION: The results showed that in maxillofacial fractures, the most commonly damaged area is the midfacial area.

KEY WORDS: *Head and Neck Trauma, Maxillofacial Fractures, Level of Consciousness.*

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Introduction

Head and neck trauma and the associated injuries account for a high rate of mortality and neurological defects. Facial trauma may be associated with other injuries within the skull, lungs, abdomen, or limbs (1). Maxillofacial fractures depend on several factors. Epidemiological studies around the world have shown that some aspects of facial fracture patterns are similar between different communities (2). The most common causes of facial fractures are motor vehicle accidents or quarrels. Other causes of facial injuries include falls or accidents that occur during exercise or work. Facial fractures due to vehicle accidents are more common in those who do not wear seat belts and lose control when an accident occurs (3).

In one study, road accidents were the most common cause of maxillofacial fractures, with mandibular bone being the most commonly reported area while most damages to soft tissue occurred in the upper lip (4). Depending on the type of injury, the direction and the extent of the impact, mandibular fractures usually occur in several places. Fractures are named based on their location and type. One of these classifications anatomically specifies the location of mandibular fractures as Condylar, Ramus, Angle, Body, Symphysis, Alveolar, Parasymphysis, and rarely includes areas related to coronoid process (5).

The most common type of midfacial fracture is compound cheekbone fracture. This type of fracture is caused by a punch or baseball on the side of the cheekbone. The same type of trauma can also cause separate fractures of the nasal bone, the sides of the eyeball, or the orbital floor. The zygomatic arch may also be damaged alone or in connection with other injuries (6). Complex fractures involving several facial bones are quite diverse and follow general patterns divided by a French surgeon named Le Fort. Because these fractures are often associated with edema and the edema obscures clinical views, imaging examinations may be the only way to determine the presence and extent of the injury (7).

Frontal sinus fractures make up approximately 5 to 15% of all facial fractures in adults. This is a very small part of the total number of accidents, although there are many long-term complications associated with this type of injury, which not only involves the frontal sinus, but more importantly, affects the brain (8). The study of Roccia et al. showed that the highest rate of dental injuries was associated with mandibular bone fractures and the maxillary teeth had the highest rate of fractures and loosening (9). A study by Bali et al. showed that most injuries were in the 20-24 age group due to road accidents. The mandibular bone was also the most affected bone (10). The results of Arangio's study showed that the age group of 18-39 years had suffered the most maxillofacial injuries, with the most common cause of these injuries and maxillofacial fractures being injuries caused by accidents. In addition, interpersonal conflicts were the most common cause of injuries and maxillofacial fractures in the age group of 40-59 years (11).

Due to the special geographical location and the existence of a water border and dense forest texture, Mazandaran province is one of the main targets of tourism in Iran, has a high rate of traffic and a huge volume of road traffic is observed in this province, especially in holidays. Therefore, this study was performed to evaluate the frequency of maxillofacial fractures in patients with head and neck trauma referred to Shahid Beheshti Hospital in Babol in 2018-2019.

Methods

This cross-sectional study was approved by the ethics committee of Babol University of Medical Sciences with the code IR.MUBABOL.HRI.REC.1398.213 and performed among all patients with maxillofacial trauma who referred to the Oral and Maxillofacial Surgery Center of Shahid Beheshti Hospital in Babol in 2018-2019. Necessary data were collected using history, clinical examinations, facial radiographs and hospital records. CT scan was performed in patients with decreased level of consciousness, neurological symptoms or clinical signs of skull fracture. Data about age, gender, cause of injury, pattern of facial or head injuries, loss of consciousness and GCS score obtained in the questionnaire were recorded.

Causes of injuries were considered based on accidents caused by motor vehicles, falls from heights, pedestrians, fights, sports injuries, and work-related injuries. Facial injuries include facial bone fractures or soft tissue injuries and head injuries include skull fractures or intracranial injuries. Skull fractures were divided into injuries, linear fractures and depressed fractures of the frontal, temporal, parietal, occipital lobe, skull base fractures, and intracranial injuries in the form of subconjunctival and intracranial hemorrhage (epidural, subdural, intracerebral, and subarachnoid hematoma). Facial bone fractures were divided into

mandibular, Lefort I, Lefort II, Lefort III, zygomaticomaxillary complex fractures including nasal, orbital and frontal bone fractures and different types of mandibular fractures based on anatomical location (condyle, ramus, angle, body, symphysis, parasymphysis and coronoid) (6, 12, 13). Data were analyzed using SPSS 24 software and X^2 statistical test and $p<0.05$ was considered significant.

Results

In this study, 236 patients with head and neck trauma referred to Shahid Beheshti Hospital in Babol were evaluated. Their mean age was 30.55±15.82 years. 44 (18.6%) of the patients were female and 192 (81.4%) were male. The mean duration of hospitalization in these patients was 6.25±6.86 days. There was significant difference in the classification of patients based on age and type of fracture, only in maxilla and dislocation (luxation) (Table 1). Out of 236 patients, 32 were admitted to the ICU, the number of days of hospitalization varied from 2 to 43 days and its mean was 9.44±8.7 days. Out of the 236 patients, 178 patients (75.42%) underwent surgery, and mean duration between hospitalization and the day of surgery in these patients was 4.46±5.89 days. 157 patients (66.5%) did not have any systemic disease. 21 patients (8.9%) reported smoking and hookah use, 12 patients (5.9%) reported alcohol consumption and 30 patients (12.7%) reported drug use. Systemic diseases such as seizures (7 patients, 3%), drug allergies (7 patients, 3%), hypertension (5 patients, 2.1%), ischemic heart disease (IHD) (6 patients, 2.5%), food allergies (3 patients, 1.3%), digestive problems (2 patients, 0.8%), Alzheimer's disease (1 patient, 0.4%), hyperthyroidism (1 patient, 0.4%), hypothyroidism (2 patients, 0.8%), asthma (3 patients, 1.3%), diabetes (4 patients, 1.7%), tachycardia (1 patient, 0.4%), systemic lupus erythematosis (SLE) (1 patient, 0.4%) and favism (1 patient, 0.4%) were also examined in patients. 55 patients had only one type of disease, 20 patients had 2 types of diseases, 3 patients had 3 types of diseases and only one person had 4 types of diseases simultaneously. Causes of head and neck trauma in this study included motorcycle and bicycle accidents in 51 people (21.6%), car accidents in 87 people (36.9%), falls from heights in 49 people (20.8%), fights in 16 people (6.8%), closed head injury in 20 people (8.5%), sports traumas in 11 people (4.7%) and bites in 2 people (0.8%) (Table 2).

Table 1. Frequency of different types of maxillofacial fractures in patients based on age (number of fractures: 318, number of patients: 236)

Type of fracture	<12 Number(%)	12-18 Number(%)	18-40 Number(%)	40-60 Number(%)	>60 Number(%)	P-value
Frontal	0(0)	0	8(72.7)	2(18.2)	1(9.1)	0.55
Zygomaticomaxillary complex	1(1.8)	7(12.3)	38(66.7)	9(15.8)	2(33.5)	0.18
Naso-orbitoethmoid (NOE)	0(0)	0(0)	6(100)	0(0)	0(0)	0.95
Nasal	11(14.1)	11(14.1)	36(46.2)	14(17.9)	6(7.7)	0.20
maxilla	0(0)	0(0)	10(52.63)	6(31.57)	3(15.87)	0.04
Palatine bone	0(0)	0(0)	4(50)	3(37.5)	1(12.5)	0.19
condyle	3(12)	6(24)	14(56)	2(8)	0(0)	0.37
body	1(5.26)	4(21.05)	10(52.63)	3(15.78)	1(5.26)	0.89
angle	0(0)	54(17.4)	16(69.6)	2(8.7)	1(1.36)	0.36
symphysis	0(0)	0(0)	6(100)	0(0)	0(0)	0.59
parasymphysis	1(4.8)	3(12.3)	13(61.9)	3(14.3)	1(4.8)	0.97
Avulsion	0(0)	2(40)	3(60)	0(0)	0(0)	0.51
Luxation	3(60)	0(0)	2(40)	0(0)	0(0)	0.04
Crown fracture	1(5.6)	0(0)	16(88.9)	0(0)	1(5.6)	0.03
Cusp fracture	1(100)	0(0)	0(0)	0(0)	0(0)	0.15
Extrusion	0(0)	0(0)	1(100)	0(0)	0(0)	0.99
Mobility	1(16.7)	1(16.7)	3(50)	1(16.7)	0(0)	0.84
Intrusion	0(0)	1(100)	0(0)	0(0)	0(0)	0.21

Table 2. Frequency of patients based on cause of fracture (number of fractures: 318, number of patients: 236)

Type of fracture	Motorcycle and bicycle accidents N(%)	Car crashes N(%)	Fall from height N(%)	Conflict N(%)	Closed head injury N(%)	Sports trauma N(%)	P-value
Frontal	3(27.3)	6(56.5)	2(18.2)	0(0)	0(0)	0(0)	0.91
zygomaticomaxillary complex	20(24.5)	25(43.1)	9(15.5)	2(3.4)	1(1.7)	1(1.7)	0.02
Naso-orbitoethmoid (NOE)	1(16.7)	5(83.3)	0(0)	0(0)	0(0)	0(0)	0.54
Nasal	17(21.5)	23(29.1)	19(24.1)	4(5.1)	10(12.7)	6(7.6)	0.19
Maxilla	7(35)	10(50)	2(10)	0(0)	0(0)	0(0)	0.79
Palatine bone	3(37.5)	4(50)	1(12.5)	0(0)	0(0)	0(0)	0.76
Condyle	6(24)	10(40)	7(28)	1(4)	1(4)	0(0)	0.76
Body	5(26.31)	7(36.84)	5(26.31)	1(5.27)	0(0)	1(5.27)	0.89
Angle	3(13)	5(21.7)	5(21.7)	5(21.7)	1(4.3)	4(17.6)	0.008
symphysis	2(33.3)	1(16.7)	1(16.7)	2(33.3)	0(0)	0(0)	0.24
parasymphysis	2(9.1)	11(50)	5(22.7)	2(9.1)	1(4.5)	1(4.5)	0.64
Avulsion	1(16.3)	2(28.6)	3(42.9)	0(0)	1(14.3)	0(0)	0.7
Luxation	0(0)	3(60)	3(60)	2(40)	0(0)	0(0)	0.77
Crown fracture	7(36.8)	7(36.8)	4(21.1)	1(5.3)	0(0)	0(0)	0.61
Cusp fracture	1(100)	0(0)	0(0)	0(0)	0(0)	0(0)	0.99
Extrusion	1(50)	0(0)	0(0)	0(0)	1(50)	0(0)	0.26
Mobility	2(33.3)	2(33.3)	2(33.3)	0(0)	0(0)	0(0)	0.96
Intrusion	0(0)	0(0)	0(0)	0(0)	1(100)	0(0)	0.2

Types of accompanying head and neck injuries in the subjects studied in this study include: subdural hematoma in 7 patients (3%), epidural hematoma in 4 patients (1.7%), skull fracture in 5 patients (2.8%), contusion in 2 patients (0.4%), CSF Leak in 1 patient (0.4%), cervical vertebral fracture in 3 patients (1.3%), subarachnoid hematoma in 3 patients (1.27%), intracranial hematoma in 3 patients (1.27%) and subgaleal hematoma in 1 patient (0.4%). The lowest GCS level in these patients was 4, the maximum level was 15 and the mean level was 14.55±1.86. In general, 221 patients (93.6%) did not have injuries in head or neck. Six patients (2.5%) had one injury, 5 patients (2.1%) had 2 injuries and 4 patients (1.7%) had at least 3 injuries (Table 3).

Soft tissue injuries in patients included rupture in 106 patients (44.9%), abrasion in 30 patients (12.7%) and no case of contusion was observed. Hard tissue injuries were examined in three types of isolated bone fractures, multiple bone fractures and panfacial fractures, which were present in 124 patients (52.5%), 66 patients (0.28%) and 8 (3.4%) patients, respectively. 38 patients (16.1%) had only soft tissue injury (Table 4). Eleven patients (4.7%) had frontal fractures (upper face), and 58 patients (24.6%) had zygomaticomaxillary complex (ZMC) fractures (Figure 1). Among people with ZMC fracture, 51.72% were in the right area, 32.75% were in the left area and 15.53% were bilateral. Naso-orbitoethmoid (NOE) fracture was observed in 6 patients (2.5%) and nasal fracture was observed in 79 patients (33.5%). Lefort I maxillary injury was present in 17 patients (7.2%), Lefort II in 2 patients (0.08%) and Lefort III in 1 patient (0.4%). Mandibular fractures were examined in several areas, including left condyle, right condyle, bilateral condyle, body, angle, right and left symphysis and parasymphysis, with a frequency of 15 patients (60%), 5 patients (20%), 5 patients (20%), 18 patients (7.6%), 23 patients (9.7%), 6 patients (2.5%) and 22 patients (9.3%), respectively (Figure 2). Fractures of arch, coronoid and ramus were found in 9 patients (3.8%), 7 patients (3%) and 4 patients (1.7%), respectively. Dentoalveolar segment was also exposed to trauma in 6 patients (2.5%).

Dental injuries included Avulsion in 7 patients (2.2%), Luxation in 5 patients (1.5%), Crown fracture in 19 patients (5.9%), Cusp fracture in 1 patient (0.3%), Extrusion in 2 patients (0.6%), Mobility in 6 patients (1.8%) and Intrusion in 1 patient (0.3%) (Table 5). Among the studied samples, 62 patients (26.3%) did not receive any treatment, 86 patients (36.4%) underwent ORIF treatment, 61 patients (25.8%) underwent Close treatment, and 3 patients (1.3%) received close and open treatment. Treatments of suturing, tooth extraction, coronectomy, cranioplasty, incision and hematoma drainage were evaluated in 17 patients, 10 patients, 1 patient, 1 patient and 2 patients, respectively. Among the patients that underwent the treatment process, 9 patients needed the administration of two types of treatment and 1 patient died due to cardiac arrest.

Table 3. Frequency of patients based on types of head and neck injuries (number of fractures: 318, number of patients: 236)

Type of fracture	Subdural hematoma N(%)	Epidural hematoma N(%)	SAH N(%)	ICH N(%)	Subgaleal hematoma N(%)	Skull fracture N(%)	Contusion N(%)	CSF Leak N(%)	vertebral fracture N(%)
Frontal	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	1(9.1)
zygomatico maxillary complex	3(5.2)	4(4.9)	1(1.7)	2(3.4)	1(1.7)	3(5.2)	1(1.7)	1(1.7)	0(0)
Naso-orbitoethmoid (NOE)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Nasal	2(2.5)	2(2.5)	3(3.8)	1(1.3)	0(0)	3(3.8)	0(0)	1(1.3)	2(2.5)
Maxilla	1(5)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	2(10)
Palatine bone	2(25)	0(0)	1(12.5)	0(0)	0(0)	1(12.5)	0(0)	0(0)	1(12.5)
Condyle	0(0)	1(1.4)	0(0)	1(4)	0(0)	0(0)	0(0)	0(0)	0(0)
Body	1(5.26)	0(0)	0(0)	1(5.26)	0(0)	0(0)	1(5.26)	0(0)	1(5.26)
Angle	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
symphysis	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
parasymphysis	1(4.5)	1(4.5)	0(0)	1(4.5)	0(0)	1(4.5)	1(4.5)	0(0)	1(4.5)
Avulsion	0(0)	0(0)	1(14.3)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Luxation	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Crown fracture	1(5.3)	1(5.3)	0(0)	0(0)	1(5.3)	0(0)	0(0)	0(0)	0(0)
Cusp fracture	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Extrusion	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Mobility	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Intrusion	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Fracture of the alveolar process	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)

Table 4. Frequency of patients by type of injury (number of fractures: 318, number of patients: 236)

Type of fracture	Soft tissue damage			Hard tissue damage		
	Rupture N(%)	Contusion N(%)	Abrasion N(%)	Isolated F. N(%)	Multiple F. N(%)	Pan Facial F. N(%)
Frontal	6(54.5)	0(0)	2(18.2)	3(27.3)	4(37.4)	4(36.4)
zygomaticomaxillary complex	32(55.2)	0(0)	18(31)	24(41.4)	29(50)	5(8.6)
Naso-orbitoethmoid (NOE)	5(83.3)	0(0)	1(16.7)	0(0)	4(66.7)	2(33.3)
Nasal	29(36.7)	0(0)	9(11.4)	54(68.4)	18(22.8)	7(8.9)
Maxilla	15(75)	0(0)	5(40)	1(5)	10(50)	9(45)
Palatine bone	4(50)	0(0)	1(12.5)	1(12.5)	4(50)	3(37.5)
Condyle	15(60)	0(0)	2(8)	9(36)	14(56)	2(8)
Body	13(68)	0(0)	3(15.78)	5(26)	12(63)	2(10)
Angle	6(26.1)	0(0)	1(4.3)	10(43.5)	13(56.5)	0(0)
symphysis	2(33.3)	0(0)	0(0)	1(16.7)	5(83.3)	0(0)
parasymphysis	10(45)	0(0)	3(13.6)	5(22.7)	15(68.2)	2(9.1)
Avulsion	7(100)	0(0)	0(0)	2(28.6)	2(28.6)	1(14.3)
Luxation	3(60)	0(0)	2(40)	1(20)	2(40)	0(0)
Crown fracture	15(78.9)	0(0)	4(21.1)	6(31.6)	8(42.1)	3(15.8)
Cusp fracture	0(0)	0(0)	1(100)	0(0)	0(0)	0(0)
Extrusion	2(100)	0(0)	0(0)	0(0)	0(0)	0(0)
Mobility	5(83.3)	0(0)	1(16.7)	2(33.3)	3(50)	0(0)
Intrusion	0(0)	0(0)	0(0)	1(100)	0(0)	0(0)
Fracture of the alveolar process	2(40)	0(0)	0(0)	2(40)	3(60)	0(0)

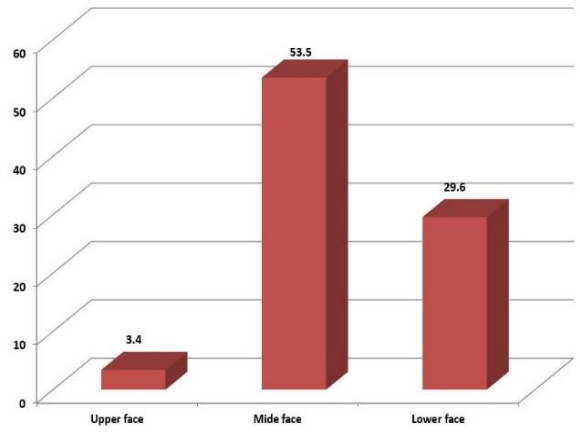

Figure 1. Frequency of patients according to the location of facial injuries

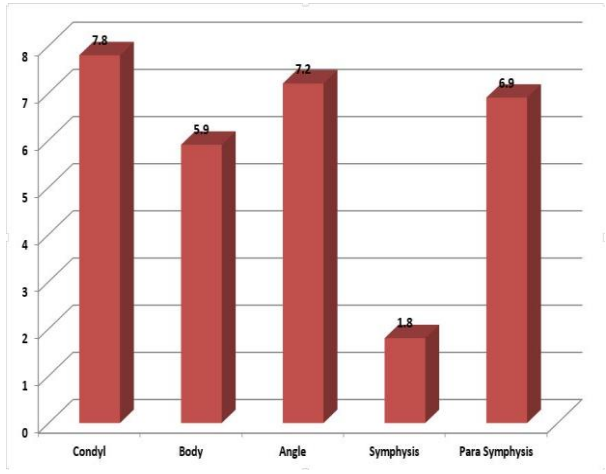

Figure 2. Frequency of patients in terms of fracture location in mandibular bone

Table 5. Frequency of fractures in patients (number of fractures: 318, number of patients: 236)

Type of fracture	Number (percent)
Frontal	11(3.4)
zygomaticomaxillary complex	58(18.2)
Naso-orbitoethmoid (NOE)	6(1.8)
Nasal	79(24.8)
Maxilla	20(6.2)
Palatine bone	8(2.5)
Mandible	95
Condyle	25(7.8)
Body	19(5.9)
Angle	23(7.2)
symphysis	6(1.8)
parasymphysis	22(6.9)
Avulsion	7(2.2)
Luxation	5(1.5)
Crown fracture	19(5.9)
Cusp fracture	1(0.3)
Extrusion	2(0.6)
Mobility	6(1.8)
Intrusion	1(0.3)

Discussion

In the present study, the incidence of fractures in males was 81.4% and in females was 18.6%, which was consistent with the frequency obtained in the study of Kazemiyan et al., conducted in Razavi Khorasan Province (14). In the study of Fakharian et al., the frequency of trauma in men and women was 71.3% and 28.7%, respectively, which was generally similar to the results obtained in the present study (15). Ansari et al. demonstrated similar results in their study (16).

In the present study, mandibular body and tooth crown fractures had a significant relationship with gender; in both cases, all patients were male, which is consistent with the results of the study by Shirinbak et al. (17). Similar results were reported in the studies of Ansari et al. (18), Adebayo et al. (19), Qing-Bin et al. (20) and Jalali et al. (21), which was consistent with our study. In this study, the highest incidence of maxillofacial fractures was associated with the cheekbones and nasal bones. Although the zygomatic bone can carry a lot of pressure, but due to its position in the lateral part of the face, it is vulnerable to blows in the anterior, posterior, lateral and horizontal directions. Interestingly, in the history of most of these patients, a history of trauma or accident was reported.

In the study of Shirinbak et al. (17), similar to our study, the highest frequency of maxillofacial fractures was related to the cheekbones. In their study, the frequency of mandibular fractures was high and, in our study, 95 people had different types of mandibular fractures. Based on evaluations, it was found that, in general, the highest incidence of fractures is related to the age range of 18-40 years. In relation to fractures such as maxilla and dental crown and luxation, the distribution of patients in the age range of 18-40 years was also statistically significant. The second and third decades are the most active period of a person's life during which people often try to earn a living and do other activities outside the house, so they are more exposed to high-risk situations such as traffic collision (21).

The results obtained in the studies of Shirinbak et al. (17), Bo et al. (22), Van Den Bergh et al. (23) and Weihsin et al. (24) also confirm the results found in the present study. The study by Kazem-Nejad et al. also examined patients in 10-year intervals, which ultimately showed the highest frequency of trauma in two age groups of 21-30 years and 31-40 years in both genders (25). However, as in the present study, due to the driving laws in most countries to observe the age requirements

for drivers, accidents are likely to play a lesser role as a cause of maxillofacial trauma at a younger age. In our study, a significant percentage of patients reported opium or alcohol use, which may be indirectly related to cases of trauma caused by road accidents as well as trauma during the fight. The results showed that the most common soft tissue injury was rupture and the most common hard tissue injury was isolated fracture.

In the study of Bali et al., the results show that most of the injuries were in the age group of 20-24 years and were due to road accidents. The mandibular bone has also been reported to be the most damaged bone (10). In another study conducted by Arangio et al., the results showed that the age group of 18 - 39 years suffered the most from maxillofacial injuries, and injuries caused by accidents were the most common factor for maxillofacial injuries. Moreover, interpersonal conflicts have been the most common cause of maxillofacial fractures in the age group of 40-59 years (11).

Another study by Roccia et al. showed that the highest rate of dental injury was associated with mandibular bone fractures, and that maxillary teeth had the highest rate of fracture and loosening (9). In their study, Manodh et al. showed that road accidents were the most common cause of maxillofacial fractures. The mandibular bone was the most damaged and most soft tissue damages were reported in the upper lip (4). In a study conducted by Hasnat et al., the results show that men constitute most victims of head and neck trauma and the most common cause of these injuries is road traffic accidents (26).

Some believe that the facial skeleton absorbs the energy of the injury and protects it from brain damage, while other studies have shown that injuries from maxillofacial trauma are severe enough to cause brain damage at the same time (27, 28). The present study showed that in both genders, the most common cause of maxillofacial fractures was traffic accidents. This finding is not unexpected because road accidents are one of the most important causes of injuries and even deaths in our country (16). After examining different types of fractures, it was found that the frequency of zygoma and mandibular angle fractures was significantly higher in accidents than other types of accidents. Similar results were reported in the study of Shirinbak et al. (17). The results of our study are consistent with the results of studies by Ansari et al. in Hamedan (18), Ferreira et al. in Portugal (29) and Bo et al. and Yue-zhong et al. in China (22, 30), Al Ahmed et al. in the United Arab Emirates (31), and Adebayo et al. in Nigeria (19), who cited accidents as the cause of most maxillofacial fractures. Unsafe, unsuitable roads, lack of highways, vehicles without safety features and violation of traffic rules can be considered as the causes of such accidents.

Due to the fact that the most common cause of maxillofacial fractures in the present study is traffic accidents, including accidents with motorcycles and other motor vehicles, strict observance of traffic rules and mandatory wearing of seat belts and helmets can decrease the incidence of maxillofacial fractures to a great extent. On the other hand, a suitable solution to reduce the rate of road accidents as well as conflicts that lead to injuries is proper education of members of society, including children in the lower grades and adults. Proper and principled training can create and shape the correct culture of driving and controlling anger. High incident rates among young people who are the most active and efficient sections of society and road accidents require serious planning. On the other hand, the role of emergency departments and their equipment cannot be neglected in reducing mortality due to trauma.

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