# Mandibular fracture trauma following the Egyptian revolution in Ain Shams University Hospital: Epidemiological study

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**Abstract**

*Mandibular fractures have shown a significant increase in number of cases in a period of the last 27 months in Egypt. This is not only as a result of Egyptian revolution and increased violence but also due to increased motorbike drivers among younger age groups. This study investigated the incidence, mode of trauma, pattern of mandibular fractures and other associated injuries at Ain Shams University Hospital, Cairo, Egypt.*

*Patients and methods: The medical records and radiographs of 196 patients having mandibular fracture and presented at Plastic and Reconstructive Surgery Department, Ain Shams University Hospital in a period of the last 27 months (from January 2010 to March 2012) were reviewed. These Patients were examined both clinically and radiologically for mandibular fractures. Patients' age, sex, smoking status, drug use, helmet use, mode of injury, site & type of the fracture & other associated injuries were recorded and assessed.*

*Results: Mandibular fractures most commonly occurred in males between 21 to 30 years of age group. The ratio of males to females was 12.6:1(174 males & 22females). Most of fractures were caused by motorcycle accidents (n=150; 76.5%) of which 92.7% were secondary to motorbike accidents (n=139), followed by occupational falls & traumas (n=33; 16.8%), violent assaults & quarrels (n=13; 6.6%). Drugs were a contributing factor at the time of injury in 3 % (n=6) of fractures. The most common site was parasymphysis (n=72; 36.7%) followed by body (n=43; 21.9%), angle (n=34; 17.3%), subcondyle (n=29; 14.8%), symphysis (n=16; 8.2%) and alveolus (n=2; 1.02%). Associated other injuries (including other maxillofacial traumas & fractures) were seen in 98% (n=192) & 2% presented as isolated mandibular fractures (n=4).*

*In conclusion, the mandibular fractures occur with high frequency in road traffic accidents (RTA) and interpersonal violence. Mandibular fractures are the most common types of facial fractures treated by the plastic surgeons and reflect trauma patterns, political and developmental status in Egypt during the last 27 months. So, it can provide a guide for prevention and management.*

**Introduction:**

The mandible occupies a very prominent and vulnerable position on the face. The incidence of mandibular fracture is twice as compared to mid facial fracture and second only to nasal fractures in frequency. Road traffic accidents (RTA), assaults, falls, sports events and pathological fracture are among the major causes.[1] The only mobile cranial bone is the mandible and is the most vulnerable to fractures. Despite the fact that it is the largest and strongest facial bone, it is the tenth most often injured bone in the body and the second most in the face.[2]

Mandibular fractures can cause a variety of impairments, including temperomandibular joint syndrome, malocclusion, poor mastication, salivary disorders, obstructive sleep apnea, and chronic pain. The first writing on mandibular fracture dates back to 1650 BC in Egypt when an Egyptian papyrus described the examination, diagnosis and treatment of them. Many patients were either not treated properly or received no treatment at all and

subsequently died.[14]

The causes and incidence of mandibular fractures vary with geographic region, socioeconomic status, culture, religion and era. To this end, independent investigators have conducted numerous studies on population groups from every continent, all with the common goal of clearing the nature of mandibular fractures regarding most common site & mode of trauma.[3]

The lack of traffic regulations including seat belt and helmet enforcements, absence of air bags in the vehicles, poor road infrastructure and drug abuse in the underdeveloped countries have been reported as leading causes of mandibular fractures.[15-17] Countries where the use of seat belt and safety helmet regulations have been made compulsory showed a decreased trend of mandibular fractures associated with RTA as compared to the past.[18,19] Mandibular fractures overwhelmingly occur in young males.[20-23]

Investigators in countries such as Jordan,[4] Singapore,[5] Nigeria,[6,7] New Zealand,[8] Denmark[9] and Japan[10] have found that motor vehicle accidents represent the most common cause of mandibular fractures in those countries, while others, in Finland,[11] Scotland[12] and Sweden[13] have reported assault as the most common etiological circumstance. There is great variability in how these findings translate in different researches. No recent study has documented the pattern of mandibular fractures in Egypt especially during the period of the Egyptian revolution.

**Patients and methods:**

The study was a retrospective chart review carried out at the Department of Plastic and Reconstructive Surgery at Ain Shams University Hospital from January 2010 to March 2012. This hospital is a tertiary care university hospital located in Cairo, Egypt.

All patients with a clinical and radiographic diagnosis of mandibular fracture were included in this study. Patients' data regarding age, sex, mode of injury, involvement of drug consumption in trauma and helmet use were collected from hospital patient records in the archives. The hospital records of 196 patients who sustained mandibular fractures were reviewed.

The data were gathered and analyzed based on age group, gender distribution, the mode of trauma, association with drug consumption, helmet use and anatomic location. The mode of trauma included road traffic accidents (RTA), interpersonal violence, occupational falls & traumas, gun shot wounds (GSW) and missiles. The data was analyzed & presented in the form of tables and charts.

**Results:**

There were 196 patients suffering from mandibular fractures from January 2010 to March 2012. 174 of them were males (88.8%) and 22 patients were females (11.2%) **Figure(1)**. Male to female (M: F) ratio was 12.6:1. The age group was ranging from 12 to 72 years with the mean age between 21 to 30 years (n=63; 32.1%), followed by 31 to 40 years (n=54; 27.6%) then 41 to 50 years (n=39; 19.9%) then 51to 60 years (n=18; 9.2%) then 12 to 20 years (n=15; 7.7%) with the lowest incidence between 61 to 72 years (n=7; 3.6%) **Figure(2)**.

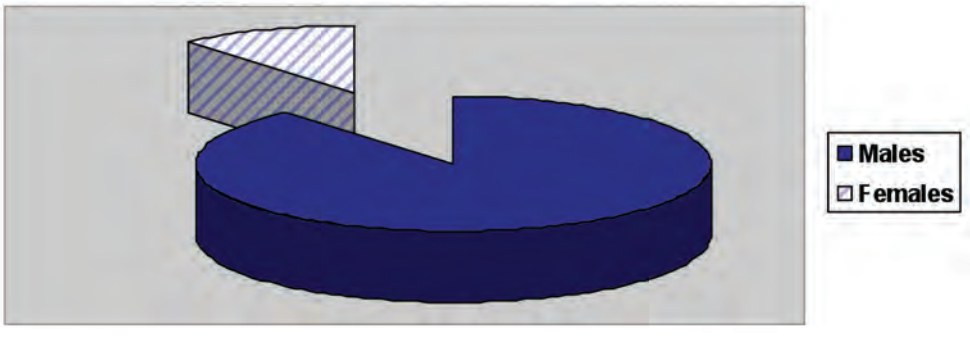


*Figure (1): Gender distribution among patients suffering from mandibular fractures.*

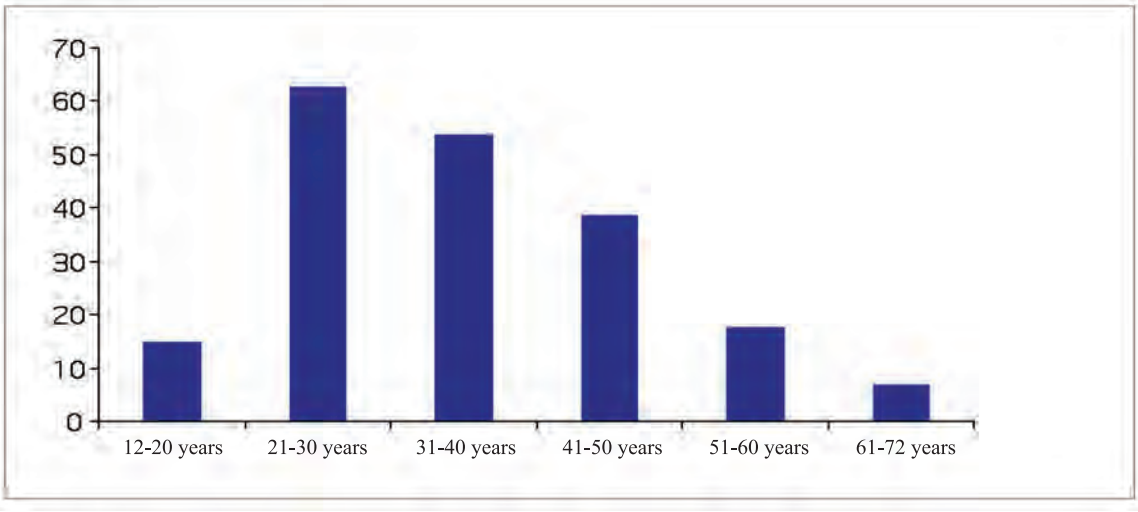


*Figure (2): Age distribution among patients suffering from mandibular fractures.*

The etiology of the mandibular fractures were as following; road traffic accidents (n=150; 76.5%) of which 92.7% were secondary to motorbike accidents (n=139), followed by occupational falls & traumas (n=33; 16.8%), violent assaults & interpersonal quarrels (n=13; 6.6%) of them 11were due to gunshot. Pathological fractures were not reported (n=0) **Figure(3)**.

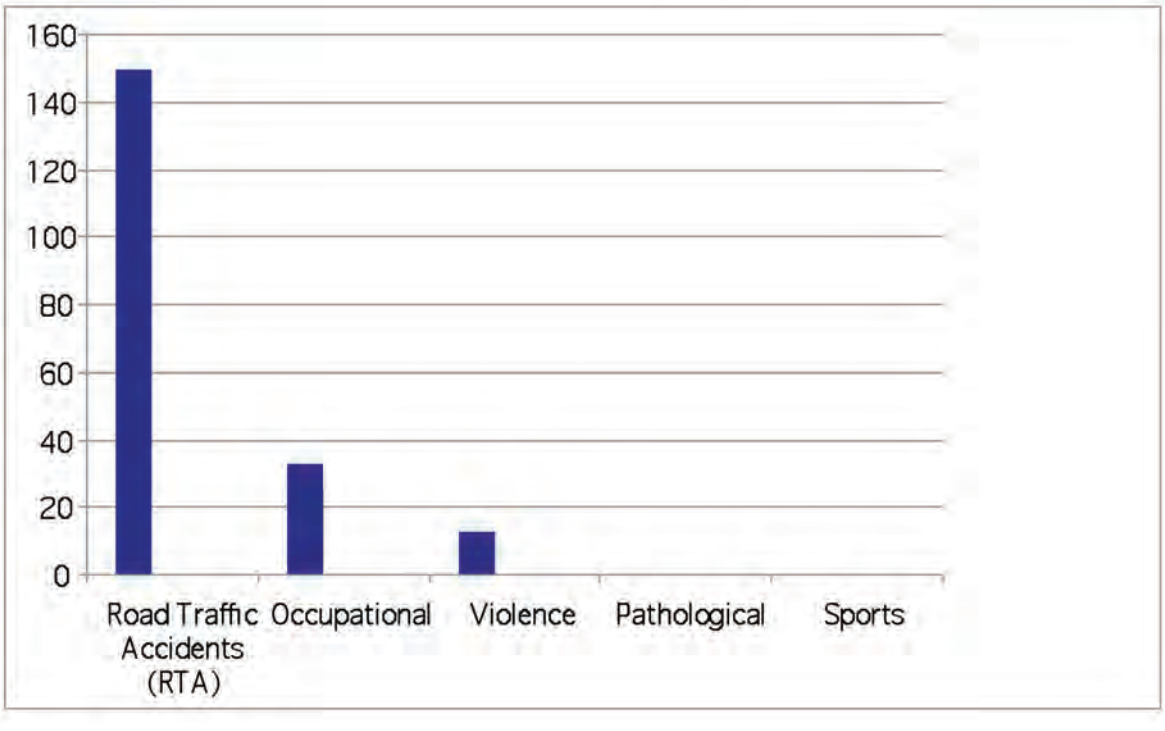


*Figure (3): Etiological factors for mandibular fractures.*

The most common site was parasymphysis (n=72; 36.7%) followed by body (n=43; 21.9%), angle (n=34; 17.3%), subcondyle (n=29; 14.8%), symphysis (n=16; 8.2%) and alveolus (n=2; 1.02%) **Figure(4)**.

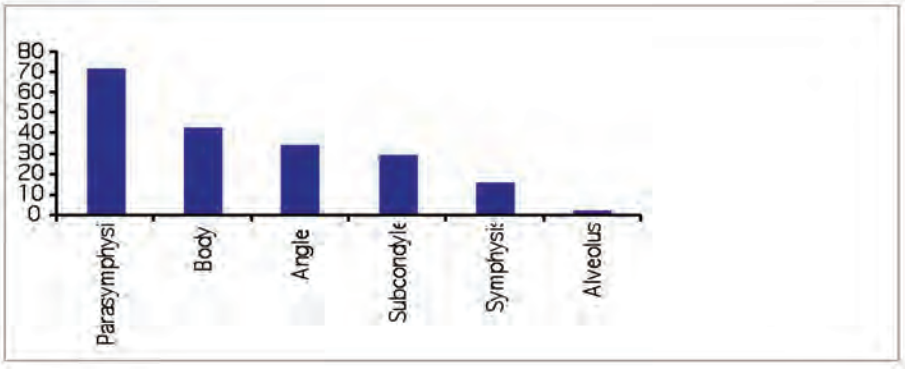


*Figure (4): Distribution of sites of mandibular fractures.*

Associated other injuries were seen in 98% (n=192) distributed as follows; maxillary fractures (n=39), zygomatic fracture (n=29), nasal bone fractures (n=12), panfacial fractures (n=7), polytraumas (with other orthopedics, chest, abdomen or neurosurgical) (n=105) & 2% presented as isolated mandibular fractures (n=4) **Figure(5)**.

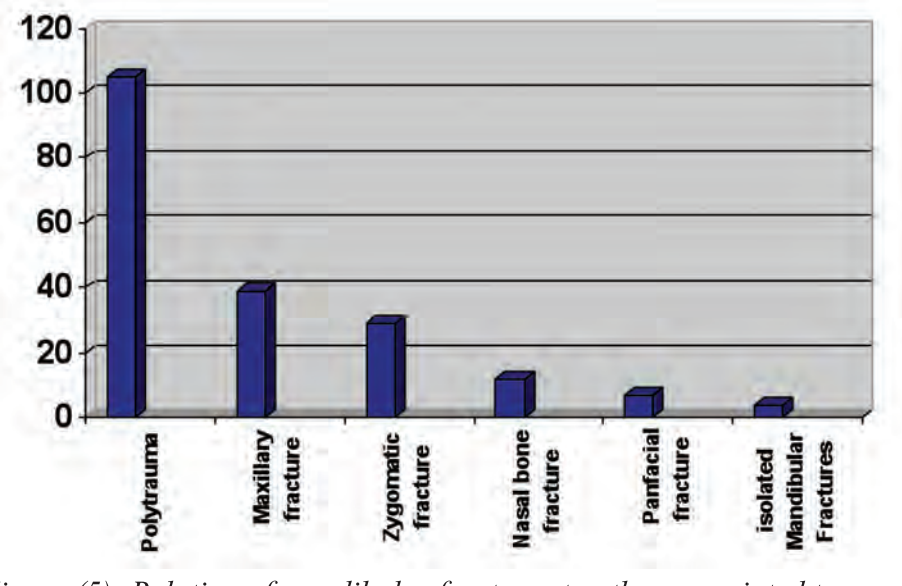


*Figure (5): Relation of mandibular fractures to other associated traumas.*

In this study, the most common mandibular fracture was parasymphsyal, secondary to RTA in the age group between 21 to 30 years with more prevalence in males and was mostly associated with other injuries.

**Discussion:**

Olson and his colleagues[24] demonstrated that vehicular accidents caused 48% of fractures. In a retrospective study, Fridrich[25] demonstrated that interpersonal violence accounted for 47% of fractures and automobile accidents for 27%. Thorn[26] reported that 156 jaw fractures (90%) in Greenland were due to interpersonal violence. Adekeye,[27] in Nigeria, reported that 76% were related to vehicular accidents.

In a large retrospective study of 137 patients with mandibular fractures, Ellis[28] reported that 43% were caused by vehicular accidents, 34% by assaults, 7% were work related, 7% occurred as the result of falls, 4% occurred in sporting accidents, and the remainder had miscellaneous causes.

Vaillant and Benoist[29] described 14 cases of gunshot injuries to the mandible. Patients were aged 6-68 years. Two children were victims of accidents, and the adults were either suicide or assault victims.

Khann et al., 2011, puplished that, the majority of victims were young adults with mean age of 20.3 years. This is in accordance with literature. This is possibly due to the fact that this age group is recognized as a phase of great personal independence, social excitement, intense mobility, careless driving on the roads, and exposure to violence. In addition, this age group represents the economically active section of society, which is more exposed to maxillofacial trauma risk factors.[30]

In Sweden, alcohol or narcotic involvement in mandibular fracture has been reported to be as high as 56%, and most of the cases associated with violence (79%) were linked to alcohol abuse. In a study conducted in Finland, 44% of mandibular fractures were associated with alcohol abuse. Investigators in Nigeria have suggested that in their region of the world, observed increases in the prevalence of mandibular fractures may be directly related to increased consumption of alcohol after annual periods of fasting.[31]

In the study reported here, alcohol wasn't associated with mandibular fractures. This discrepancy may be explained by underreporting by hospital staff. It may also suggest that the relatively strict laws governing the sale and consumption of alcohol in Egypt may be effective in preventing alcohol-related violence.

Lucas et al., 2005, showed that, there are two basic etiologies for mandible fractures. Pathological fractures are related with tumors, osteoporosis and other diseases that directly or indirectly affect the bone. Traumatic fractures are the most frequent mandible fractures and are related to traffic accidents, falls, violence, sport activities, among others. Data related with gender demonstrates male over female predominance in a rate of 4:1, which is in agreement with the literature. The age range 20 to 29 years was the most affected one, a fact that coincides with data from mandible fractures, but also from other facial bones. The predominance of male gender in the age range 20-29 years is due to the fact that this group is more prone to traffic accidents and violence, normally associated with use of alcoholic beverage.[33]

In developing countries the old aged people are economically dependent on their family. The low frequencies of very young and old age groups are due to the low activities of these age groups. The male to female ratio of 1:0.69 shows that the fracture mandible is commoner in male population in western region of Nepal. This finding is consistent with results of previous studies conducted all over the world. The relatively high number of male to female is due to the fact that males are engaged more in outdoor activities while the females are confined to indoor activities.[32]

In our present study, the main cause of mandibular fractures was road traffic accidents especially motorbike and the second cause was occupationally related traumas. This reflected the increased incidence in 21-30 years old patients especially men while the fractures of the children were almost secondary to road traffic accidents. This reflected the nature of our community. Gunshots related traumas were seen in our study which are thought to be increased in a period of 27 months following the Egyptian revolution due to increase in violence. So, the primary causes of mandibular fractures vary according to the area in which the survey was taken and the socioeconomic status of the community.

So, we hope that our study can present a guide to our community for real causes for mandibular fractures, to present tools to limit or decrease its incidence such as strict traffic regulations including seat belt and helmet enforcements, air bags in the vehicles, improving road infrastructure, limiting drug abuse among drivers and safety precautions in factories.

**Summary and conclusion:**

The mandibular fractures most commonly occur in RTA and interpersonal violence. This explains the increased incidence of mandibular fracture during the last 27 months (The Egyptian Revolution). The incidence and causes of mandibular fractures reflect trauma patterns within a wide range of social settings. Their causes often reflect shifts in trauma patterns over time. It is hoped that this study will be valuable to government agencies and health care professionals involved in planning future programs of prevention and treatment.

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