



Pattern of Mandible fracture reported in a single institute: A retrospective analysis of 1230 cases to determine causes of facial trauma and preventive strategies in Lahore Population

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Abstract

Background: Maxillofacial fractures are the most commonly reported injuries in developed as well as developing countries, among all facial bones; mandible is most commonly fractured. The pattern of mandibular bone fracture has changed drastically over the past two decades due to increase occurrence of high velocity impact. The objective of this study was to determine the pattern and causes of mandibular fractures that have reported in the Department of Surgery at Punjab Dental Hospital Lahore.

Methods: Ethical Review Committee of de'Montmorency College of Dentistry (DCD), Lahore, granted the Ethical approval for this retrospective study. Data was taken from the Department of Oral and Maxillofacial Surgery of de'Montmorency College of Dentistry/ Punjab Dental Hospital (DCD/PDH) by using secondary data of indoor register from January 2017 to December 2020. Record which met our inclusion criteria was included in this study and record having incomplete data was excluded. A total of 1230 cases were entered in SPSS version 21 to determine descriptive statistic of the data. Percentages and frequencies of variables like gender, site of fracture and causes of fracture were calculated.

Results: Our study included 1230 patients out of which 873 were males and 357 were females. The most affected age group was the fourth decade of life (38.1%) and the major etiological factor was road traffic accident (RTA) which led to fractures in 1067 patients (86.7%). Para-symphysis and symphysis was the most commonly affected area comprising of 36.2% of all fractures. The second most common site was condyle (23.9%). Least commonly fractured site was coronoid process of the mandible.

Conclusion: Cause of majority of mandible fractures is RTA and most commonly affected anatomical site were Para-symphysis and Symphysis.

Keywords: Facial fracture, mandible fracture, road traffic accident, prevention of facial trauma

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Introduction

Maxillofacial fractures are the most commonly reported injuries in developed as well as developing countries (1). Among the

etiological factors, the most common being assaults and interpersonal violence in developed countries followed by falls, sports injuries and road traffic accidents (2). In

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contrast to this, the most common cause of fractures in developing countries is road traffic accidents. This could be due to various factors including use of motorbikes in developing world, seat belt and speeding legislations, overloading of a vehicle, use of a safety helmet, fatigue and alcoholism (3). Most of the people involved in maxillofacial injuries are in the third and fourth decade of their lives (4).

Among all facial bones, mandible is most commonly fractured (5). The pattern of mandibular bone fracture has changed drastically over the past two decades due to increase occurrence of high velocity impact. While simple and unilateral fractures were more common before, with high velocity trauma, there is increase in multiple fractures of a single bone along with comminution of a fractured bone in various segments. In this article, we determined the pattern and causes of mandibular fractures that have reported in our department (6).

Methodology

Ethical Review Committee of de'Montmorency College of Dentistry (DCD), Lahore, granted the Ethical approval for this retrospective study. Secondary data was taken from the indoor record register of the Department of Oral and Maxillofacial Surgery of de'Montmorency College of Dentistry/ Punjab Dental Hospital (DCD/PDH) from January 2017 to December 2020. Inclusion criteria of this study were patients of any age and gender with fracture of mandible. We excluded patients with iatrogenic fractures and patients where in records, radiographs were not available. Gender was categorized as male and female. Cause of the fracture was categorized as road traffic accident, falls, interpersonal violence, sports, pathological and other. Site of the fracture was condyle, coronoid, angle, ramus, body, dentoalveolar, symphysis and para-symphysis and Unspecified. Record which met our inclusion criteria was included in this study and record having incomplete data was excluded. Record of 1230 cases was entered in SPSS version 21 to determine descriptive statistic of the data. Percentages and frequencies of variables like gender, site of fracture and cause of fracture were calculated.

Results

Our study included 1230 patients out of which 873 were males and 357 were females. The most affected age group was the fourth decade of life (38.1%), followed by third decade with 20.8% [Table 1].

Table 1. Gender Distribution of mandibular fracture among 1230 individuals

Variable	Frequency	Percentages
Gender- Distribution of fractures across gender		
Male	873	70.97
Female	357	29.03
Total	1230	100

Table 2. Age Distribution of the mandibular fracture among 1230 individuals

Age- Distribution of fractures across age groups		
0-10	69	5.6%
11-20	123	10%
21-30	257	20.8%
31-40	469	38.1%
41-50	171	13.9%
51-60	96	3.4%
61-70	42	3.4%
>70	3	0.24%
Total	1230	100

Table 3. Pattern and causes of mandibular fracture among 1230 individuals

Sr No	Variable	Frequency	Percentages
1	Site		
	Condyle	295	23.9%
	Coronoid	8	0.65%
	Ramus	25	2.03%
	Angle	123	10%
	Dento-alveolar	30	2.4%
	Body	283	23%
	Symphysis and para-symphysis	446	36.2%
	Unspecified	20	1.62%
Total	1230	100	
2	Etiology		
	Road traffic accident	1067	86.7%
	Falls	94	7.64%
	Interpersonal violence	68	5.5%
	Sports	0	0
	Pathological	1	0.08%
	Total	1230	100

The major etiological factor was road traffic accident which led to fractures in 1067 patients (86.7%). The second etiological factor was falls, which affected 94 patients (7.64%) followed by interpersonal violence including gun-shot wound affecting 68 patients (5.5%).

Only one patient was reported to have a pathological fracture due to osteoradionecrosis. Para-symphysis and symphysis were the most commonly affected area comprising of 36.2% of all fractures [Table 3]

Discussion

The major etiology for facial fractures vary according to the geographical location. The regions where there is inadequate legislation and in areas of terrorism, the major cause is assault including gun shot, interpersonal violence and bomb blast injuries (6). However, in the majority regions of the world the leading cause of trauma is road traffic accidents. Among RTA, two wheeled motorbikes are major culprit in developing countries as opposed to developed countries which is consistent with our study (7).

Trauma is recognized as a separate and a very significant entity worldwide. According to the American college of Surgeons, there are five levels of trauma centers based on various factors, including number of patients given admission per year, contribution in research and teaching and on available resources. There are 1154 recognized trauma centers in USA with 190 level I centers (8). In China, a three level classification system for trauma facilities was developed since 1970s which is constantly been upgraded as per the demands of their country (9). Similarly there are 110 level I trauma centers in Germany as well (10).

In Pakistan, there is no designated trauma center available with no classification system in place. We have a range of private and public emergency services available including the 1122 rescue team provided by Punjab government. Similarly various non-profit organizations provide a wide network of ambulance services (11). But most of the rescue workers in Pakistan do not have an international level certification in Advance Trauma Life Support. In Punjab, which is the most populated province of Pakistan, there are 23 teaching hospitals, 34 DHQs and 88 THQs but most of these facilities lack the basic required equipment and trained personals for management of trauma (12).

As Pakistan is a growing economy, there has been a drastic increase in urbanization with increase in number of registered vehicles. According to the Gallup survey conducted in 2015, there has been 439% increase of two wheeled motor vehicles, 413% increase in three wheeled vehicles and 114% increase in cars (13). With this ever increasing load on the roads, there is an increased need for not only development but also

vigorous implementation of traffic rules as their violations are a major cause of road traffic accidents. The four most significant factors in traffic rules violations include, awareness, education, enforcement and engineering. According to this study conducted by Shabbir et al, it was highlighted that there is a need to not only implement traffic laws vigorously but also to provide the drivers with knowledge regarding traffic laws (14).

Tabish Hussain et al conducted a survey to determine knowledge about traffic legislation and attitudes of citizen such as drivers, passengers, and pedestrian in Islamabad and reported that deficient Road-Safety Awareness was at top (27%) followed by wrong use/no use of seatbelts/helmets (21%) and legislative aspects were 17% including under-age driving, vehicles without fitness and license problems exploring the bitter hidden truths. They further narrated actions areas for preventing Road Traffic Accidents(RTAs) such as interventions to improve road-safety education, identification of safety measures for traffic black-spots, enforcement of seatbelt/helmet laws and the development of highway ordinances (15). Ahmed et al. also reported RTA a major cause of facial trauma about 53.1% and mandibular fracture around 59.4% in their study (16). Another author reported mandible a major site of fracture 49.5% and RTA 58.4 % a major cause in Lahore population (17). Cheema and Amin also reported the commonest cause to be RTA (54%) and major site mandible (67%) in 702 individuals who reported in Mayo Hospital during period of 2001-2002 (18). Another author conducted a study in Taiwan on a large data of 6013 cases and found that RTA is the major reason of facial fracture around 55.2%. However instead of mandible most common site was maxilla (19). Another author reported RTA 37.26% a major cause among pediatric population in Lahore and mandible as a major site 46% (20). Similar report shows data from Lahore with RTA as a major cause of mandible fracture (56%) on Para-symphysis area (21). Another author reported RTA 64.7% a major cause of facial trauma in Peshawar and mandible as a major site around 69.1%. Body of the mandible was the major anatomical site around 30.3% (22). Safety measures such as helmet is established preventive tool for craniofacial trauma across the globe (23).

The second major cause after RTA is falls. According to WHO, it is a major public health problem that affects the extremes of age. In our study, pediatric patients are

affected more than any other age group highlighting that low socioeconomic status along with overcrowding of the houses are the key factors leading to these injuries. Majority of our patients had accidental falls which has been associated with rural areas (24, 26). The third important cause of maxillofacial trauma is assault and gunshot violence. According to a survey, the rate of private guns owned in Pakistan is 11.62 per 100 people, out of which only 4.37 guns out of 100 people are licensed (25). As already stated, the rural health centers are not equipped with the facilities to manage these cases on their own which leads to increase referral to urban hospitals.

Conclusion

Trauma makes up the major load in a surgical setting. About 58.9 % people reported were belonging to age group 20 to 40 year and most of them were male about 70.97%. Most common cause of mandible fractures was RTA and most commonly affected anatomical sites were Para-symphysis and Symphysis.

Recommendations to reduce the incidence of trauma

Appropriate measures should be taken to reduce this load. As Pakistan is a developing country and requires extensive work in the field of trauma management, following are some suggestions that can help reduce the burden on the healthcare system:

1. Management starts with prevention. Careful evaluation should be done of the number of vehicles being released on the roads. Two wheeled motorbikes surely are cheaper and a requirement in a developing country like Pakistan where owing cars is expensive and public transport is inadequate. Separate lanes can be provided for two and three wheeled motors on all boulevards. The use of helmets by the drivers has been made mandatory but it requires careful quality control at the manufacturing levels along with mandatory helmets for rest of the passengers on the vehicles.
2. Over-crowding of all vehicles must be strictly prohibited.
3. Speed limits are usually designated for heavy traffics and for cars only. Separate speeding limits should be in place for motor bikes as well.
4. Awareness campaigns for traffic regulations must be conducted at regular intervals.
5. Better legislation regarding construction safety should be implemented in rural areas.

6. The production, sale and licensing of weapons should be kept in check.
7. Basic trauma units with equipment and staff trained in advanced trauma life support should be provided at district levels.
8. Careful and regular evaluation of steps taken in order to keep it up to date.

Funding

This research did not receive any specific grant from any funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

Authors of this research don't have any conflict of interest.

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