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Pattern Of Maxillofacial Fractures In Combined Military Hospital, Peshawar

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ABSTRACT

Objectives: To determine the various patterns of maxillofacial fractures in patients presenting at CMH, Peshawar
Study Design: Cross-sectional study
Place and Duration of Study: 30-Military Dental Center, CMH, Peshawar Pakistan, from Sep 2021 to Mar 2022.
Methodology: A total of 207 patients from all age groups, both genders, presenting with any features of maxillofacial fracture due to accidental injuries were included. A thorough history and clinical and radiographic examination were carried out, along with a diagnosis of suspected facial fractures per clinical presentation and radiographic assessment.
Results: The different accidental injuries found in this study were as follows; 127(61.35%) road traffic accidents, 45(21.74%) falls, 13(6.28%) assaults, 16(7.73%) sports injuries and 6(2.90%) gunshot wounds. The different bones involved were 38(18.36%) injuries of the frontal bone, 48(23.19%) in the maxilla, 42(20.29%) in nasal, (14.01%) in NOE, 110(53.14%) in zygoma and 122(58.94%) injuries included mandible bone.
Conclusion: Roadside accidents are the most common aetiology of maxillofacial fracture, and the mandible is the most commonly involved bone in such fracture.

Keywords: Accidental Injuries, Maxillofacial Injuries, Traffic Accidents, Non-penetrating wounds, Mandible.

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INTRODUCTION

Facial fracture results in injuries to hard tissues, including the skeletal components, dentition as well as soft tissues.[1] The most typical reason for maxillofacial injuries is fracture. Fracture to the maxillofacial region results in injuries to the skeleton, teeth, and soft tissues of the face. Maxillofacial injuries are becoming more common and severe, and this can be attributed to the population's growing socioeconomic activity and significant reliance on road transportation.[2,3] Throughout the past three decades, there have been numerous changes in the aetiology of maxillofacial fracture, and these changes are still occurring. It differs by socioeconomic level, cultural traits, different age groups, different geographical locations, and other factors.[4]

The patterns of maxillofacial fracture frequently vary geographically, socially and environmentally as well. Road traffic accidents are the most frequent causes of facial injuries in developing countries like Pakistan, in contrast to interpersonal violence being the major contributor in developed countries.[5,6]

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As a result of maxillofacial fracture, a variety of morbidities, including salivary diseases, malocclusion, soft tissue infections, temporomandibular joint dysfunction, and osteomyelitis, may be brought on by maxillofacial fractures.[7,8] In addition to morbidities, many injuries have considerable cost repercussions due to hospital stays, surgical procedures, etc. Road traffic accidents, domestic violence, sports injuries, falls, and industrial injuries are some of the aetiologies of MFTs on a global scale, listed in decreasing order of incidence.[9,10]

Because of airway blockage or bleeding, facial damage may be fatal. Long-term functional issues could develop, including damage to key sensory organs involved in vision, smell, hearing, and taste.

Seeing the varied presentation of fracture across the globe and the scarcity of any local data, we conducted this study to determine the patterns of maxillofacial fracture in local clinical settings. The aim was to identify the frequency of the local causes of the injuries and better management options. The results can enable the concerned authorities to know the target vulnerable population, better formulate the awareness strategies for prevention, and properly train and equip the local maxillofacial centres to cater to their healthcare needs.

METHODOLOGY

The cross-sectional study was conducted at the 30-Military Dental Center, Combined Military Hospital, Peshawar, Pakistan from September 2021 to March 2022, after approval from Institutional Review Board (Reference number: MDC/Trg/02). Using the WHO Sample size calculator, the sample size was calculated keeping the prevalence of maxillofacial fractures due to assault injury at 15.1%.[11] The non-probability consecutive sampling technique was used.

Inclusion Criteria: All adult patients aged more than 18 years, of either gender, presenting with any clinical or radiographical features of maxillofacial fracture due to any accidental injury were included.

Exclusion Criteria: All patients previously treated with pathological fractures, mal-united fractures or fractures more than three weeks old were excluded.

Baseline clinical and demographic data was collected from all the patients meeting the inclusion criteria. Informed consent was obtained from the patients to participate in the study voluntarily.

Thorough history and clinical and radiographic examinations were carried out for all the participants. Suspected facial fractures were diagnosed based on clinical presentation and radiographic assessment. Radiographs such as OPG and advanced imaging techniques like Computed Tomography (CT) Scan were used. Data was collected on specially designed Performa. The associated head injuries, along with GCS, were documented. The mechanism and timings of the injury were elaborated, followed by stratification for the injury caused to the bones, muscles or nerves. The gravity of the soft tissue injuries was also clearly documented.

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The p-value of ≤0.05 was set as the cut-off value for significance.

RESULTS

There were 207 participants included in this study. The mean age was 48.07±12.95 years, with an age range of 20 to 70 years. The mean body mass index was 29.13±3.35 kg/m2, with 137(66.18%) participants having a BMI of more than 27 kg/m2. There were 132(63.77%) participants from rural areas; 52(25.12%) were hypertensive, and 56(27.05%) had diabetes mellitus. In this study, we found that RTA was the most common type of accidental injury occurring amongst 127(61.35%) participants, as shown in Figure-1.

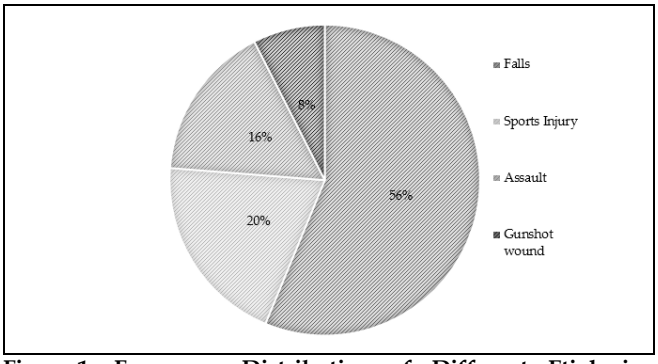

Figure-1: Frequency Distribution of Different Etiologies Resulting in Maxillofacial Fracture in Patients Undergoing Accidental injuries (n=207)

There were 668 fractures among 207 participants, with an average of 3.23±1.2 fractures per participant. The type of bone involved is shown in Figure-2.

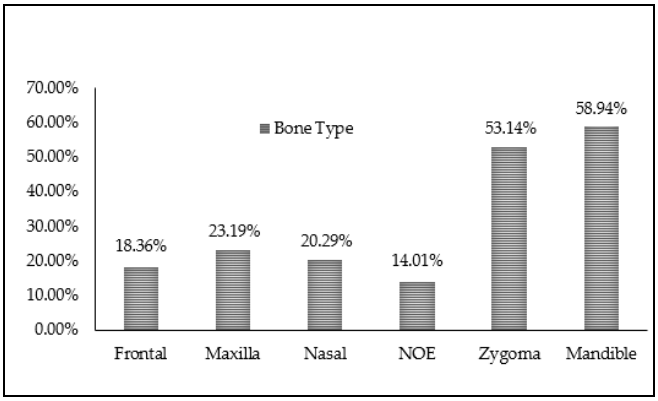

Figure-2: Frequency Distribution of Types of Bones Fractured in Maxillofacial Fracture (n=207)

The type of bone fracture was compared with aetiology, and it was revealed that frontal bone fractures occurred more due to road traffic accidents and falls (p=0.003), zygoma bone fractures occurred more commonly due to road traffic accidents (p=0.007), NOE bone fractures were also more common in road traffic accidents and assault (p=0.004). Similarly, mandible fractures were also more common in road traffic accidents and fall injuries (p=0.026), as shown in Table-II. The association of

Table-I: Association of Etiology with Type of Bone Fractured (n=207)

Fractured Bone	Etiology					*p*
	RTA	Fall	Assault	Sports	Gunshot	
Maxilla (n=48)	30(62.5%)	13(27.1%)	1(2.1%)	3(6.3%)	1(2.1%)	0.573
Frontal (n=38)	21(55.3%)	16(42.1%)	0(0%)	0(0%)	1(2.6%)	0.003
Zygoma (n=110)	59(53.6%)	23(20.9%)	12(10.9%)	11(10.0%)	5(4.5%)	0.007
Nasoorbitoethmoidal (NOE) complex (n=29)	24(82.8%)	0(0%)	4(13.8%)	0(0%)	1(3.4%)	0.004
Nasal (n=42)	24(57.1%)	10(23.8%)	2(4.8%)	3(7.1%)	3(7.1%)	0.441
Mandible (n=122)	81(66.4%)	26(21.3%)	9(7.4%)	4(3.3%)	2(1.6%)	0.026

Table-II: Association of Etiology with Baseline Demographic and Clinical Variables (n=207)

Characteristics		Etiology					*p*
		RTA (n=127)	Fall (n=45)	Assault (n=13)	Sports (n=16)	Gunshot (n=6)	
Age	20-50 yrs	90(70.9%)	29(64.4%)	11(84.6%)	9(56.3%)	6(100.0%)	0.196
	51-80 yrs	37(29.1%)	16(35.6%)	2(15.4%)	7(43.8%)	0(0.0%)	
Gender	Male	48(37.8%)	11(24.4%)	2(15.4%)	4(25.0%)	4(66.7%)	0.087
	Female	79(62.2%)	34(75.6%)	11(84.6%)	12(75.0%)	2(33.3%)	
Body MassIndex	≤27kg/m2	48(37.8%)	2(4.4%)	6(46.2%)	9(56.3%)	5(83.3%)	<0.001
	>27kg/m2	79(62.2%)	43(95.6%)	7(53.8%)	7(43.8%)	1(16.7%)	
Residence	Rural	58(45.7%)	11(24.4%)	2(15.4%)	3(18.8%)	1(16.7%)	0.011
	Urban	69(54.3%)	34(75.6%)	11(84.6%)	13(81.3%)	5(83.3%)	
Fractures	≤3	59(46.5%)	28(62.2%)	13(100%)	16(100%)	6(100%)	<0.001
	>3	68(53.5%)	17(37.8%)	0(0%)	0(0%)	0(0%)	

aetiology with respect to age, gender, BMI and place of living is given in Table-III.

DISCUSSION

Maxillofacial fractures are more predominant in big cities due to heavy traffic and high violence rates. From 2012 to 2016, in a retrospective investigation carried out by Wusiman *et al*. at various Xinjiang hospitals. They found that among the 2492 maxillofacial fracture patients examined in 1981. The largest category in both genders was those between the ages of 21 and 30. Traffic accidents accounted for 41.8% of the fracture cases and were the most frequent aetiology. The most typical location for fractures was the zygoma 25(3%), followed by the mandible 31(97%).[11] In a study conducted by Kanala *et al*.[12] retrospective analysis was performed on the data of 1,112 patients who were sent to our oral and maxillofacial unit in Andhra Pradesh, India, between February 2008 and October 2017. It was concluded that RTAs were the primary reason for maxillofacial injuries among patients who came to our hospital. The most frequent type of fracture, accounting for nearly half of cases, was mandibular fractures. Open reduction and internal fixation treated more than half (55%) of all maxillofacial fractures. The huge number of poorly maintained, overloaded automobiles on unfit roads, traffic law violations (especially by inexperienced young drivers), abuse of alcohol or other intoxicants, and some drivers' sociocultural behaviours may all contribute to this high frequency. A study conducted by Abhinav *et al*.[13] concluded that lower face (mandibular) fractures comprised 64% of the 944 individuals with maxillofacial injuries, followed by the isolated midface fractures (19%). The most frequent cause of fracture was automobile accidents. Maxillofacial injuries' genesis and pattern reflect community fracture patterns, and they might serve as a guide for creating programmes for prevention and treatment. In an Irani study conducted by Rezaei *et al*. 14 skeletal fractures occurred in 631 individuals. The leading cause of fracture 74(8%) was a motor vehicle collision, followed by an attack 13(2%) and a fall 8(3%). The most frequent injury was a nasal fracture 45(5%), which was followed by a mandibular (29%) and zygomatic (24.9) fracture. The most frequent related fracture was to the central nervous system. Open reduction and stiff internal fixation were used to reduce 72% of mandibular fractures, 87% of maxillary fractures, and 84.8% of zygomatic fractures.[14]

Similar sort of results have been reported by Al-Hassani *et al*.[15] Emodi *et al*.[16] and Namis *et al*. in Saudia Arabi, 17 where it is concluded that RTA was the major contributing factor in the pathogenesis of oral and maxillofacial face injuries and mandibular fractures predominated over other types of maxillofacial fractures. As a result, traffic laws should be properly followed. In a study by Roccia *et al*.,[18] car

accidents were the most frequent cause of injury (62.6%). The middle part of the craniofacial skeleton was fractured in more than half of the individuals. In 172(45.5%) individuals, some injuries were also present. 5.3% of patients overall declined surgery. On average, 7.3 days were spent in the hospital. According to this study, there has been a significant decline in maxillofacial fractures following auto accidents since the turn of the millennium. The implementation of road safety measures over the past 30 years has changed how drivers and motorcyclists behave, at least in north-western Italy. Sinha *et al*.[19] found maxillofacial fracture due to road traffic accidents and reported that Motorcycle accidents were the primary etiological reasons for RTA. The lower third of the face was the most damaged anatomically. The most often afflicted region in MFIs was the para symphysis, while mandibular fractures were the most common solitary fractures. The mainstay of the investigation was computed tomography with 3D reconstruction. The most frequent soft tissue injury among RTA patients was laceration.

CONCLUSION

This study concluded that roadside accidents are the most common aetiology, and the mandible is the most commonly involved bone in maxillofacial fracture patients. Therefore, we recommend that proper evaluation and management of maxillofacial fracture should be done in order to decrease the morbidity of these particular patients. It is also recommended to implement awareness strategies for prevention, training of staff, and adequately equipping the local maxillofacial centres to provide healthcare needs.

Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

FNK & ZA: Conception, study design, drafting the manuscript, approval of the final version to be published.

SJ & MA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

MRA & SS: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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