https://doi.org/10.29309/TPMJ/2026.33.04.9873 www.theprofesional.com

ORIGINAL ARTICLE

Clinical trends in maxillofacial trauma: A retrospective hospital-based study.

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ABSTRACT... Objective: To analyze trends in the management of maxillofacial fractures at a tertiary care hospital and identify demographic patterns to guide preventive strategies. **Study Design:** Retrospective observational study. **Setting:** Department of Oral and Maxillofacial Surgery, BAMDC. **Period:** March to December 2023. **Methods:** Data from 142 patients who underwent surgical management for maxillofacial fractures were analyzed. Information on demographics, etiology, fracture location, and treatment modality was recorded using a standardized form. Statistical analysis was conducted using SPSS v22.0, with $p \leq 0.05$ considered significant. **Results:** The majority of patients were male (83.8%) with a mean age of 26.3 years. Road traffic accidents were the most common cause (51.5%), followed by sports injuries (21.1%), falls (19%), and interpersonal violence (8.4%). Mandibular fractures were most frequent (57.7%), followed by zygomatic complex (50.7%) and maxillary fractures (21.8%). Open reduction and internal fixation with intermaxillary fixation was the most used treatment (58.5%). A significant association was found between age groups and the incidence of mandibular versus mid-facial fractures ($p = 0.0006$). **Conclusion:** Young males are most affected by maxillofacial fractures, primarily due to road traffic accidents. Targeted preventive measures for high-risk groups are crucial for reducing incidence and improving outcomes.

Key words: Mandibular Fractures, Maxillofacial Fractures, Maxillary Fracture, Maxillofacial Surgery, Road Traffic Accidents, Trauma.

Article Citation: Pervez J, Ahmad M, Saleem S, Niazi H, Shaf ul Hassan, Khan A. Clinical trends in maxillofacial trauma: A retrospective hospital-based study. Professional Med J 2026; 33(04):611-614. https://doi.org/10.29309/TPMJ/2026.33.04.9873

INTRODUCTION

Maxillofacial trauma results from physical injury to the facial region and may involve damage to soft tissues, bony structures, or both.[1] Maxillofacial fractures represent a set of traumatic injuries, affecting the facial skeletal region[2] and often leading to complex clinical challenges. These fractures can result from various causes, including vehicle accidents, assaults, falls, and sports-related activities.[3] Road traffic accidents represent the primary cause of maxillofacial fractures in low- and middle-income countries.[4] the etiology and types of maxillofacial injuries vary among different countries, depending upon cultural, social and economic variables.[5] Other causes of maxillofacial injuries include physical assaults[6], which can result from interpersonal violence or criminal activities; sports-related injuries[7], which are common in contact sports and activities with a high risk of impact; and injuries sustained during civilian warfare[8], where conflict zones expose individuals to blunt force trauma or penetrating injuries from explosions or projectiles.

These injuries not only cause physical pain and functional impairment but also have profound psychosocial impacts on affected individuals.[9] Despite advances in safety measures and trauma care, the burden of maxillofacial fractures remains substantial. The incidence of these fractures continues to increase[10] worldwide and it varies widely across different populations, influenced by factors such as age, gender, geography, and socio-economic status. Recognizing the incidence of maxillofacial fractures is essential for maxillofacial surgeons, healthcare professionals, public health authorities, and policymakers to formulate effective prevention strategies and ensure appropriate resource allocation. The incidence rate of maxillofacial fractures underscores the importance of targeted interventions. For instance, young males, particularly those involved in high-risk activities, show a higher predisposition to such

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Article received on: 31/05/2025
Date of revision: 30/07/2025
Accepted for publication: 18/08/2025

injuries, necessitating tailored preventive measures. Similarly, the elderly population, increasingly susceptible to falls, requires specific strategies to mitigate risks and enhance safety.

The objective of this article is to provide the incidence of maxillofacial fractures, exploring demographic trends, etiology, and the treatment modality. By evaluating the retrospective epidemiological data, we could understand the patterns and determinants of these injuries, ultimately contributing to more effective prevention and management strategies.

METHODS

This is retrospective study was conducted at department of oral and Maxillofacial surgery, Bakhtawar amin dental college & hospital Multan from march 2023 to dec 2023. The WHO sample size calculator was employed to estimate a minimum sample size of 136 participants. with 95% confidence level, 7% margin of error, and by taking 26.3 % frequency in a study by Ozkaya et al.[11]

Inclusion Criteria

Patients with any age of male or female gender who had fracture or traumatic injuries to maxillofacial region, were operated in Maxillo-facial department.

Exclusion Criteria

Patient who refused treatment were excluded from the study

Ethical approval was obtained from the ethical review board (90/23/COD-26-01-23). After taking Informed consent, A total of n=142 patients operated in the maxillofacial department of Bakhtawar Amin Dental Hospital Multan requiring surgery were enrolled. Non-probability sampling technique was used. Patient demographics, including age, sex, and cause of injury, were recorded using a standardized data collection form. Thorough intraoral and extraoral clinical examinations were conducted, along with a detailed patient history. Data were analyzed using SPSS version 22.0. categorical variables i.e. trauma cause, type of fractures and treatment provided were shown as frequency and percentage. A p-value of ≤0.05 was taken as significant

RESULTS

This retrospective research contained a total number of n=142 patients operated at the Maxillofacial trauma centre from Jan 2021 to dec 2023. The patients included in the sample had a mean age of 26.3±13.9 years, ranging from 02–63 years. There were 83.8% (n=119) male and 16.2% (n=23) female patients in the sample Table-I. The results showed that Road Traffic Accidents were the major cause of trauma 73 (51.5%), followed by sports injuries 30(21.1%), falls 27(19%) and altercations 12 (8.4%) Table-I. Most common bone of head and neck region involved in fractures was Mandible 82(57.7%) followed by Zygomatic Complex 72(50.7%), Maxilla 31 (21.8%), Naso-orbito-ethmoid complex 22(15.4%), Ethmoid bone 16 (11.2%) and frontal bone 5(3.5%) Table-I Variety of treatment options were provided at the hospital out of which most common was Open Reduction and Internal Fixation along with Inter-maxillary fixation 83 (58.5%) while other options were ORIF 28 (19.7%), fixation with wires 22 (15.5%), ORIF with mesh plates 6(4.2%) and Arch bars with elastics 3(2.1%) Table-I Samples were divided into two age groups. First group contained individuals from age 2 to 32 while the second group contained individuals aged 33 to 63. Frequencies of each bone fracture for the respective groups were calculated and Chi Square test was performed which showed a p-value of 0.0006 which is found to be significant Table-II. This grouping also revealed that older age group had more incidence of mid face fractures while younger age group had more incidence of mandible fractures.

DISCUSSION

A study conducted in Saudi Arabia[12] identified road traffic accidents as the primary cause of maxillofacial fractures. The high occurrence of these fractures in developing countries is linked to various factors, such as unclear traffic regulations, the use of unapproved or uninspected vehicles, and insufficient road lighting and signage. In one study[13] there were 1,399 fractures in 1,112 patients, Nearly half of them(47%) were mandibular fractures, whereas cranial and orbital bone fractures represented a mere 1% of all cases. In another study[14] The incidence of trauma was highest during the mon12` oon season, comprising 43% of cases (n = 7,927). Road traffic accidents were the

primary cause, contributing to 40% of cases (n = 4,510). Mandibular fractures were the most common type of facial injury, representing 41% of cases (n = 1,821). Fractures of the alveolar process account for 2-8% of all craniofacial injuries.[15] Additionally, the severity of these fractures often escalates when soft tissues and teeth are also involved.

TABLE-I

Frequency table showing gender, cause of fracture, treatment provided and anatomical location of fracture of all individuals included in the study.

	Frequency	Percentage %
Gender		
Male	119	83.8
Female	23	16.2
Cause of fracture		
Fall	27	19
Road Traffic Accident	73	51.5
Altercations	12	8.4
Sports Injuries	30	21.1
Treatment provided		
Open reduction internal fixation	28	19.7
Open reduction internal fixation with Intermaxillary fixation	83	58.5
Fixation with wires	22	15.5
Arch bars with elastics	3	2.1
Open reduction internal fixation with mesh plates	6	4.2
Anatomical location of fracture		
Mandible	82	57.7
Maxilla	31	21.8
Zygomatic complex	72	50.7
NOE complex	22	15.4
Ethmoid bone	16	11.2
Fron5274tal bone	5	3.5

Another study[16] concluded that zygomatic complex fractures were predominantly caused by road traffic accidents (RTAs), which are especially prevalent in this region.

Among the patients examined, 75% sustained injuries from RTAs, 31% from violent assaults, 33% from falls, and 7% from sports-related incidents. Previous research[17] has similarly identified traffic accidents as the leading cause of maxillofacial fractures.

This article will delve into the geographical disparities in maxillofacial fracture incidence, highlighting the impact of regional differences in traffic regulations, healthcare access, and socio-economic conditions. Such insights are critical for designing region-specific policies and improving global trauma care standards. In conclusion, a thorough understanding of the incidence and underlying factors of maxillofacial fractures is essential for advancing trauma care and prevention efforts. By addressing the diverse factors influencing these injuries, healthcare systems can better prepare to reduce their occurrence and improve outcomes for those affected.

CONCLUSION

This study concludes that road traffic accidents are the leading cause of maxillofacial fractures, especially among young males, with mandibular fractures occurring most frequently. Significant age-related variations were observed, with younger individuals more prone to mandibular fractures and older individuals to mid-face fractures. The most common treatment was open reduction and internal fixation with inter-maxillary fixation. These findings highlight the need for targeted prevention strategies, focusing on high-risk groups like young males and the elderly, alongside improved public awareness and road safety measures to reduce trauma incidence.

TABLE-II

Comparison of type of fractures among age groups

Age Groups	Frequency (Percentage)	Mandible	Maxilla	Zygoma	NOE	Frontal Bone	P-Value
2-32	102(71.8 %)	67	18	41	9	3	0.0006
33-63	40(28.2 %)	14	13	31	13	2	

ACKNOWLEDGMENTS
This study is dedicated to those who have contributed and collaborated in this research.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

SOURCE OF FUNDING
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Jazib Pervez:** Drafting, final approval.
2	**Mujeeb Ahmad:** Data acquisition.
3	**Suffiyan Saleem:** Critical revisions.
4	**Hifza Niazi:** Data analysis.
5	**Shaf ul Hassan:** Revision.
6	**Azeem Khan:** Data entry.