Section: OMFS

Original Research Article

RETROSPECTIVE ANALYSIS OF INCIDENCE AND PATTERNS OF MAXILLOFACIAL TRAUMA IN BURDWAN DENTAL COLLEGE AND HOSPITAL.

Jayanta Saha[1], Prateeti Ghosh[2], Anindita Saha[3], Soumen Mandal[4], Mustafizur Rahaman[4], Sanjukta Bagchi[5]

[1]*Associate Professor and Head of the Department of Oral and Maxillofacial Surgery, Burdwan Dental College and Hospital, Bardhaman, West Bengal, India*
[2]*BDS. House Surgeon, Department of Oral and Maxillofacial Surgery, Burdwan Dental College and Hospital, Bardhaman, West Bengal, India*
[3]*Associate Professor of Department of Oral Medicine and Radiology, Burdwan Dental College and Hospital, Bardhaman, West Bengal, India*
[4]*Assistant Professor of Department of Oral and Maxillofacial Surgery, Burdwan Dental College and Hospital, Bardhaman, West Bengal, India*
[5]*Assistant Professor of Department of Public Health and Dentistry, Burdwan Dental College and Hospital, Bardhaman, West Bengal, India*

Received *: 16/09/2026*
Received in revised form *: 11/10/2026*
Accepted *: 24/10/2026*

Corresponding Author:
Dr. Prateeti Ghosh,
BDS. House Surgeon, Department of Oral and Maxillofacial Surgery, Burdwan Dental College and Hospital, Bardhaman, West Bengal, India.
Email: pghosh.1298@gmail.com

DOI: 10.70034/ijmedph.2026.4.314

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (4); 2085-2090

ABSTRACT

Background: Trauma is one of the leading causes of death and disability. Maxillofacial trauma can cause disfigurement of parts of face and oral cavity, thereby affecting the oral functioning and aesthetics. Multidisciplinary approach is needed for proper treatment. The purpose of this study is to analyze the prevalence and patterns of maxillofacial trauma cases reported to our institute.

Materials and Methods: A retrospective study of 255 patients with maxillofacial injuries in our institute was conducted between January 2024 to June 2025. Etiology, age, gender, site of injury, influence of alcohol, use of protective gear- these factors were taken into consideration. Descriptive statistics and chi-square test were used for statistical analysis with significance value at $p<0.05$.

Results: RTA was the main cause of maxillofacial trauma followed by falls and assaults. Majority of the patients were male and between the age group of 21 to 30 years. Mandible was the most commonly fractured bone with parasymphysis as the most frequent site and in midface, ZMC fracture was most common. Influence of alcohol and lack of use of protective gear were the contributing factors to RTA.

Conclusion: Development of better road safety measures and educational strategies for increasing public awareness and improvement of socioeconomic status is needed to decrease the incidence of maxillofacial trauma.

Keywords: Maxillofacial trauma, road traffic accidents, mandible, protective gear.

INTRODUCTION

Trauma is an inevitable part of human life and one of the leading causes of morbidity, mortality and disability. Maxillofacial injuries are relatively common form of trauma in everyday life because of the anatomical position of the facial structures making it more prominent, thereby, increasing the risk of taking the force of impact. Pneumatization of sinuses reduces the thickness of facial bones, making them more susceptible to fractures. Maxillofacial trauma causes injuries to skeletal components, dentoalveolar components as well as soft tissues of the face. Early treatment and rehabilitation help to restore the form and function. Incidence and patterns vary depending on the geographical, environmental factors and socioeconomic status of the people.[1] Road traffic accident is considered to be the primary cause of maxillofacial trauma. Other causes are assaults, falls, sports injuries, industrial mishaps etc. The aims and objectives of this study is to evaluate and analyze the incidence and prevalence of different types of patterns of maxillofacial injuries.

MATERIALS AND METHODS

A retrospective study on maxillofacial injuries in our institute was conducted between January 2024 to June 2025. Data were collected from the hospital records of patients who had attended the outpatient department of our hospital with injuries.

They were subjected to questionnaire including name, age, gender, cause of injury, time and date of injury, site of injury, other associated injuries, type of vehicle, alcohol intake and use of protective gear at the time of accident etc. Then the clinical examinations were carried out and different parameters were taken into account such as level of consciousness, history of vomiting, bleeding from ear, nose, soft tissue examination, neurological examination, skeletal examination, checking the occlusion, mobility of bone segment and also involved teeth, different radiographic imaging techniques. A total of 255 cases were selected based on these parameters.

Inclusion Criteria

All the patients who attended the Outpatient Department of our Hospital with maxillofacial injuries. Patients with only hard tissue injury, only soft tissue injury or both hard and soft tissue injuries are included.

Exclusion Criteria

Patients with injury to other parts of the body except maxillofacial trauma.

Patients with concomitant fatal injuries, intracranial haemorrhage.

Statistical Analysis: Data was collected and spread in EXCEL sheet. Descriptive statistics, qualitative and quantitative variables such as frequencies, mean, standard deviation were used. Chi-square test (Goodness of fit) was used to evaluate the association between age, gender, cause of injury, level of consciousness, site of injury etc. A p value of less than 0.05 was considered as statistically significant.

Ethical Approval: The study was approved by the Institutional Ethical Committee of Burdwan Dental College and Hospital, Burdwan (IEC/BDCH/OMR-21) according to the Declaration of Helsinki, 1975, as revised in 2000.

RESULTS

Among 255 patients, most of the patients were between the age group 21 to 30 years [Table 2A]. Around 87.45% of total patients were male and 12.55% were female with male to female ratio of 7:1 [Table 2B].

Road Traffic Accident was the most common cause of injury followed by fall [Table 2C].

Dentoalveolar fracture was the most common fracture. Mandible was the most commonly injured facial bone with parasymphysis (24.3%) as the most common site followed by condyle (19.6%) and coronoid process (1.18%) as the least common site of fracture [Table 6].

Around 37% of the total patients were under the influence of alcohol and 31.25% of patients with road traffic accidents (excluding pedestrians) were using protective gear at the time of injury. In 14% of the RTA cases, patients were pedestrians; 76% of the vehicles were two wheelers [Table 7].

[Table 1-4] shows statistical analysis of demographic factors (age, gender), cause of injury, level of consciousness at the time of injury.

[Table 5] shows site of bleeding at the time of injury.

[Table 6] depicts the type of injuries and their anatomical location. [Table 7] depicts the association of alcohol consumption, use of protective gear at the time of injury, type of vehicles with injury.

Table 1: Descriptives

	Age (Years)	Gender	Cause of Injury	Level of Consciousness	Site of Injury
N	255	255	255	255	255
Missing	0	0	0	0	0
Mean	33.7				
Median	31				
Standard deviation	12.8				
Minimum	14				
Maximum	74				

Table 2: Frequencies

Table 2A: Frequencies of Age (Years)-Transform1

Age group (Years)-Transform1	Count	% of Total	Cumulative
1 (<20)	40	15.7	0.157
2 (21-30)	84	32.9	0.486
3 (31-40)	70	27.5	0.761
4 (41-50)	34	13.3	0.894
5 (>50)	27	10.6	1

Table 2B: Frequencies of Gender

Gender	Number	%of Total	Cumulative
M	223	87.5	0.875
F	32	12.5	1

M- Male, F- Female

Table 2C: Frequency of Cause of Injury

Cause of Injury	Counts	%of Total	Cumulative %
RTA	174	68.2%	68.2%
Assault	12	4.7%	72.9%
Fall	49	19.2%	92.2%
Industrial cause	11	4.3%	100.0%
Others	9	3.5%	95.7%

Table 2D: Frequencies of Level of consciousness

Levelof consciousness	Count	%of Total	Cumulative
Conscious	204	80	0.8
Unconscious	51	20	1

Table 3: Contingency Tables

Table 3A Gender

Age group (Years)-Transform1		M	F	Total
1 (<20)		35	5	40
2 (21-30)		76	8	84
3 (31-40)		66	4	70
4 (41-50)		25	9	34
5 (>50)		21	6	27
Total		223	32	255
	Value		df	p
χ^2	12		4	0.017
N	255			

Table 3B

Age group (Years)-Transform1	RTA	Cause of Injury			Others	Total
		Assault	Fall	Industrial cause		
1 (<20)	26	0	11	0	3	40
2 (21-30)	70	1	7	4	2	84
3 (31-40)	47	4	13	4	2	70
4 (41-50)	14	6	11	1	2	34
5 (>50)	17	1	7	2	0	27
Total χ^2 Tests	174	12	49	11	9	255
Value df - χ^2 39.8 16. N 255			P- <.001			

RTA- Road Traffic Accident

Table 3C

Gender	RTA	Assault	Fall	Others	cause	Total
M	159	9	40	8	7	223
F	15	3	9	1	4	32
Total	174	12	49	9	11	255
	Value df	p				
χ^2	11.4 4	0.023				
N 255						

RTA- Road Traffic Accident

Table 4: Proportion Test (N Outcomes)

Table 4A: Proportions Cause of Injury

Level	Count	Proportion
RTA	174	0.6824
Assault	12	0.0471
Fall	49	0.1922
Industrial cause	11	0.0431
Others	9	0.0353
χ^2 Goodness of Fit χ^2 df	p	
393 4	<.001	

RTA- Road Traffic Accident

Table 4B: Proportions – Level of Consciousness

Conscious	204		0.8
Unconscious	51		0.2
χ^2	df	p	
91.8	1	<.001	

Table 4C: Proportions - Gender

Level		Count	Proportion
M		223	0.875
F		32	0.125
	χ^2	df	p
	143	1	<.001

Table 5: Site of Bleeding at the time of injury

Site of Bleeding	Number	Percentage
Mouth, lip, chin	133	52.16%
Ear	56	21.96%
Nose	68	26.67%
Skin of face	85	33.33%
Head	17	6.67%
Eye (Periorbital ecchymosis and subconjunctival hemorrhage)	39	15.29%

Table 6: Pattern of Injury

Number		Percentage
Hard Tissue Injury		
Parasymphysis	62	24.31%
Symphysis	17	6.67%
Angle	28	10.98%
Body	26	10.2%
Condyle	50	19.60%
Ramus	4	1.57%
Coronoid Process	3	1.18%
Dentoalveolar Fracture	79	30.98%
zygomaticomaxillary complex	12	4.71%
Le fort I	9	3.53%
Le fort II	6	2.35%
Multiple fractures	38	15%
Soft Tissue Injury Abrasion & bruishes	49	19.22%
Laceration	66	25.88%
Crush & blunt injury	53	20.78%
Multiple soft tissue injury	87	34.12%

Table 7: Association of Alcohol consumption, Protective Gear and Type of Vehicle with Injury

Criteria	Number (Percentage)
Alcohol consumption	94 (37% of total patients)
Use of protective gear	50 (31.25% of total RTA cases involving riders, drivers, vehicle occupants and excluding pedestrians)
Vehicle riders or drivers Two wheelers Four wheelers Pedestrians	 132(76% of total RTA cases) 28(16% of total RTA cases) 14(8% of total RTA cases)

DISCUSSION

Our study revealed that RTA were the main causative factor of maxillofacial injuries. Falls and assaults respectively were the second and third most common cause of maxillofacial injuries. Similar results were found in the study conducted by Shinde et al,[2] in Maharashtra and Fernandes et al,[3] in Goa, Prasad C et al,[1] in Chennai. RTA was the leading cause of maxillofacial injuries in the developing countries. Similar results were also seen in the studies conducted by Mishra et al,[4] in Lucknow, Obuekwe ON et al,[5] in Nigeria, Kaura S et al,[6] in Punjab. According to the report given by WHO, RTA is the reason for the death of one million people and injury to 15-20 million in a year,[7] However, some other studies conducted by Abukhder M et al,[8] in UK and Ogundare B.O et al,[9] found physical assaults as the main causative factor of maxillofacial trauma.

In the present study male to female ratio of the population studies was 7:1. Similar male predilection was found in the studies conducted by Das G et al,[10] Ahmed HE et al.,[11] Singaram et al,[12] found that male population was four times more likely to be involved in RTAs than the female counterpart. Landge et al,[13] found that male to female ratio was 6:1. The discrepancy may be due to the fact that males are more involved in exposure to risk factors such as driving vehicles, sports that involve physical contact, an active social life which involves usage of alcohol and drugs.

In the present study the most commonly affected age group was 21-30 years and this finding is consistent with many other epidemiological studies conducted by Mishra et al,[4] Obuekwe ON et al,[5] Al-Hassani A et al,[14] Fernandes et al,[3] Giri et al,[15] Soundarya et al,[16] This age group is more prone to fracture because of inexperienced and rash driving and lack of knowledge of utilization of safety devices such as seat belts. Also the effect of alcohol makes them prone to injuries. The second most common age group is 31 to 40 years

In our study fracture involving the mandible was more common than any other facial bone fractures. Similar results were found in the studies conducted by Prasad C et al,[1] Das G et al,[10] Landge et al,[13] Muralidhar P et al,[17] Motamedi et al,[18] However some other studies were contradictory to our studies such as Ahmed et al,[11] Mishra et al,[4] Shinde et al,[2] Brucoli et al,[19] reported that most of the fractures were ZMC fractures; Fernandes et al,[3] reported that most of the fractures were zygomatic arch fractures; Al-Hassani A et al,[14] Alves LS et al,[20] reported that orbital fractures were most common fracture; Arslan ED et al,[21] documented nasal bone as the most common site of fracture.

In the present study, parasymphysis was most common site of fracture. The result is consistent with other studies conducted by Das G et al,[10] Gurung SU et al,[22] Second most common site of fracture is condyle followed by angle fracture, body fracture and symphysis fracture. The least common site of fracture in mandible was ramus and coronoid process. However, the body of the mandible was previously reported to be the most common fractured site of mandible in the studies conducted by Ugboko VI et al,[23] Adesina OA et al,[24] ZMC was the most common site of fracture in midface followed by Lefort I and Lefort II. Fracture of mandible occurs most likely by skidding of two wheelers when the person falls down from the vehicle or hits against the vehicle itself, thereby transmitting a direct blow to the mandible. Fracture of maxilla and other facial bones occur most commonly in accidents involving the collision of vehicles where the force and momentum are directly transmitted to the entire face. Around 15% of the total patients had multiple fractures involving mandible or midface or both.

In the present study, it was also found that one third of the patients had injuries to the teeth which involves avulsion, fracture, subluxation, intrusion of teeth [Table 6]. Dentoalveolar fractures most commonly occur in bike accidents and specially in persons not using helmets.[1] It can occur isolated or in combination with other any type of fracture or soft tissue injuries.

Usually facial bone fractures occur in association with multiple soft tissue injuries. This finding is consistent with the result of our study. In this study, single type of superficial soft tissue injuries such as laceration (26%), crush & blunt injury (21%), abrasion & bruishes (19%) were noticed as well as multiple soft tissue injuries as a combination of laceration, crush & blunt injuries, abrasion & bruishes were also found in 34% cases [Table 6].

In the present study, 76% of the vehicles involved in the RTA cases were two-wheelers. Similar results were found in the studies conducted by Adesina OA et al,[24] Kamulegeya A et al,[25] Umar KB et al,[26] However, some previous studies of Atubi AO et al,[27] Kual A et al,[28] Eke N eta al,[29] reported that four-wheelers were the most involved vehicles in the RTA.

Driving under the influence of alcohol or drugs increases the occurrence of RTA. In the present study, 37% of the total patients were reported to be under the influence of alcohol at the time of injury. Some other studies conducted by Telfer MR et al,[30] Hutchinson IL et al,[31] suggested strong association between alcohol consumption and maxillofacial injuries.

Use of protective gears reduces the severity of injuries associated with Road Traffic Accidents.[22] In most of the cases, failure to wear helmets markedly increases the probability of head injuries while lack of seat belt use results in forward jerk during collision causing higher rate of injury to the facial bones and chest. In our study, 31% of the drivers, riders or vehicle occupants (patients associated with RTA cases excluding the pedestrians) were using protective gear like helmets and seat belts at the time of in.

In our study, 80% patients were conscious after the accident where 20% patients were unconscious after the accidents. It usually depends on the severity of the accident. In most of the cases, unconsciousness occurs due to associated traumatic brain injury like concussion, intracranial hemorrhage, cerebral contusion or laceration, skull fracture and also due to airway obstruction, hemorrhagic shock, alcohol or drug intoxication.

Therefore, maxillofacial trauma needs special attention because direct injury to the face may lead to permanent damage to vision, hearing, esthetics, mastication,[1] phonetics which can further affect the mental health also.

CONCLUSION

The study has reached to the conclusion that Road traffic accident is the major cause of maxillofacial trauma and younger persons especially males in between the age group of 21-30 years are more prone to the injuries. Mandible is the most commonly affected site of injury. The findings of our study indicate the need for development of effective educational interventions and preventive strategies to enhance public awareness, improvement of socioeconomic status, [32,33] and implementation of rules and regulations strictly to prevent alcohol intoxication, drug abuse, mobile phone use during driving and also to use safety gears like helmet, seat belts etc. and to maintain maximum speed limit while driving on the highways and also to improve the road condition. Necessary measurements should be taken to improve the treatment modalities to decrease the rate of morbidity and mortality.

Acknowledgement: We acknowledge the support of Burdwan Dental College and Hospital, which provided us the opportunity and all the necessary facilities to conduct this study. We would like to express our sincere gratitude to the Principal of the institute for giving us permission to explore the hospital records of patients to conduct the study. We

also acknowledge and sincerely appreciate the support and technical guidance received from the Department of Health and Family Welfare, Government of West Bengal.

REFERENCES

1. Prasad C, Narayanan MB, Parimala V, Vijaykanth M. Prevalence and pattern of maxillofacial trauma in North Chennai: A Retrospective Study. J Indian Assoc Public Health Dent. 2018;16:303-7.
2. Shinde SU, Khairnar MR, Jambhekar S, Patil P, Oza KK, Raikar A et al. Epidemiology of Oral and Maxillofacial Traumatic Injuries Among the Patients Reporting to the Dental Institute of Western Maharashtra Region, India. J Maxillofac Oral Surg. 2024;23(4):1041-1047.
3. Fernandes TB, Mandrekar PN, Visen A, Khandeparker PVS, Dhupar V, Akkara F. Pattern of associated brain injury in maxillofacial trauma: A retrospective study in a high-volume centre. Br J Oral Maxillofac Surg. 2022;60(10):1373-1378.
4. Mishra N, Singh AK, Janani T, Sharma NK, Priya A. Retrospective analysis on the incidence and pattern of facial bone fractures in a major trauma centre of Eastern Uttar Pradesh. Indian J Dent Sci. 2021;13(3):182-6.
5. Obuekwe ON, Etetafia M. Associated injuries in patients with maxillofacial trauma: Analysis of 312 consecutive cases due to road traffic accidents. J Med Biomedl Res. 2004;3(1):30-6.
6. Kaura S, Kaur P, Bahl R, Bansal S, Sangha P. Retrospective study of facial fractures. Ann Maxillofacl Surg. 2018; 8(1):78-82.
7. WHO. WHO Staatistics Annual 1992 in WHO, Geneva. 1992.
8. Abukhder M, Mobarak D. A retrospective cohort study on the aetiology and characteristics of maxillofacial fractures presenting to a tertiary centre in the UK. Ann Med Surg. 2022; 77.
9. Ogundare B.O, Bonnick A, Bayley N. Pattern of mandibular fractures in an urban major trauma centre. J Oral Maxillofac Surg. 2003; 61(6): 713-8.
10. Das G, Pathak D, Shukla B, Shukla R, Patel D, Mondal K. Trends in the patterns of maxillofacial fractures in kolkata. Int J Prev Clin Dent Res. 2020;7(4):107-10.
11. Al Ahmed HE, Jaber MA, Abu Fanas SH, Karas M. The pattern of maxillofacial fractures in Sharjah, United Arab Emirates: A review of 230 cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2004;98(2):166-70.
12. Singaram M, G SV, Udhayakumar RK. Prevalence , pattern, etiology and management of maxillofacial traumain a developing ccountry: a retrospective study. J Korean Assoc Oral Maxillofac Surg. 2016;42(4):174-81.
13. Landge JS, Gavali P, Shah KM, Choudhary Y. A retrosopective study: Pattern of maxillofacial injuries in government dental college and hospital Aurangabad,Marathvada region. J oral med oral surg oral pathol oral radiol. 2023;9(1):22-6.
14. Al-Hassani A, Ahmed K, El-Menyar A, Abutaka A, Mekkodathil A, Peralta R et al. Prevalence and pattern of maxillofacial trauma: a retrospective descriptive study. Eur J Truma Emerg Surg. 2022;48(4):2513-2519.
15. Giir KY, Singh AP, Dandriyal R, Indra N, Rastogi S, Mall SK et al. Incidence and pattern of mandibular fractures in Rohilkhand region, Uttar Pradesh state, India: A retrospective study. J Oral Biol Craniofac Res. 2015;5(3):140-5.
16. Soundarya H, Swetha M, Bhashitha M. Maxillofacial Fractures: A retrospective study. Int Dent J Stud Res. 2019;7(4):87-91.
17. Muralidhar P, Bandela V, Ghaffar Khan AA, Shah SJ, Elfadeel ASA, Basany RB et al. A 5 year comprehensive evaluation of maxillofacial injuries in polytrauma patients at a tertiary hospital- an epidemiological study. ACTA ODONTOLOGICA SCANDINAVICA. 2024;83:126-131.
18. Motamedi MH. An assessment of mandibular fractures: a 5-year study of 237 patients. J Oral Maxillofac Surg. 2003;61(1):61-4.
19. Brucoli M, Boffano P, Romeo I, Corio C, Benech A, Ruslin M et al. Epidemiology of maxillofacial trauma in the elderly: A Euripean multicentre study. J Stomatol Oral Maxillofac Surg. 2020;121(4):330-8.
20. Alves LS, Aragao I, Sousa MJC, Gomes E. Pattern of maxillofacial fractures in severe multiple trauma patients: a 7-year prospective study. Braz Dent J. 2014; 25(6):1-4.
21. Arslan ED, Solakoglu AG, Komut E, Kavalci C et al. Assessment of maxillofacial trauma in emergency department. World J Emerg Surg. 2014;9(1):13.
22. Gurung SU, Singh G, Mishra M, Mondal S, Gaur A. Maxillofacial injuries related to road traffic accidents: A five year multi centre analysis. Craniomaxillofac Trauma Reconstr. 2019;3(1):e61-6.
23. Ugboko VI, Odusanya SA, Fagade OO. Maxillofacial fractures in a semi-urban Nigerian teaching hospital: A review of 442 cases. Int J Oral Maxillofac Surg. 1998; 27(4):286-289.
24. Adesina OA, Wemambu JC, Opaleye TO, Salami AY. Maxillofacial Fractures: A Three-Year Survey. J Surg Curr. 2019;9(4):51-6.
25. Kamulegeya A, Lakor F, Kabenge K. Oral maxillofacial fractures seen at a Ugandan tertiary hospital: A six-month prospective study. Clinics (Sao Paulo). 2009;64(9):843-8.
26. Umar KB, Shuja RA, Ahmed K, Mohammad TK, Abdus S. Occurrence and characteristics of maxillofacial injuries- A study. Pak Oral Dent J. 2010;30(1):57-61.
27. Atubi AO. A synopsis of number/ types of vehicles involved in road traffic accidents in Lags State, Nigeria. Int J Humanit Soc Sci. 2012;2(24):141-8.
28. Kual A, Sinha US, Pathak YK, Singh A. Fatal road traffic accidents, study of distribution, nature and type of injury. J Indian Acad Forensic Med. 2005;27(2):71-6.
29. Eke N, Etebu EN, Nwosu SO. Road traffic accidents mortalities in Port Harcourt, Nigeria. Anil Aggrawal's Internetl Journal of Forensic Medicine and Toxicology. 2000;1(2):1-6.
30. Telfer MR, Jones GM, Shepherd JP. Trends in the aetiology of maxillofacial fractures in the United Kingdom(1977-1987). Br J Oral Maxillofac Surg. 1991;29(4):250-5.
31. Hutchinson IL, Magennis P, Shepherd JP, Brown AE. The BAOMS United Kingdom survey of facial injuries part 1: Aetiology and the association with alcohol consumption. British Association of Oral and Maxillofacial Surgeons. Br J Oral Maxillofac Surg. 1998;36(1):3-13.
32. Feller CN, Adams JA, Friedland DR, Khani M, Luo J, Poetker DM. Impacts of Socioeconomic Status on Dentoalveolar Trauma. WMJ. 2023;122(1):32-37.
33. Goodfellow M, Burns A. Relation between facial fractures and socioeconomic deprivation in the north east of England. British Journal of Oral and Maxillofacial Surgery. 2019;57(3):255-259.