

Research Article	Pak-Euro Journal of Medical and Life Sciences
DOI: 10.31580/pjmls.v5i1.2447	Copyright © All rights are reserved by Corresponding Author
Vol. 5 No. 1, 2022: pp. 129-134	
www.readersinsight.net/pjmls	
Submission: February 23, 2022	Revised: March 24, 2022 Accepted: March 31, 2022

PATTERN OF MAXILLOFACIAL INJURIES IN ROAD TRAFFIC ACCIDENT DURING COVID-19

Sadia Awais^{1*}, Ayesha Rasool¹, Chanda Shehzadi¹

¹Oral & Maxillofacial Surgery Department, King Edward Medical University, Lahore, Pakistan

*Corresponding Author: Dr. Sadia Awais E-mail: sadiawais02@gmail.com



Abstract

Objectives: This study aims to assess the prevalence and pattern of maxillofacial injuries presented at department of oral & maxillofacial surgery (OMFS), Mayo Hospital, Lahore, Pakistan during COVID-19 pandemic. Determining patterns of occurrence of maxillofacial trauma and etiology can improve early diagnosis and treatment, thereby decreasing the percentage of morbidity and mortality associated with these fractures. **Methodology:** Sample data was collected from the Department of OMFS, Mayo hospital, during January, 2021 till December, 2021. 263 patients with confirmed diagnosis of maxillofacial trauma participated in this research. Record of all patients including sex, age, cause of road traffic accidents, radiograph, fracture site, vehicle type, use of seat belts/helmets, time to reach the hospital, and other safety devices were reviewed and evaluated. **Results:** There were 299 (57.27%) mandibular, 102 (19.50 %) zygomatic, 100 (19.10 %) maxillary, 12 (2.29 %) nasal, and 9 (1.70 %) frontal injuries. Maxillofacial trauma was more prevalent in males (87%) than in females (13%) and was commonly seen in young age groups (21-30 years). Two-wheelers (motorcycle) was the vehicle used in most of the cases reported (68.4 %) and major cause of RTA was inattentiveness to traffic rules (31.9 %). In road traffic accidents, mandible (57.27%) is the most common fractured bone, followed by zygomatic bone fracture. **Conclusion:** It is concluded that maxillofacial injuries in males (20 to 30 years) of age range were more prevalent and are observed mostly in mandibular bones. Although cases reported were less in number when compared to previous data, the pattern of fractured facial bones were more or less the same.

Keywords: Mandible, Maxillofacial injuries, Motorcycle, Road traffic accidents, Traffic rules

INTRODUCTION

The transmittable nature of the Covid-19 made all the governments to device public health protocol to control the spread of this contagious disease. Use of protective gears, maintaining social distance, shutting of educational institutions, focusing on personal hygiene, and ban on all non-essential events and activities (1) were made necessary. Every individual was affected by Covid-19 pandemic in some way or another. Although limitations over public transport have led to decline spread of this contagious disease but it also has an indirect effect on the road traffic accidents (2).

Face is a most prominent structure in human body for its esthetic, social and functional value. Maxillofacial surgeons play significant role in the management of craniomaxillofacial injuries during road traffic accident (RTA), so this specialty has had to adapt to this outbreak with full preparation. Trauma to face involves unusual consideration and is very challenging due to specificity of this anatomical zone. Injuries can go from delicate tissue slash to a complex fracture of facial region that may be presented together with damages to head, spine, extremities chest, and abdomen (3). Complicated fractures to maxillofacial region may cause damage to the respiratory system, central nervous system, and digestive system as well. Furthermore, esthetic disorders due to facial trauma, commonly develops a psychological stress. The occurrence and frequency of fractures will fluctuate from one country to the other depending upon various factors. The most common etiology that led to maxillofacial trauma in underdeveloped countries turned out to be Road traffic accidents, followed by assaults and warfare. While assaults are the main reason of injuries to facial region in developed countries (4). Variation is also observed in incidence and pattern of fracture between underdeveloped and developed country owing to legislative fluctuations

such as use of safety belts/helmets and speed limits implementation (5). Apart from this, industrial accidents, sport injuries, and pedestrian collisions may also be the source of injuries to maxillofacial structures.

Yearly, around the world about 1 million deaths are observed due to auto collisions on road, whereas non-fatal road traffic accidents are a topmost reason for hospitalization (6). In Pakistan RTAs contribute to about 56% of maxillofacial trauma as road traffic rules are not completely followed by the people. Other factors of RTA can be clothing, poor vehicle maintenance, balancing issues, design safety devices, speeding, and substance abuse (7, 8). The injuries of facial bones are clearly correlated to the prominent position as well as the fact that these bones largely remain unprotected during accidents as automobile drivers do not wear helmets or seat belts (9).

The purpose of this study is to investigate the pattern of maxillofacial injuries resulting from RTAs and what factors contribute to it. Taking into consideration all the patterns of injuries and causes of RTAs, this study can help policy makers to evolve a better Road Traffic Legislation, which will be enacted in Pakistan to regulate traffic on roads by focusing on the target groups and introduce cost effective preventive measures. Determining patterns of occurrence of maxillofacial trauma can improve early diagnosis and treatment, thereby decreasing the percentage of morbidity and mortality associated with these fractures.

MATERIALS AND METHODS

The study was carried out in a tertiary care hospital and study design for this research was approved by the human research ethics committee of King Edward Medical University, Lahore, Pakistan, via letter no 641/RC/KEMU. Patients with full consent (aged 0 - 70 years) who encountered trauma to the maxillofacial region were part of this study. It excludes previously treated trauma cases. Patients presented with any oral pathology i.e., cyst, tumors, pathological fractures with severe osteoporosis, Injuries due to bomb blast and with soft tissue laceration were also excluded. All medical records, radiographs and CT scan of patients presented in OPD of the oral and maxillofacial department were collected from January 2021 till December 2021, with proper written informed consent. A total number of (n=263) patients with a 95% confidence level and an 8% margin of error was finalized as sample size.

Sampling technique was non-probability purposive sampling. A structured proforma was made to document/record all the relevant information regarding gender, age, pattern, and etiology facial injuries. Other information such as vehicle type, location, the use of seat belts, helmets and other safety devices were also evaluated and reviewed.

STATISTICAL ANALYSIS

All data gathered was managed and analyzed using SPSS version 20 for statically analysis and descriptive statistics including frequencies and percentages were calculated.

RESULTS

The results are based on data collected from 263 patients, reported in OPD of OMFS dept., Mayo hospital, Lahore. According to the anatomical locations of maxillofacial injuries, the pattern of fracture was classified in six main categories. This includes Maxillary fractures, Mandibular fractures, Zygomatic fractures, Frontal bone fractures, and Nasal bone fractures. Mandibular fractures were further sub classified as Para symphysis fracture, symphysis fracture, angle fracture, body fracture, Sub condylar, Condylar fractures, and Coronoid fractures.

Age group of the individuals mostly involved and affected in road traffic accidents. Hence the individuals mostly affected in road traffic accidents were between (n=21) years to (n=30) years. Majority of drivers seen in accidents were young and with carefree attitude (Table I).

Table I. Distribution of maxillofacial injuries according to age categories (n=263)

Age group (Years)	Frequency	Percentage
0 to 10	10	3.80 %
11 to 20	47	17.80 %
21 to 30	124	47.14 %
31 to 40	66	25 %
41 to 50	7	2.66 %
51 to 60	8	3.00 %
61 to 70	1	0.30 %

Most commonly involved facial bone was mandible (57.2%), followed by zygomatic bone (19.5%). Maxillary process was the third most common bone to be fractured in RTAs (Table II).

Table II. Patterns of maxillofacial fractures and number of fractures according to anatomical site

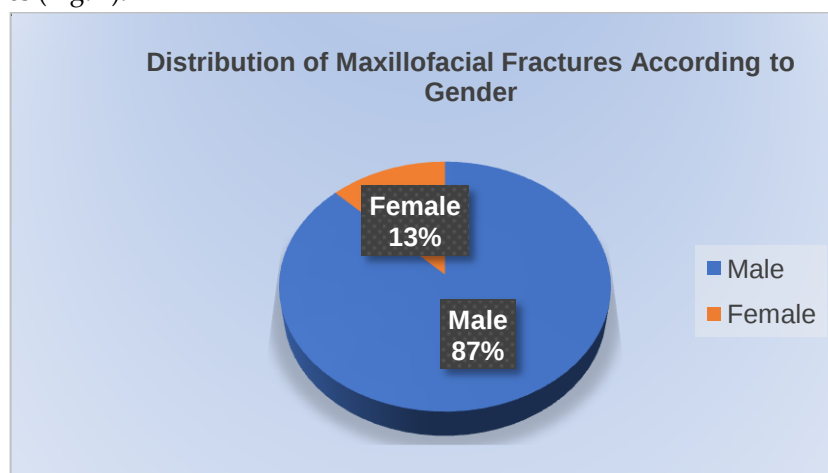
Anatomical site	Number of Fractures	Percentages %
Zygomatic Fractures	102	19.50 %
Maxillary Fractures	100	19.10 %
Mandibular Fractures	299	57.27 %
Frontal Bone Fractures	9	1.70 %
Nasal Bone Fractures	12	2.29 %
Total number of fractures	522	100 %

Most fractured bone was mandible bone, the chief site involved in the fracture of mandible was para symphysis (31.90%), followed by sub condyle (23.40%) and body (20%), the least common was the ramus of the mandible (1.30%) respectively (Table III).

Table III. Anatomical location of mandibular fractures

Mandibular Anatomical Site	Number of fractures	Percentage %
Para symphysis	95	31.90 %
Symphysis	18	6%
Angle	36	12%
Body	60	20%
Ramus	4	1.30%
Sub condyle	70	23.40%
Condyle	11	3.60%
Coronoid	5	1.60%
Total	299	100%

Pattern of all maxillofacial fractures presented were with higher percentage in males (87%) as compared to females (Fig. 1).

**Fig. 1.** Frequency of maxillofacial injuries according to gender

Chief cause of RTAs was found to be inattentiveness to traffic rules by the drivers, and most of the accidents happened during school/office timings, followed by over speeding of vehicle (Fig. 2).

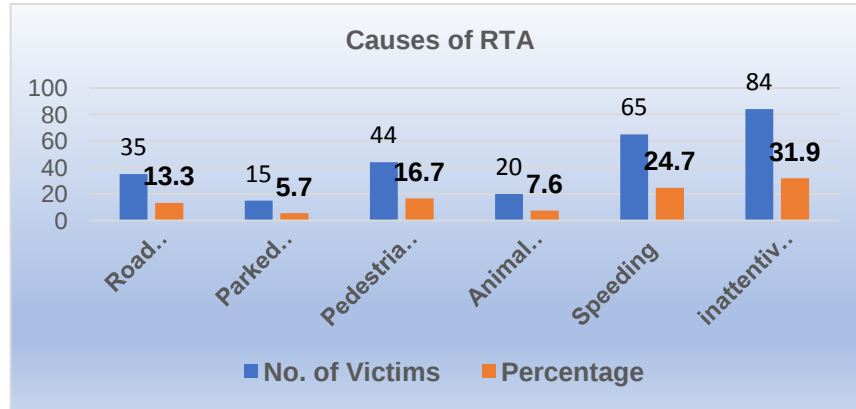


Fig. 2. Causes of RTAs

Motorcycles vehicles have been principally accountable for road accidents as there was ban on other public transport during pandemic for a limited time period, followed by chingchi, lorries, taxis, buses and cars. And among (n=263) cases reported, (n=180), were motor bikers, whereas only 14% were helmet users (Fig. 3).

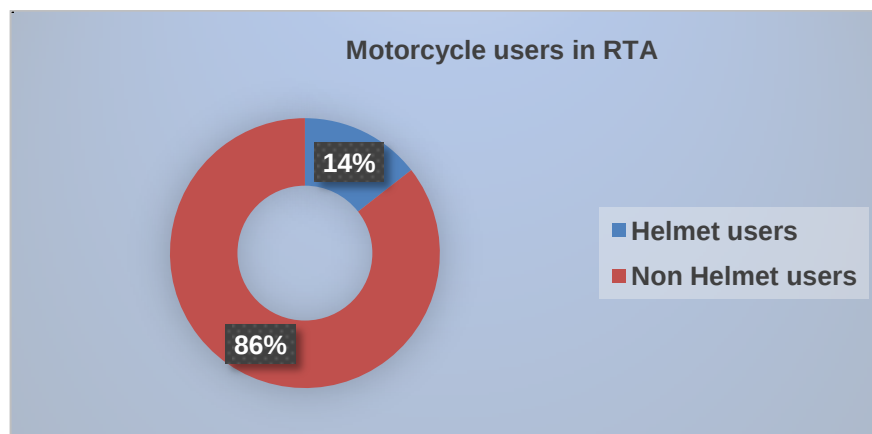


Fig. 3. Motorcycle users in RTAs

DISCUSSION

Trauma to any structure can be the principal reason of mortality and morbidity. Maxillofacial injuries are not uncommon in Pakistan (10). However, incidence and pattern related to age, sex, time, geographical region, cultural characteristics, traffic volume, implementation of law, climatic conditions, and socio-economic conditions May fluctuate (11). During lockdown, which was imposed due to contagious nature of cCovid-19, a reduction in number and severity of sustained injuries is noteworthy among patients reported in oral and maxillofacial department of Mayo hospital, Lahore (12).

In our study, most of the injuries reported due to RTAs, have common presentation with fractured mandible or lower jaw (13). Mandibular fractures account for 57.2% of maxillofacial injuries followed by zygomatic bone, which is consistent with previous findings (14). Parasymphysis is the most common part of the mandible bone that was fractured, accounting for 31.9 % of the total number of trauma cases stated in specific time periods, which is in divergence with figures acquired from developed communities. Our study is in accordance with Abhinav RP *et al.*, (2019), who stated that "Para symphysis is the most common fracture site of the mandible" (15).

Of the total (n=263) cases documented, most of the patients were males comprising 87%, with male to female ratio of 6.5:1, which correlates with the reports published earlier (16). The reason of a greater number of males experiencing facial trauma in developing countries, is due to the fact that the burden of economy lies on the young male mostly and they have to travel daily for a living usually on motorbikes. Another observation is that most of the bikers were non-helmet users, predisposing them to traumatic

injuries. Similar findings were reported in other studies (17). In a report by WHO, Pakistan is the world's fifth most populous country where legislations regarding traffic law are not being followed in their true spirit, thus resulting in a high morbidity and mortality (18). In this study, a 4-year-old boy, subjected to trauma, was the youngest patient reported while a 70-year-old female was the oldest. The highest percentage of trauma is seen in the age group of 21-30 years old male followed by 31-40 years. The same observation was noticed in previous studies (19, 20).

Motorbike and Chingchi Rickshaws are the main vehicles involved in RTA, which is in comparison with the other studies carried out in Pakistan (21). Most of the accidents take place during school and office timings after lockdown was being lifted (22). The Principal reason of RTA in Pakistan is due to violation of traffic rules and not taking precautionary measures (like seat belts, helmet, speed limits, traffic education etc.) properly while being on road (23, 24). Suboptimal vehicle maintenance as the majority of drivers belong to low-income groups. And last but not the least, poor road conditions play a substantial role in increased RTA.

Patients report to Mayo hospital, Lahore from far flung areas with the majority having a low socio-economic status that leads to the irregular follow ups. Yet, the accessible information showed the result of the patients was acceptable and sufficient. The common management modality was open reduction and internal fixation. An awareness campaign is mandatory by the government, in schools and driving academies to teach the public about the importance of protective measures while driving a vehicle on road.

CONCLUSION

According to the results, it is concluded that reduction in number and severity of sustained facial injuries is notable during the time of pandemic. Maxillofacial injuries are predominant in males and mostly patients are of 20 to 30 years of age. Mostly facial trauma is of mandibular bones with Para symphysis is the most common site to be fractured. Information on transit regulations and execution of helmets and seatsbelts ought to be required to keep away from such intense facial injuries.

Conflict of Interest:

No conflicts of interest declared by authors.

Acknowledgement:

We are extremely grateful to Professor. Dr Nabeela Riaz, Mayo hospital, Lahore, Pakistan, for her immense support.

Funding Source:

No grant is taken in any form for the completion of this research project.

References:

1. Ludwig DC, Nelson JL, Burke AB, Lang MS, Dillon JK. What Is the Effect of COVID-19-Related Social Distancing on Oral and Maxillofacial Trauma? *J Oral Maxillofac Surg.* 2021;79(5):1091-1097.
2. Vishal, Prakash O, Rohit, Prajapati VK, Shahi AK, Khaitan T. Incidence of Maxillofacial Trauma Amid COVID-19: A Comparative Study. *J Maxillofac Oral Surg.* 2020:1-6.
3. Visholm TM, Sandhu N, Dhariwal DK. COVID-19: The Oral and Maxillofacial Surgery Experience, Oxford, UK. *Craniomaxillofac Trauma Reconstr.* 2021;14(4):317-324.
4. MacKenzi EJ1. Epidemiology of injuries: current trends and future challenges. *Epidemiol Rev.* 2000; 22(1):112-9.
5. Lee DW, Choi SY, Kim JW, Kwon TG, Lee ST. The impact of COVID-19 on the injury pattern for maxillofacial fracture in Daegu city, South Korea. *Maxillofacial Plast Reconstr Surg.* 2021;43(1):35.
6. Akama MK, Chindia ML, Macigo FG, Guthua SW. Pattern of maxillofacial and associated injuries in road traffic accidents. *East Afr Med J.* 2007;84(6):287-95.
7. Nhongo SS, Sklavos A, Lee K, Chan STF, Austin S. The changing face of maxillofacial trauma during the 2020 COVID-19 lockdowns in Melbourne, Australia. *Oral Maxillofac Surg.* 2022:1-6.
8. Agnihotri A, Galfat D, Agnihotri D. Incidence, and pattern of maxillofacial trauma due to road traffic accidents: a prospective study. *J Maxillofac Oral Surg* 2014;13(2):184-8.

9. Salzano G, Dell'Aversana Orabona G, Audino G, Vaira LA, Trevisiol L, D'Agostino A, Pucci R, Battisti A, Cucurullo M, Ciardiello C, Barca I, Cristofaro MG, De Riu G, Biglioli F, Valentini V, Nocini PF, Califano L. Have There Been any Changes in the Epidemiology and Etiology of Maxillofacial Trauma During the COVID-19 Pandemic? An Italian Multicenter Study. *J Craniofac Surg*. 2021;32(4):1445-1447.
10. Gorgu M, Adanali G, Tuneel A, Senen D, Erdogan B. Airbags and wearing seat belts prevent crush injuries or reduce severity of injury in low-speed traffic accidents. *Eur J Plast Surg* 2002;25:215-18.
11. Mosaddad SA, Erfani M. Facial and dental trauma among accident victims (Epidemiology, diagnosis, and treatment). *J Res Med Dent Sci*. 2017;5(5):87-94
12. Mohammad Hosein Kalantar Motamedi. An assessment of maxillofacial fractures: a 5-year study of 237 patients. *J Oral Maxillofac Surg*. 2003;61(1):61-4.
13. Philip G, Dominic S, Poorna T A, Ek J. Pattern of maxillofacial fractures in a Tertiary Referral Centre in Central Kerala - A comparison between the Pre-COVID and COVID periods. *J Oral Biol Craniofac Res*. 2022;12(1):45-48.
14. Kanala S, Gudipalli S, Perumalla P, Jagalanki K, Polamarasetty PV, Guntaka S, Gudala A, Boyapati RP. An etiology, prevalence, fracture site and management of maxillofacial trauma. *Ann R Coll Surg Engl*. 2021;103(1):18-22.
15. Abhinav RP, Selvarasu K, Maheswari GU, Taltia AA. The Patterns and Etiology of Maxillofacial Trauma in South India. *Ann Maxillofacial Surg*. 2019;9(1):114-117.
16. Leslie Sara Mathew Kalathil, Umamar Mangalath, A Roshni, Sachin Aslam, Tom Thomas, Rakesh B Nair. Study of Patterns of Maxillofacial Injuries: An Institution-based Observational Study. *J Pharm Bioallied Sci*. 2021;13(Suppl 2):S1019.
17. Perkins CS, Layton SA. The etiology of maxillofacial injuries and the seat belt law. *Br J Oral Maxillofacial Surg* 1988; 26:353-63.
18. Iida S, Matsuya T. Pediatric maxillofacial fractures: their etiological characters and fracture patterns. *J Craniomaxillofacial Surg* 2002; 30: 237-41.
19. Mohammed S. Elarabi and Anwar B. Changing pattern and etiology of maxillofacial fractures during the civil uprising in Western Libya *Med Oral Patol Oral Cir Bucal*. 2018; 23(2): e248-e255.
20. Khan SU, Khan M, Khan AA, Murtaza B, Maqsood A, Ibrahim W, Ahmed W. Etiology and pattern of maxillofacial injuries in the Armed Forces of Pakistan. *J Coll Physicians Surg Pak*. 2007;17:94-7
21. Saeed AC, Farhat A. Incidence and causes of maxillofacial skeletal injuries at the Mayo Hospital in Lahore, Pakistan. *Br J Oral Maxillofacial Surg*. 2006;44(3):232-4.
22. Haq EU, Liaquat A, Aftab A, Mehmood HS. Etiology pattern and management of maxillofacial fractures in patients seen at mayo hospital Lahore-Pakistan. *Pakistan Oral and Dental Journal*. 2014;34(3).
23. Sahd R, Jawad AK, Amna S, Asif UQ, Adnan K. Patterns of Mandibular Fractures and Associated Comorbidities in Peshawar, Khyber Pakhtunkhwa. *Cureus*. 2019;11(9):e5753.
24. Shahzad MA, Marath MA. Etiology, Patterns and Treatment Modalities for Maxillofacial Fractures. *Pakistan Journal of Medicine and Dentistry*. 2019;7(3):6.