ISSN (E): 2708-2601
ISSN (P): 2708-2598

Medical Journal of South Punjab
Article DOI:10.61581/MJSP.VOL05/04/09

Volume 5, Issue 4, 2024

Pattern of dentoalveolar injuries in trauma patients presenting in maxillofacial department of Tertiary Care Hospital

Publication History

Received: June 26, 2024 Revised: Aug 23, 2024
Accepted: Sep 22, 2024 Published: Dec 30, 2024

Authors and Affiliation:

Ahmad Sohail[1], Jehan Alam[2], Ruqayah Shah[3], Sarfraz Ali[4]

[1-4]Jinnah Postgraduate Medical Centre, Karachi, Pakistan.

[*]**Corresponding Author Email**: drahamdsohail11@gmail.com

Conflict of Interest:

Author(s) declared no conflict of interest.

Acknowledgment:

No Funding received.

Citation: Sohail A, Alam J, Shah R, Ali S. Pattern of dentoalveolar injuries in trauma patients presenting in maxillofacial department of tertiary care hospital. Medical Journal of South Punjab. 2024 December 30; 5(4):56-61.

Please scan me to access online.

An official publication of
Medteach Private Limited, Multan, Pakistan.
Email: farman@mjsp.com.pk, Website: https://mjsp.com.pk/index.php/mjsp

Medical Journal of South Punjab
Volume 5, Issue 4, 2024; pp: 56-61
Original Article

Pattern of dentoalveolar injuries in trauma patients presenting in maxillofacial department of Tertiary Care Hospital

Ahmad Sohail[1], Jehan Alam[2], Ruqayah Shah[3], Sarfraz Ali[4]
[1-4]Jinnah Postgraduate Medical Centre, Karachi, Pakistan.
[*]**Corresponding Author Email**: drahamdsohail11@gmail.com

ABSTRACT

Objective: To determine the patterns of dentoalveolar injuries in patients presenting to the Maxillofacial Surgery Department of a tertiary care hospital.

Methods: The study employed a cross-sectional design and was conducted in the Department of Oral and Maxillofacial Surgery at Jinnah Postgraduate Medical Centre, Karachi, from December 2023 to June 2024. A detailed history and clinical examination, including extra-oral and intra-oral assessments, were conducted. Radiographic evaluations such as periapical, panoramic, and cone-beam CT scans were performed as needed. Injuries were classified according to Andreasen's criteria.

Results: Regarding the causes of nerve injury, road traffic accidents were the most common etiology, accounting for nearly half of the cases 49.7%, followed by assault 22.7%, falls 14.9%, epileptic seizures 9.4%, and firearm injuries 3.3%.The pattern of dentoalveolar injuries showed that enamel fractures were the most prevalent 24.9%, followed by root fractures 16.6%, subluxation and concussion 14.4%, dentine fractures 12.6%, extrusion 8.3%, crown fractures 6.6%, and intrusion 2.2%.

Conclusion: Young males were predominantly affected by dentoalveolar trauma, with road traffic accidents and falls as the leading causes. Avulsion, subluxation, and luxation were the most common injury patterns.

Keywords: Dentoalveolar injuries, Pattern, Maxillofacial, Causes, Etiology

1. INTRODUCTION

Dentoalveolar injuries refer to damage involving the teeth, their supporting structures, gingiva, oral mucosa, and the alveolar process of the maxilla or mandible, with or without associated injuries to adjacent soft and hard tissues[1]. These injuries include fractures of teeth, avulsion, displacement, as well as fractures of the alveolar process[2]. The etiology of these injuries varies across different countries and even within the same country, depending on culture, socioeconomic, and environmental factors[3].

Common causes include road traffic accidents,falls, contact sports,interpersonal violence, epilepsy,child abuse, and mental disorders[4]. In children, falls are the most frequent cause, while road traffic accidents are the predominant factor in adults[5]. Dentoalveolar injuries can be classified based on the affected structures, including dental hard tissue, gingival or periodontal tissue, alveolar bone, or a combination of these, and they may or may not be associated with facial fractures and soft tissue injuries[6].

Dentoalveolar injuries, particularly common in young patients, often present as emergencies requiring prompt diagnosis and timely management[7]. These injuries are more frequent in children compared to adults, with central incisors being the most commonly affected. A male predominance is observed, with a male-to-female ratio of 3.3:1[8]. Predisposing factors include class II malocclusion with lip incompetence and labially proclined incisors. Diagnosis is primarily based on clinical examination, supported by conventional radiographs such as periapical, occlusal, and orthopantomogram. The primary goal of treatment is to restore function and esthetics, with management strategies tailored to the nature of the injury[9]. A study conducted by Janjuaet al[10]on 138 patients who were presented at maxillofacial department and reported that the proportion of mandibular central fractures was 13.6%[10].

The purpose of this study was to highlight the patterns of dentoalveolar injuries in the local population. This research holds significance as it can help recommend preventive measures to the concerned authorities to reduce the incidence of dentoalveolar injuries, particularly in very young individuals. Additionally, it aims to inform clinicians to suspect and assess for dentoalveolar injuries in patients presenting with facial fractures or soft tissue injuries.

2. METHODOLOGY

The study employed a cross-sectional design and was conducted in the Department of Oral and Maxillofacial Surgery at Jinnah Postgraduate Medical Centre, Karachi, from December 2023 to June 2024over a duration of six months following synopsis approval. The sample size was calculated as 181 using a formula accounting for a finite population correction factor, with an estimated proportion of infraorbital nerve injury at 13.6% and a 5% margin of error. Non-probability consecutive sampling was used to select participants.

Patients aged 18 years and above, of both genders, and diagnosed with dentoalveolar injuries defined as trauma affecting teeth and surrounding alveolar bone, confirmed via radiographic assessment were included. Exclusion criteria comprised patients with only soft tissue injuries, maxillofacial injuries not involving dental tissue, and edentulous patients.

After obtaining approval from the Institutional Ethical Review Board (IERB), patients were informed about the study's objectives, assured confidentiality, and provided written consent. A detailed history and clinical examination, including extra-oral and intra-oral assessments, were conducted.

Radiographic evaluations such as periapical, panoramic, and cone-beam CT scans were performed as needed. Injuries were classified according to Andreasen's criteria.

Data were analyzed using SPSS version 27.0, with descriptive statistics (mean, standard deviation) for numerical variables like age and frequencies/percentages for categorical variables such as gender and injury patterns. Nerve injuries were stratified by age, gender, and trauma type to assess effect modifications, with statistical significance set at $p < 0.05$.

3. RESULTS

A total of 181 patients were included in this study. The demographic distribution revealed that the majority were male (n = 153, 84.5%) while females constituted a smaller proportion (n = 28, 15.5%). The mean age of patients was 24.86 years (SD = 9.39). Age distribution showed that a larger percentage of patients were above 18 years (n = 124, 68.5%), with the remainder being 18 years or younger (n = 57, 31.5%). (Table. I).

Regarding the causes of nerve injury, road traffic accidents were the most common etiology, accounting for nearly half of the cases (n = 90, 49.7%), followed by assault (n = 41, 22.7%), falls (n = 27, 14.9%), epileptic seizures (n = 17, 9.4%), and firearm injuries (n = 6, 3.3%).

The pattern of dentoalveolar injuries showed that enamel fractures were the most prevalent (n = 45, 24.9%), followed by root fractures (n = 30, 16.6%), subluxation and concussion (each n = 26, 14.4%), dentine fractures (n = 23, 12.6%), extrusion (n = 15, 8.3%), crown fractures (n = 12, 6.6%), and intrusion (n = 4, 2.2%).(Table. II).

An analysis of the association between gender and causes of nerve injuries using the Chi-square test indicated no statistically significant relationship ($\chi^2 = 2.95$, df = 4, $p = 0.566$). Males were the predominant gender across all injury categories. Similarly, no significant association was observed between age group and causes of nerve injuries ($\chi^2 = 1.35$, df = 4, $p = 0.852$). Both age groups (>18 years and ≤18 years) were proportionally represented across the different causes of injury.(Table. III).

Table-I: Demographic statistics of the patients

Variable	Category	Frequency (%)	Mean ± SD
Gender	**Male**	153 (49.7)	–
	Female	28 (15.5)	–
Age (years)	–	–	24.86 ± 9.39
	≤18 years	57 (31.5)	–
	>18 years	124 (68.5)	–

Table-II:Causes of nerve injury and pattern of dentoalveolar injury of the patients

Variable	Category	Frequency (n)	Percentage (%)
Causes of nerve injury	**Road Traffic Accident**	90	49.7
	Assault	41	22.7
	Fall	27	14.9
	Fire arm Injury	6	3.3
	Epileptic seizures	17	9.4
Pattern of Dentoalveolar Injury	**Enamel Fracture**	45	24.9
	Dentine Fracture	23	12.6
	Crown Fracture	12	6.6
	Root Fracture	30	16.6
	Concussion	26	14.4
	Subluxation	26	14.4
	Extrusion	15	8.3
	Intrusion	4	2.2

Table-III:Association between gender, age and causes of nerve injuries

Effect modifier	Road Traffic Accident	Assault	Fall	Epileptic seizures
Male	77 (85.6)	36 (87.8)	23 (85.2)	12 (70.6)
Female	13 (14.4)	5 (12.2)	4 (14.8)	5 (29.4)

≤18 years	27 (30.0)	15 (36.6)	8 (29.6)	6 (35.3)
>18 years	63 (70.0)	26 (63.4)	19 (70.4)	11 (64.7)

4. DISCUSSION

Dentoalveolar trauma is a common presentation in emergency departments, often resulting from road traffic accidents (RTAs), falls, sports injuries, interpersonal violence, and other traumatic incidents. Dentoalveolar trauma represents a significant portion of maxillofacial injuries, and understanding its pattern is essential for formulating preventive strategies and optimizing management protocols[11].

The findings of this study align with several previous reports on dentoalveolar trauma, though some variations exist in demographic and etiological patterns. The male predominance (84.5%) observed in this study is consistent with global trends, as multiple studies have reported higher trauma rates in males, often attributed to greater participation in high-risk activities and road traffic accidents (RTAs). For instance, a study by Glendor et al[12] noted that males accounted for 60-70% of dental trauma cases, though the proportion in the present study is even higher, possibly reflecting regional differences in gender-based exposure to trauma.

Similarly, Lam et al[13] reported that males were twice as likely as females to sustain dentoalveolar injuries, reinforcing the gender disparity seen in trauma epidemiology. The mean age of 24.86 years in this study is also consistent with previous research, as young adults are frequently identified as the most affected group due to their higher engagement in sports, vehicular accidents, and altercations. A study by Andersson et al[14] found that the peak incidence of dental trauma occurs between ages 20-30, closely matching the current findings.

Road traffic accidents (49.7%) emerged as the leading cause of dentoalveolar injuries in this study, which corroborates findings from studies in developing countries where traffic regulations may be less stringent. A study by Adekoya-Sofowora et al[15] in Nigeria reported RTAs as the primary etiology in 40% of cases, while Al-Malik et al[16] observed a similar trend in Saudi Arabia. However, in high-income countries, sports-related injuries and falls are often more prevalent, as noted by Petti et al[17], suggesting that socioeconomic and infrastructural factors influence trauma patterns. Assaults (22.7%) as the second most common cause in this study contrast with findings from studies in Europe and North America, where accidental falls and sports injuries dominate, and highlighting regional differences in violence-related trauma.

The predominance of enamel fractures (24.9%) and root fractures (16.6%) in this study is consistent with the literature, as these injuries are frequently reported in dentoalveolar trauma. Glendor et al[12] noted that enamel-dentin fractures are the most common, followed by luxations, which aligns with the current findings. However, the relatively high proportion of subluxation/concussion (14.4%) contrasts with some studies, such as those by Bastone et al[18], where crown fractures were more prevalent. This discrepancy may arise from differences in study populations or trauma mechanisms. The lack of a significant association between gender or age and injury cause ($p > 0.05$) differs from some previous reports. For example, a study by Traebert et al[19] found that males were more likely to sustain trauma from sports, while females experienced more falls, suggesting that cultural or behavioral factors may influence these associations.

In a study conducted by Janjua et al[20], which examined the patterns of dental injuries, the findings revealed that the most frequently observed injury type was tooth avulsion and subluxation, accounting for 16.7% of all

reported cases, followed by luxation injuries, which were seen in 9.4% of the cases.

5. CONCLUSION

Young males were predominantly affected by dentoalveolar trauma, with road traffic accidents and falls as the leading causes. Avulsion, subluxation, and luxation were the most common injury patterns.

6. REFERENCES

1. Burman S, Lal B, Alagarsamy R, Kumar J, Ankush A, Rai AJ, et al. Evidence-based management of isolated dentoalveolar fractures: a systematic review. Journal of the Korean AssociatOral Maxillofac Surg. 2024 Jun 1;50(3):123-33.
2. Kanala S, Gudipalli S, Perumalla P, Jagalanki K, Polamarasetty PV, Guntaka S, et al. Aetiology, prevalence, fracture site and management of maxillofacial trauma. Ann Royal Coll Surg England. 2021 Jan;103(1):18-22.
3. Yari A, Fasih P, Bagheri A, Aryanezhad SS, Sani MK. Prevalence and pattern of maxillofacial injuries associated with domestic violence: a retrospective study at a major trauma center. Dental Traumatol. 2024 Mar;40:61-8.
4. Fernandes TB, Mandrekar PN, Visen A, Khandeparker PV, Dhupar V, Akkara F. Pattern of associated brain injury in maxillofacial trauma: a retrospective study from a high-volume centre. BrJ Oral Maxillofac Surg. 2022 Dec 1;60(10):1373-8.
5. Menon CS, Mohan AR, Nimmagadda J, Manohar K, Sham ME, Archana S, et al. Incidence of maxillofacial injuries in the emergency department-retrospective study. J Maxillofac Oral Surg. 2023 Aug 31:1-9.
6. Sharma M. Evaluation of traumatic maxillofacial injuries in population. J Advanced Med Dental Sci Res. 2021 Dec 1;9(12):69-72.
7. Kalathil LS, Mangalath U, Roshni A, Aslam S, Thomas T, Nair RB. Study of patterns of maxillofacial injuries: an institution-based observational study. J Pharm Bioallied Sci. 2021 Nov 1;13(Suppl 2):S1019-23.
8. Kotecha S, Scannell J, Monaghan A, Williams RW. A four year retrospective study of 1,062 patients presenting with maxillofacial injuries at a specialist pediatric hospital. Br J Oral MaxillofacSurg. 2008;46:293-6.
9. Muralidhar P, Bandela V, Khan AA, Shah SJ, Elfadeel AS, Basany RB, et al. A 5-year comprehensive evaluation of maxillofacial injuries in polytrauma patients at a tertiary hospital–an epidemiological study. ActaodontologicaScandinavica. 2024 Apr 10;83:40250.
10. Uddin F, Ahmad S, Qayum Z. Frequency of various types of dentoalveolar injuries in trauma patients visiting to teriary care hospital. J Khyber Coll Dent. 2022 Dec 31;12(04):29-32.
11. Khan SU, Khan M, Khan AA, Murtaza B, Maqsood A, Ibrahim MW, et al. Etiology and Pattern of Maxillofacial injuries in the Armed Forces of Pakistan. J Coll Physicians Surg Pak. 2007;17: 94-7.
12. Glendor U. Epidemiology of traumatic dental injuries – a 12 year review of the literature. Dent Traumatol. 2008;24(6):603-11.
13. Lam R. Epidemiology and outcomes of traumatic dental injuries: a review of the literature. Aust Dent J. 2016;61 Suppl 1:4-20.

14. Andersson L. Epidemiology of traumatic dental injuries. J Endod. 2012;38(3 Suppl):S2-5

15. Adekoya-Sofowora CA, Adesina OA, Nasir WO, Oginni AO, Ugboko VI. Prevalence and causes of fractured permanent incisors in 12-year-old suburban Nigerian schoolchildren. Dent Traumatol. 2006;22(4):226-30.

16. Al-Malik MI. Oral injuries in children attending a hospital in Saudi Arabia. J Maxillofac Oral Surg. 2003;2(1):7-11.

17. Petti S, Glendor U, Andersson L. World traumatic dental injury prevalence and incidence, a meta-analysis – one billion living people have had traumatic dental injuries. Dent Traumatol. 2018;34(2):71-86.

18. Bastone EB, Freer TJ, McNamara JR. Epidemiology of dental trauma: a review of the literature. Aust Dent J. 2000;45(1):2-9.

19. Traebert J, Peres MA, Blank V, Böell Rda S, Pietruza JA. Prevalence of traumatic dental injury and associated factors among 12-year-old school children in Florianópolis, Brazil. Dent Traumatol. 2003;19(1):15-8.

20. Janjua OS, Ahmed W, Ibrahim MW, Luqman U, Qayyum MU. Etiology and pattern of dentoalveolar injuries in patients at Armed Forces Institute of Dentistry, Rawalpindi. Pak Armed Forces Med J. 2011 Sep 30;61(3):94-7.