



Prevalence of Dentoalveolar Fractures - A Retrospective, Institutional survey

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Abstract

Objective: This study aims to find a pattern between the prevalence of Dentoalveolar fractures and their respective demographic group.

Methodology: The data was collected from the patient archives of AMC Dental College and Hospital. A total of 257 patients who suffered maxillofacial trauma in the span of 5 years (2017-2021) were considered. Of these, 93 suffered from Dentoalveolar fracture. These were segregated into factors such as age, gender, and etiology were correlated with the type of fracture.

Result: The most common etiology of Dentoalveolar Fractures (DAF) was found to be Road Traffic Accident (RTA) (47%), followed by slip/fall (40%). Drivers of 2-wheeled vehicles suffered the greatest number of DAF at

59%. Out of 93 patients, 66.6% were males and 33.4% were females. Children and adolescents aged 11-20 years suffered the most with DAF. Most DAF were presented in the maxillary arch.

Conclusion: This study helps one understand to always look for the most inconspicuous injuries such as dentoalveolar fractures and should keep in mind the importance of early diagnosis and prompt treatment.

Keywords: Dentoalveolar Fracture, Maxillofacial Trauma, Retrospective survey, Etiology.

Introduction

India is one of the most populous countries in the world. The sheer number of vehicles on the road today is unparalleled among other nations today.

Accidents happen now and then not only on the road but also in the confines of homes and workplaces. Of these, some are fatal due to blood loss, breathing impairment, or fatal injuries to vital organs.

Injuries pertaining to the maxillofacial region are often non-fatal except those accidents, which result in prolonged obstruction of breath ⁽¹⁾. The most common type of maxillofacial trauma is dentoalveolar fractures ⁽²⁾. One such type of maxillofacial trauma is a dentoalveolar fracture.

A dentoalveolar fracture refers to a fracture involving the tooth and its surrounding bone without including the basal bones of the maxilla and mandible ⁽³⁾. These fractures are generally caused due to low impact injuries like Slip/fall etc. These fractures are further classified based on the location or extent of the injury (Andreasen et. al.) ⁽⁴⁾ like avulsion, luxation, etc. The majority of DAF are non-displaced.

It generally presents with common signs and symptoms like pain, mobility of affected teeth, bleeding, contusions, laceration step deformity, and malocclusion. Treatment of DAF has evolved during the years but largely remains conservative to this day i.e., Soft diet and splinting. Other methods like reduction, arch bar wiring, orthodontic reduction, or in some cases, extraction are also employed depending upon each case. The incidence of DAF is very high hence ⁽⁵⁾, it becomes imperative to analyze the Etiology behind it and how we can improve diagnosing and treating it.

It has been noted in the literature that road traffic accidents are the leading cause of Dentoalveolar fractures ⁽⁶⁾. This retrospective study was conducted at AMC DENTAL HOSPITAL, Ahmedabad, India; a tertiary dental care hospital, taking into consideration the various demographics, patterns of trauma, and the

association between Dentoalveolar fractures and their etiology.

Methodology

This paper took into consideration a total of 257 cases of maxillofacial trauma, between a period of January 2017 to December 2021. These cases were collected from the patient archives of AMC Dental College, Ahmedabad, India.

The data was collected based on a preformat which included information such as Age, Sex, Etiology, Type of fracture, Radiographic examination employed, and Date of occurrence.

Out of these, 93 cases had Dentoalveolar fractures with or without concomitantly occurring maxillofacial fractures; hence were included in the study. Only those patients, who were admitted into the ward of AMC Dental Hospital within the stipulated time, were included in the study. Injuries pertaining to the teeth and not the alveolar bone were excluded from the study.

Results

In this study, 257 cases were evaluated, out of which, 93 cases presented with dentoalveolar fractures. Of these cases, 62 patients were Males, and 31 were Females, and it was noted that the incidents of trauma were significantly higher in males as opposed to females in all age ranges except for 41-50 years.

The ages ranged from 5-70 years. Furthermore, DAF is most prevalent in age groups 11-20 years at 25% (n=24) followed by 21-30 years at 24% (n=22). The least prevalent class appears to be between 61-70 years and children below 10 years ⁽⁷⁾.

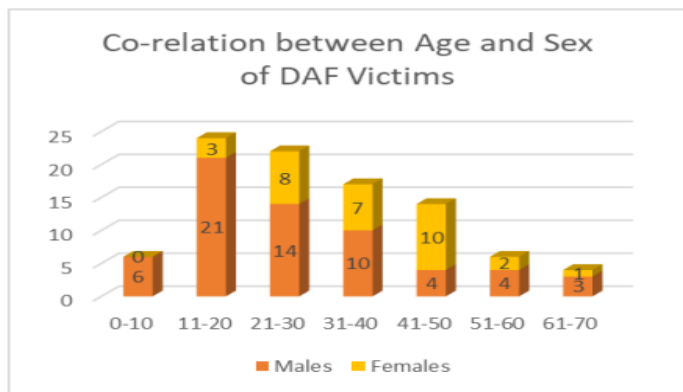


Fig 1: Bar graph depicts the correlation between the age and gender of DAF victims.

Age	Male	Female	Total
0-10	06	00	06
11-20	21	3	24
21-30	14	08	22
31-40	10	07	17
41-50	04	10	14
51-60	04	02	06
61-70	03	01	04

Table1: Relates the age and gender of DAF victims.

Several a etiologies were noted, namely, Road traffic accidents (RTA)(n=44), Assault (n=9), Slip and fall (n=37), Workplace injuries (n=1), and Sports Injuries (n=2). Most patients were victims of Road Traffic Accidents (n=44), in which the drivers were the most commonly injured ⁽⁸⁾.

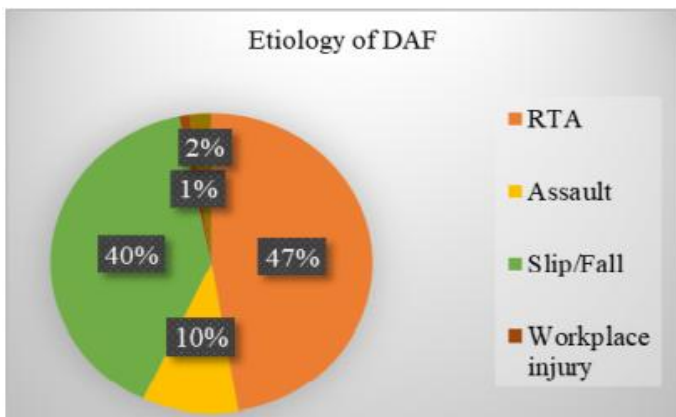


Fig 2: Prevalence of DAF based on etiology

Type of Etiology	Number of Dentoalveolar fractures
RTA	44
Assault	9
Slip/Fall	37
Workplace	1
Sports Injury	1

Table 2: Refers to the prevalence of DAF based on etiology.

When the fractures were assessed, it was found that isolated dentoalveolar fractures were the most prevalent. The Dentoalveolar fractures involving only the maxilla were found to be 73% (n= 67), DAF occurring in the mandible were 11% (n=10), DAF involving both the jaws were 11% (n=10) and those with concomitant maxillofacial fractures were only 5% (n=5) ⁽⁹⁾. Thus, the likelihood of fractures incurred by the maxillary region seems to be higher.

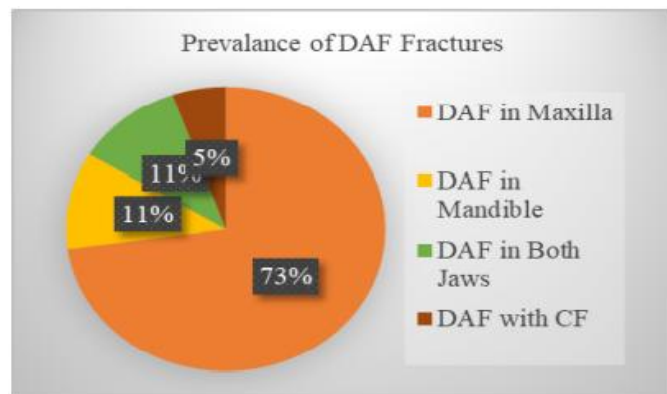


Fig 3: Prevalence of DAF based on anatomic site.

DAF in Maxilla	67
DAF in Mandible	10
DAF in Both Jaws	10
DAF with Concomitant Fractures	5

Table 3: Refers to the prevalence of DAF in the anatomical location.

The Road Traffic Accident (RTA) victims (n=44) were sub-segregated into Drivers, Pillion riders, and Pedestrians.

Among these, Drivers incurred the highest number of injuries (n=26), followed by pedestrians (n=13), and lastly, the pillion riders (n=5). It should be noted that the drivers were riding a 2-wheeler with/without personal protective gear⁽¹¹⁾.

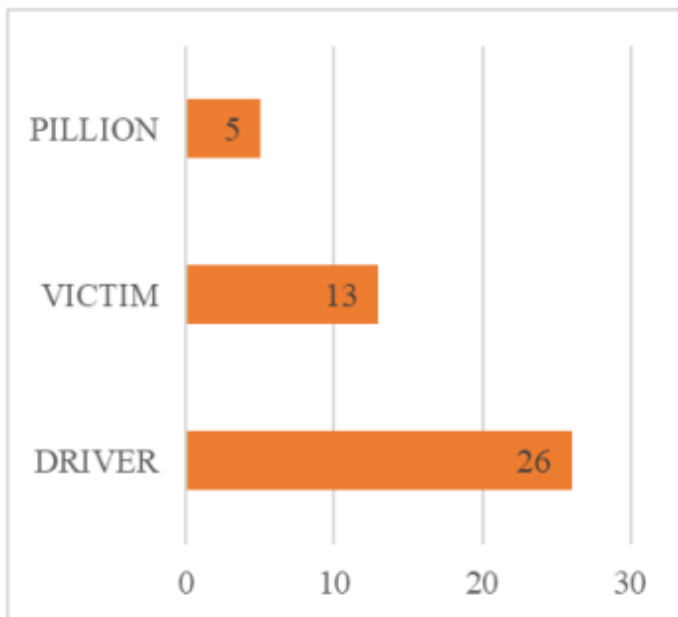


Fig 4: Prevalence of DAF based on victim type

Driver	26
Victim	13
Pillion	5

Table 4: Refers to the above bar graph Fractures in drivers were further evaluated based on the type of DAF inflicted. Most of the drivers experienced injuries in the maxillary region (69%), followed by DAF in both arches (14%).

DAF in the mandibular arch was found to be only 11% and those with concomitant fractures were at a meagre 6%⁽¹²⁾.

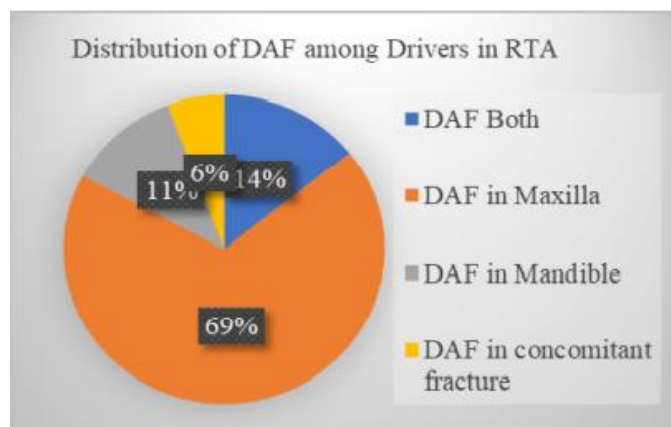


Fig 5: Prevalence of DAF in drivers.

Type of Fracture	Number of victims
DAF in Both Jaws	5
DAF in Maxillary Arch	24
DAF in Mandibular Arch	4
DAF + Concomitant Fracture	2

Table 5: DAF within drivers.

On the evaluation of the Pedestrians in RTA, almost all cases of DAF were noted in the maxillary arch (92%), followed by DAF in the mandibular region (8%). No cases were noted in which both arches were involved or had any other concomitant fractures⁽¹³⁾.

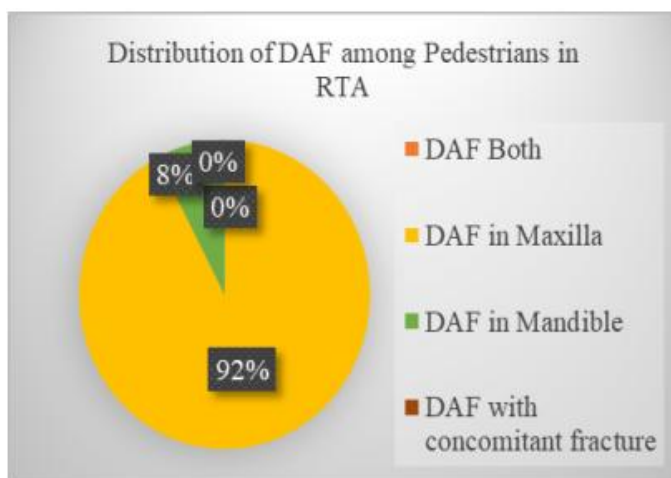


Fig 6: DAF prevalence among Pedestrians.

Type of Fracture	Number
DAF in Both Jaws	0
DAF + Maxillary #	12
DAF + Mandibular #	1
DAF + Concomitant #	0

Table 7:

On the evaluation of the Pillion riders in RTA, maximum cases of DAF were found to be in the maxilla (83%) and those in both arches were only at 17%. No cases of DAF in the mandible or those with any other concomitant fractures were found⁽¹⁴⁾.

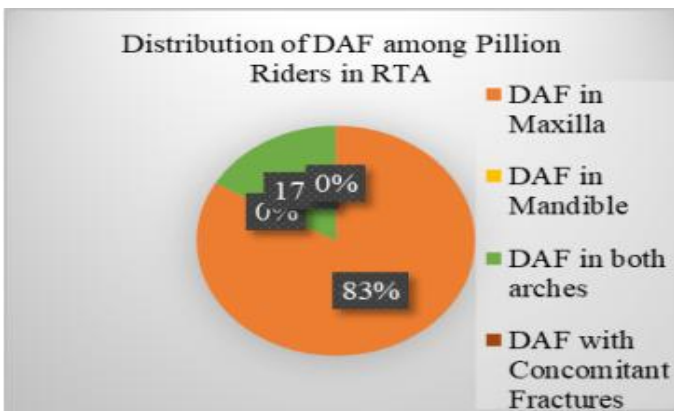


Fig 7: Prevalence of DAF in Pillion.

Type of Fracture	Number
DAF in Both Jaws	5
DAF + Maxillary #	0
DAF + Mandibular #	1
DAF + Concomitant #	0

Table 7:

On the evaluation of Slip/Fall cases, maximum dentoalveolar injuries were noted to be in the maxillary region (70%), followed by the mandibular region (16%). DAF in both arches was found to be at 11% and ones with concomitant fractures were only 3%. Maximum Dentoalveolar fractures were noted in the anterior segments of both arches, mainly the maxillary arch (15).

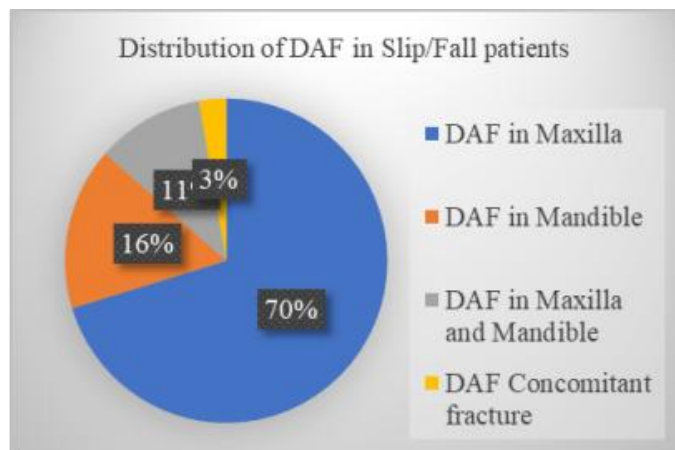


Fig 8: Prevalence of DAF in Slip/Fall cases.

Type of Fracture	Number
DAF in Both Jaws	4
DAF + Maxillary #	26
DAF + Mandibular #	6
DAF + Concomitant #	1

Table 8:

On the evaluation of Assault victims, almost half of the DAF cases were found to be in the maxillary arch (50%), followed by DAF in both maxillary and mandibular arches (30%). The cases with DAF occurring in the mandible and ones with concomitant fractures were both found to be only 10%⁽¹⁶⁾.

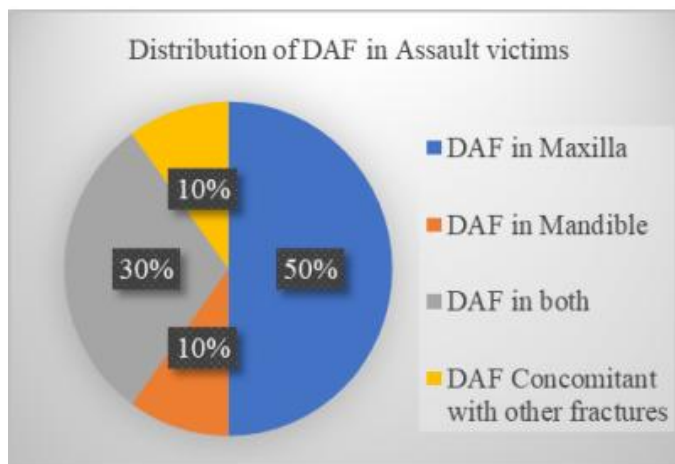


Fig 9: Prevalence of DAF in assault cases.

Type of Fracture	Number
DAF in Both Jaws	3
DAF + Maxillary #	5
DAF + Mandibular #	1
DAF + Concomitant #	1

Table 9:

Discussion

It was noted that Dentoalveolar Fractures were most commonly noticed in the maxilla (17). This could warrant the fact that the maxilla is forwardly placed in the skull, especially the anterior teeth, making them more vulnerable to such accidents. Additionally, this survey was conducted in a Gujarati dominant population, which has shown to have a higher genetic predisposition towards an Angle's Class II Malocclusion. A study hospital-based study conducted by Dr. Romina Kapadia et. al in Gujarat showed that Angle's Class-II, Div.1 malocclusion is the most prevalent in the Gujarati population (18). Their study concluded the following- In all, 47.6% showed CI-II Div 1, 40.2% showed CI-I, 8.2% showed CI-II Div-2 whereas only 4% showed CI-III malocclusion. This emphasizes the reason for higher instances of maxillary injuries pertaining to excessive overjet and overbite.

This survey also showed that out of a sample size of 93, most people experienced road traffic accidents (RTA) (19). It can be assumed that such is true due to poorly enforced traffic laws and partaking in unlawful activities such as unwillingness to wear appropriate safety gear while driving and/or driving under the influence (20). The drivers in RTA, on questioning, were found to drive 2-wheelers without proper helmets increasing their risk to get injured, it was also noted that drivers who were

wearing protective gear with a chin cap only suffered minor injuries and showed lesser chances of a dentoalveolar fracture. Furthermore, it was noted that drivers fell victim to the greatest number of dentoalveolar fractures, as opposed to pillion riders and pedestrians (21). This can be attributed to the fact that pillion riders are generally able to jump away from the vehicle; hence the driver becomes the bearer of the brunt of the force of impact.

Slip/fall cases were seen to be the second most common etiology for DAF. A pattern was noted wherein the maximum number of patients were females in the age range of 30-50 (22), these statistics brings about an assumption that such injuries could be due to domestic violence and are misrepresented as a slip/fall (23). A common etiology of DAF in the anterior teeth is a hit or a punch to the midface, which is expressed by physical assault victims. (24)

The third most common etiology seen was physical assault cases (25). Such was a result of either communal or interpersonal fights. It was also seen that the main reason for the assault was psychological aggression or triggers rather than intoxication. Additionally, maxillo facial traumas due to workplace incidents (factory mishaps) were noted but only in a small percentage of the sample population.

It is no surprise that the covid-19 pandemic affected various aspects of one's life and there was a significant trend seen in the number of cases of dentoalveolar fractures pre v/s post-pandemic (26). The prevalence of maxillofacial trauma was significantly reduced in the pandemic era of covid-19, as a large number of the population had stopped working and driving. A sharp increase in domestic violence was seen during the time of lockdown. A retrospective cross-sectional study

conducted by Piyush Kumar in the year 2022 noted that there was a steep increase in the total number of domestic violence complaints as compared to the year 2018. It was noted by him that there was a 55.03% rise in the year 2022 as compared to 2018 and a 56.43% rise as compared to the year 2019. ⁽²⁷⁾

Some domestic assault cases were not reported as such but the obvious signs of deliberated violence were evident which is a matter of conjecture.

One of the possible unwanted sequelae of dentoalveolar trauma to deciduous teeth is the dilaceration of the succedaneous teeth. This poses a great problem for future treatments. ⁽²⁸⁾

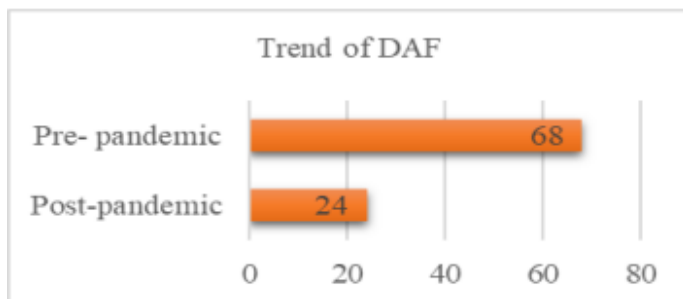


Fig 10:

Pre-Pandemic	68
Post -Pandemic	24

Table10:

Limitation

This study is a retrospective study that limits opportunities for patient follow-up, and one relies on the history, which could be misrepresented and cannot be crosschecked with the patient. Furthermore, at the time the history was elicited some information could have been missed out on.

This study also does not accurately follow any classifications of dentoalveolar fractures. Lastly, as several variables are taken into consideration we cannot narrow down to single causation. Hence, further studies

and research is required to link the etiology with the type of trauma.

Conclusion

It is integral for clinicians to understand the trend seen within dentoalveolar fractures to accurately diagnose such fractures and avoid missing them during a diagnosis. When a case of trauma is presented at a clinic a practitioner should keep in mind the etiology, and individual factors given during the patient history and link it to the pattern established during this study, hence circumventing an incomplete diagnosis. This will allow for better/quicker judgment and treatment protocols.

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