



### **Dentoalveolar Injuries - A 12 Years Retrospective Study of 366 Cases**

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#### **Abstract**

**Introduction:** Childhood and adolescence are both common times for dental trauma. From the point of injury, treating a traumatised tooth necessitates meticulous diagnosis and coordination among all dentists involved. Maxillofacial injuries require ongoing long-term data collection since it enables the creation and assessment of preventive interventions.

**Materials and Methods:** It was a retrospective study, done on a sample of 366 Patients, who attended our department between 2010 and 2022.

All subjects have been studied on parameters like gender, age, etiology, time lapse between injury and reporting,

jaw involved, side involvement, type of dentoalveolar injury and treatment done.

**Results:** The patients incorporated in the study comprised 366 patients with 276 males and 90 females. Males were injured two to three times more frequently than females.

The most common cause of the Dentoalveolar injury was due to RTA in 64.8% of cases, followed by fall (27.6%).

The amount of time elapsed between traumatic injury and patients seeking dental care (time difference) most commonly seen in 0–24 h (26%), followed by 2nd day (23.8%) and 3rd day (16.7%). upper jaw was involved in 177 (48.4%) whereas 154 (42.1%) of the cases lower jaw. The most common involved side was right side.

**Conclusion:** Being the longer the delay of consultation the poorer the prognosis. It required immediate intervention to present good prognosis.

Safety programs should be instituted in India to increase public awareness and to decrease morbidity resulting from Dento alveolar trauma.

**Keywords:** Dentoalveolar, trauma, Road Traffic accidents, maxillo facial, Prognosis.

### Introduction

Childhood and adolescence are both common times for dental trauma. From the point of injury, treating a traumatised tooth necessitates meticulous diagnosis and coordination among all dentists involved.<sup>1,2</sup>

Maxillofacial injuries require ongoing long-term data collection since it enables the creation and assessment of preventive interventions. When the etiologic factors are determined, preventive strategies that attempt to stop future injuries can be established.<sup>3,4</sup>

Nevertheless, a lot of this trauma is still being ignored, treated incorrectly or treated excessively, which will make future treatments more challenging.

These injuries have a variety of etiologies, types and sites depending on a number of variables. The results of various research may vary depending on the population's socioeconomic status and geographic location.<sup>5</sup>

Recent research indicates that trauma, such as falls, assaults, and car accidents, is the most frequent cause of maxillofacial injuries.

Alcohol intake, male gender, and criminal violence are risk factors for maxillofacial fractures. In addition to this increased leisure time has also become a significant contributor to the aetiology of maxillofacial fractures.

But the outcome for several Dento-alveolar injuries can be considerably improved with prompt and adequate care. In this regard, we have made an effort to gather

long-term data and have studied it in accordance with the above prospective.<sup>6</sup>

### Materials and Methods

It was retrospective study, done on a sample of 366 Patients was drawn from the patients who attended our department of Oral and Maxillofacial Surgery between 2010 and 2022.

Patients on clinically & radiographically who are diagnosed to have Dentoalveolar Fracture which may or may not be associated with any other maxillofacial & or other parts of the fracture of body were included and Patients whose records are not available or is partially available were excluded from the study.

All subjects of this study that have been reported and treated either by surgically or non-surgically, at our Centre, have been studied and analysed thoroughly on parameters like gender, age, etiology, time lapse between injury and reporting, jaw involved, side involvement, type of dentoalveolar injury and treatment done.

For the purpose of our study, a simple classification which was given by William D Clark was followed<sup>7</sup>

William D Clark Classification<sup>7</sup>

A fracture of the edentulous section results in a class I alveolar process fracture. (Figure 1A)

A dentulous portion of the alveolar process is fractured in a class II alveolar process fracture, with little to no displacement. (Figure 1B)

Alveolar process fracture of class III refers to a dentulous section that has moderate to severe displacement. (Figure 1C)

Alveolar process fracture, class IV refers to the fracture has one or more fracture lines that are shared with other fractures of the facial skeleton that supports the teeth. (Figure 1D)

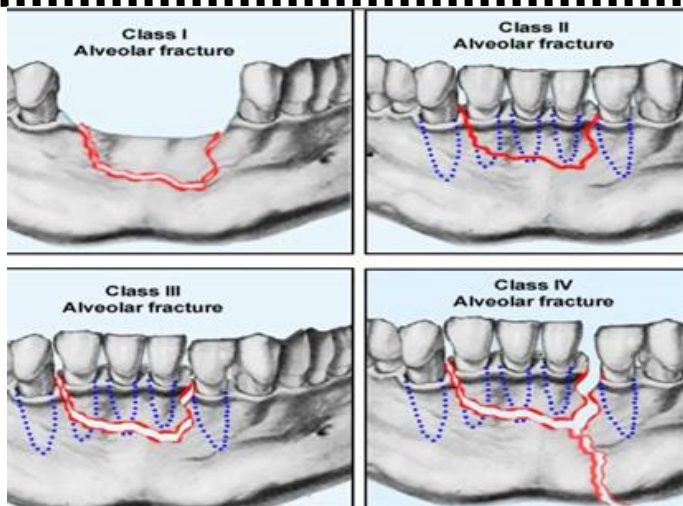


Figure 1: (A, B, C, D): William D Clark Classification

### Results

The patients incorporated in the study comprised 366 patients with 276 males and 90 females. Males were injured two to three times more frequently than females. (Table 1)

In case of young adults (15–20) years were 30.3% and adults second decade were 37.2% at the greatest risk for facial and dental injuries. (Table 2)

The most common cause of the Dentoalveolar injury was due to RTA in 64.8% of cases, followed by fall (27.6%). Occupational injuries was responsible in 4.9% and assault in 2.7% (Table 3).

The amount of time elapsed between traumatic injury and patients seeking dental care (time difference) most commonly seen in 0–24 h (26%), followed by 2nd day (23.8%) and 3rd day (16.7%). (Table 4).

As far as the jaws concerned almost in 177 (48.4%) upper jaw was involved whereas 154 (42.1%) of the cases lower jaw. In 35 (9.6%) patients involved both jaws (Table 5).

The most common involved side was right side involved in 70 (19.1%) of cases, left side was in 123 (33.6%) of cases and in 173 (47.3%) of cases both sides were involved. (Table 6).

The most common type of dentoalveolar fracture involved according to William D Clark classification were Class 2 in 148 (40.43%), Class 3 in 104 (28.41%), Class in 84 (22.95%) and Class 1 in 30 (8.19%) cases (Table 7, Graph 1).

Table 1: Gender Distribution

Gender	Number	Percentage%
Male	276	75.4%
Female	90	24.6%
TOTAL	366	100.0%

Table 2: Age Group Distribution.

Age Group in Years	Number	Percentage%
15-20	111	30.3%
21-30	136	37.2%
31-40	70	19.1%
41-50	35	9.6%
51-60	14	3.8%
TOTAL	366	100.0%

Table 3: Etiology of Trauma

Etiology	Number	Percentage%
Assault	10	2.7%
Occupational injuries	18	4.9%
Fall	101	27.6%
RTA	237	64.8%
TOTAL	366	100.0%

Table 4: Time Span between Injury and Reporting

Time Span Between Injury and reporting	Number	Percentage%
1 Day	97	26.5
2 Days	87	23.8
3 Days	61	16.7
4 Days	27	7.4
5 Days	5	1.4
6 Days	8	2.2
7 Days	44	12.0

8 Days	7	1.9
9 Days	2	0.5
10 Days	13	3.6
11 Days	0	0.0
12 Days	7	1.9
14 Days	3	0.8
15 Days	4	1.1
16 Days	1	0.0

Table 5: Jaw

Jaw	Number	Percentage%
Upper	177	48.4
Lower	154	42.1
Both Jaws	35	9.6
Total	366	100.0

Table 6: Side

Side	Number	Percentage%
Right	70	19.1
Left	123	33.6
Left and right	173	47.3
Total	366	100.0

Table 7: William D Clark Classification

	Number	Percentage%
Class I	30	8.19
Class II	148	40.43
Class III	104	28.41
Class IV	84	20.95
Total	366	100.0

Graph 1: WD Clark classification

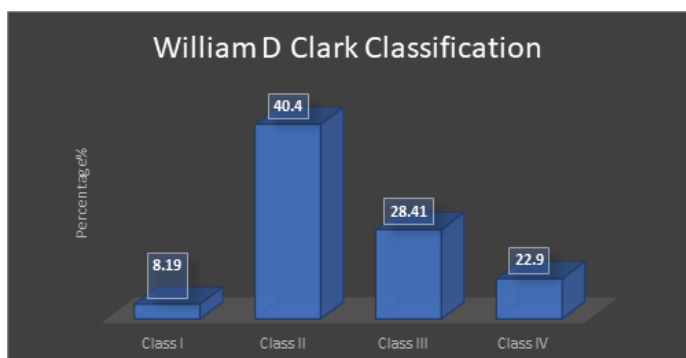
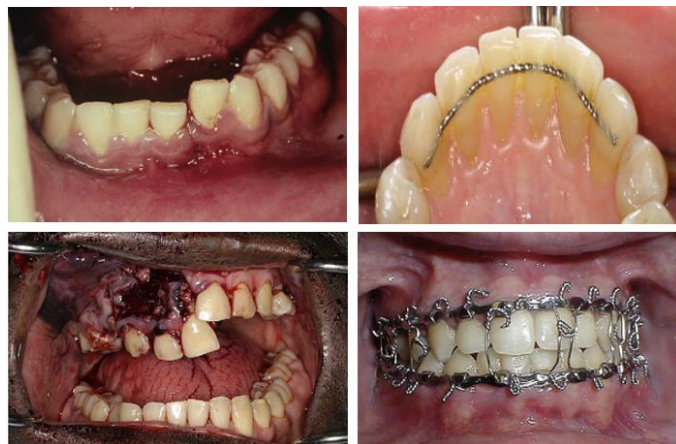


Figure 2: Different dentoalveolar injuries and their management



### Discussion

Both in urban and rural settings, maxillofacial injuries are becoming increasingly prevalent. Both the developed and developing nations have experienced a change in trend. Change in socio-economic status is largely responsible for the changes in pattern. In the developed nations, the major cause of the injuries is the interpersonal violence.<sup>8</sup> While in the developing nations it is mainly attributed to road traffic accidents. In developed nations, the number of maxillofacial injuries caused by RTA has significantly decreased attributable to strict road traffic rules and the installation of safety standards including the required safety belts, air bags, helmets use for motorized two-wheelers and speed limits.<sup>9</sup> But in developing countries like India, traffic and safety laws are not implemented strictly, hence RTA is responsible for 237 (68.4%) maxillofacial fractures in our study. The study done by Shaul Lin et al.<sup>10</sup> reported (54.5%), K. Subhash raj et al.<sup>11</sup> (62%), Second leading cause of dentoalveolar injuries in our study was accidental falls 101 (27.6%) cases followed by occupational injuries in 18 (4.9%) cases and Assault in 10 (2.7%) cases. Similar to other studies done by Husam Elias et al<sup>12</sup>, Amanda da Costa Nardis et al<sup>13</sup>, Po snick JC et al<sup>14</sup>. In contrary to our study Nardis AC et al.<sup>13</sup> found

the most common cause was fall 58.18%, Kallel I et al.<sup>15</sup> found 40% of cases were falls followed by RTA in 33.12% cases, Gfeller et al<sup>16</sup> found 30% cases of all in their study.

In the current study, the mean age of the subjects 111 (30.3%) patients were 15-20 years of age, 136 (37.2%) in 21-30 years age group are characteristic for young adults who sustain dental trauma. This represents a trend of trauma occurrence in school-age children and young adults, possibly as a result of intense social activity. Our study is in accordance to the previous studies done by Sawhney CP et al.<sup>17</sup> 77% in 16-30 years of age, Lin S et al<sup>18</sup> (30.3%) 19–28 years of age, Gfeller et al.<sup>16</sup> reported mean age 17.9 years and Tuli et al<sup>19</sup> was 18 years of age.

The high incidence of injuries in males and females (ratio 2:1) observed which are in accordance with previous publications done by Altay N et al.<sup>6</sup> (ratio 2:1), Schatz JP et al<sup>20</sup> (ratio 2:1), Gfeller et al.<sup>16</sup> (61.3% males and 38.7% females), Lin S et al<sup>18</sup> (ratio 7:2) where males were involved in greater extent as compared to females. One may speculate that this difference, greater participation in outdoor activities and in activities that require physical contact in which males are more commonly involved.

The mean time interval from injury until initial presentation to a health care professional was 97 (26.5%) patients within 24 hours, 87 (23.8%) within 2 days and 61 (16.7%) at 3 days. Which comprises of approximately 67% of cases. Previous studies done by Tuli et al<sup>19</sup> reported 60% of patients reported within 24 hours of trauma, Kallel I et al<sup>15</sup> mentioned in their study that majority of patients reported 1-3 days after injury. Being situated in the vicinity of city well known institution in the surrounding area immediately after trauma, patients are reporting to our center.

Upper Jaw was involved in most of the cases 177 (48.4%), lower jaw was involved in 154 (42.1%) of cases

and bijaw involvement was present in 35 (9.6%) patients. Similar results as observed by Gassner et al<sup>21</sup>, Iatrou I et al<sup>22</sup>, Kallel I et al<sup>15</sup> where upper jaw was most frequently involved.

Right side was involved in 70 (19.1%) patients, Left side was involved in 123 (33.6%) and both sides in 173 (47.3%) patients.

According to William D Clark classification<sup>7</sup>, Class I was present in 30 (8.19%) patients, Class II was in 148 (40.43%) patients, Class III in 104 (28.41%) patients and Class IV in 84 (22.95%) patients.

Splinting was done in Class I, II, III cases and Open reduction and internal fixation was performed in Class IV cases.

The longer the reporting period, prognosis of the treatment results will reduce accordingly. Patients consulting on the same day of the trauma presented an external root resorption at 3 months. the longer the delay of consultation, more complications occurred. Thus, for a period of 1 to 3 days, the patients underwent ankylosis and replacement resorption at 3 months, surface resorption and external root resorption at 4 weeks or at 3 months. For patients who came for consultation 3 days after trauma, they subsequently suffered from external root resorption at 4 weeks, 3 months, or 6 months. This was accordance to the study done by Kallel et al<sup>15</sup>. Immediately the treatment of the Dentoalveolar fracture was done with Erich arch bar fixation in adults and fibre reinforced composite arch bar in Paediatric patients.

### Conclusion

Based on the results of the present study, we can conclude that the incidence of Dentoalveolar fractures in the area of study is high, Boys were most commonly involved with frequent aetiological factor Road traffic accident, resulting in injuries of Upper jaw. Being the longer the delay of consultation the poorer the prognosis.

It required immediate intervention to present good prognosis. Safety programs should be instituted in India to increase public awareness and to decrease morbidity resulting from Dentoalveolar trauma.

### References

1. Nik-Hussein NN: Traumatic injuries to anterior teeth among schoolchildren in Malaysia. *Dental Traumatology* 2001, 17:149-52.
2. de Carvalho Rocha MJ, Cardoso M: Traumatized permanent teeth in Brazilian children assisted at the Federal University of Santa Catarina, Brazil. *Dental Traumatology* 2001, 17:245-9.
3. Hogg NJ, Stewart TC, Armstrong JE, Girotti MJ: Epidemiology of maxillofacial injuries at trauma hospitals in Ontario, Canada, between 1992 and 1997. *Journal of Trauma and Acute Care Surgery* 2000, 49:425-32.
4. Hausamen J-E: The scientific development of maxillofacial surgery in the 20th century and an outlook into the future. *Journal of cranio-maxillofacial surgery* 2001, 29:2-21.
5. Schwartz-Arad D, Levin L, Ashkenazi M: Treatment options of untreatable traumatized anterior maxillary teeth for future use of dental implantation. *Implant Dentistry* 2004, 13:120-8.
6. Altay N, Güngör HC: A retrospective study of dento-alveolar injuries of children in Ankara, Turkey. *Dental Traumatology* 2001, 17:197-200.
7. Clark WD: Mandibular Alveolar Fractures.
8. Zaitoun H, North S, Lee S, Albadri S, McDonnell S, Rodd H: Initial management of paediatric dento-alveolar trauma in the permanent dentition: a multi-centre evaluation. *British dental journal* 2010, 208:E11-E.
9. Lin S, Levin L, Goldman S, Peleg K: Dento-alveolar and maxillofacial injuries: a 5-year multi-center study. Part 1: General vs facial and dental trauma. *Dental Traumatology* 2008, 24:53-5.
10. Lin S, Levin L, Goldman S, Sela G: Dento-alveolar and maxillofacial injuries: a 5-year multi-center study. Part 2: Severity and location. *Dental Traumatology* 2008, 24:56-8.
11. Subhashraj K, Nandakumar N, Ravindran C: Review of maxillofacial injuries in Chennai, India: a study of 2748 cases. *British Journal of Oral and Maxillofacial Surgery* 2007, 45:637-9.
12. Elias H, Baur DA: Management of trauma to supporting dental structures. *Dental Clinics* 2009, 53: 675-89.
13. da Costa Nardis A, Costa SAP, da Silva RA, Kaba SCP: Patterns of paediatric facial fractures in a hospital of São Paulo, Brazil: a retrospective study of 3 years. *Journal of Cranio-Maxillofacial Surgery* 2013, 41:226-9.
14. Posnick JC, Wells M, Pron GE: Pediatric facial fractures: Evolving patterns of treatment. *Journal of oral and maxillofacial surgery* 1993, 51:836-44.
15. Kallel I, Douki N, Amaidi S, Ben Amor F: The incidence of complications of dental trauma and associated factors: a retrospective study. *International journal of dentistry* 2020, 2020.
16. Gfeller D, von Arx T: Retrospective analysis of dento-alveolar injuries at a Swiss university clinic (2011-2015). *Swiss dental journal* 2021, 131:500-10.
17. Sawhney C, Ahuja R: Faciomaxillary fractures in North India a statistical analysis and review of management. *British journal of oral and maxillofacial surgery* 1988, 26:430-4.
18. Lin S, Levin L, Goldman S, Peled M: Dento - alveolar and maxillofacial injuries—a retrospective study from a level 1 trauma center in Israel. *Dental Traumatology* 2007, 23:155-7.

19. Tuli T, Hächl O, Rasse M, Kloss F, Gassner R:  
Dento alveoläre Traumen. Mund-, Kiefer-und Gesichtschirurgie 2005, 9:324-9.
20. Schatz J-P, Joho J-P: A retrospective study of dento-alveolar injuries. Dental Traumatology 1994, 10: 11-4.
21. Gassner R, Tuli T, Hächl O, Moreira R, Ulmer H: Cranio maxillofacial trauma in children: a review of 3,385 cases with 6,060 injuries in 10 years. Journal of oral and maxillofacial surgery 2004, 62:399-407.
22. Iatrou I, Theologie-Lygidakis N, Tzerbos F: Surgical protocols and outcome for the treatment of maxillofacial fractures in children: 9 years' experience. Journal of Cranio-Maxillofacial Surgery 2010, 38:511-6.