

Prevalence of Permanent Anterior Teeth Trauma in Children Between 8-12 Years in Urban and Rural Districts in Rohtak, Haryana, India

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ABSTRACT

Trauma to the oral region occurs frequently and comprises of 5% of all injuries for which people seek treatment. The aims and objectives of this study is to assess and record the prevalence of traumatic injuries to the permanent dentition in 8-12 year children in urban and rural areas of district Rohtak and to ascertain the percentage of children seeking treatment. Out of 2000 school children, 323 children had suffered injury to permanent anterior teeth. The overall prevalence of traumatic dental injuries of permanent anterior teeth in Rohtak was observed to be 16.1%. A significant gender influence on the occurrence of trauma was observed with more boys (18.4%) than girls (13.6%). This study showed that majority (97.3%) of children with dental trauma remained untreated as only 9 children had undergone treatment among 323 children who suffered dental trauma. Dental injuries are preventable and preventive and promotive programmers should be encouraged to reduce the prevalence of dental injuries in children. Public Health Education regarding the epidemiology of dental injuries and its prevention through health promotion may play a major role in reducing the prevalence of traumatic dental injury and avoiding the cost of treatment in developing countries.

Keyword: Prevalence, Anterior teeth, dental, trauma, Rohtak, Haryana.

INTRODUCTION

Trauma to the oral region occurs frequently and comprises of 5% of all injuries for which people seek treatment¹. In the permanent dentition, dental injuries increase in school going children due to vigorous playing and sports activities. 30 % of all children suffer trauma to primary dentition and 22% children suffer trauma to permanent dentition². The

most common injuries in the permanent dentition are due to falls, followed by traffic accidents, acts of violence and sports¹.

Traumatic dental injuries may range from simple enamel fracture to complete tooth loss which may have a bearing on child patients and their parents. The maxillary incisors are the most frequently injured teeth in both primary as



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well as permanent dentition and in most of the cases damage occurs to the crown³. Because of their exposed position in the dental arch, maxillary incisors are the teeth most commonly involved. Incisal injury occurs more frequently in male children, children with prognathic maxillae and children with pronounced overjet³.

Epidemiological reports indicate that dental trauma is a serious dental public health problem in children and may exceed the occurrence rate of dental caries and periodontal diseases in a foreseeable future⁴.

Epidemiological data provide a basis for evaluation of the concepts of effective treatment, and planning within any health environment. Furthermore, in India there is a paucity of studies on the prevalence of trauma to the dentition as compared to dental caries and periodontal diseases. Hence this study was designed as an effort to measure the prevalence of trauma to the anterior teeth, in urban and rural areas in Rohtak, which could provide necessary information for future dental health planning and clinical practice.

Aims and objectives

The aims and objectives of this study are

- To assess and record the prevalence of traumatic injuries to the permanent dentition in 8-12 year children in urban and rural areas of district Rohtak.
- To ascertain the percentage of children seeking treatment

MATERIALS AND METHODS

Area profile

Rohtak is a district located in the southeast of Haryana. It is located in the southeast of Haryana & northwest of Delhi, bounded by Jind and Sonapat districts to the north, Jhajjar and Sonapat districts to the east and Hissar, Sirsa and Bhiwani districts to the west.

The district covers an area of 1668.47 km². The district consists of two tehsils - Rohtak and Meham. Rohtak tehsil is further divided into three community development blocks - Rohtak, Kalanaur

and Sampla. Meham tehsil is further divided into two community development blocks - Meham and Lakhna-Majra.

The present study was undertaken by the Department of Pedodontics and Preventive Dentistry, Government Dental College, Rohtak from September 2008 to August 2009 with the aim of obtaining data regarding injuries to the permanent anterior teeth. The survey was carried out on 2000 school children of both genders whose age ranged from 8-12 years. Children from both Government and private schools of urban and rural areas of Rohtak formed the study population. Consent was obtained from concerned authorities of schools. The Principals and head teachers of the schools were informed about survey schedule for permission and cooperation.

Children whose permanent anteriors had erupted, or at least 3/4ths the crown had emerged into the oral cavity and in the age group of 8-12 years were included in the study. Those children receiving orthodontic treatment or had undergone orthodontic treatment were excluded from the study.

The clinical examination was carried out under daylight with subjects seated on a chair. A sufficient number of mouth mirrors, probes, tweezers, kidney trays, gloves, pads, cotton were packed and sterilized for each day of work. A tooth was considered fractured, when a part of it was missing due to trauma. Types of anterior teeth were classified according to Ellis and Davey Classification⁵.

RESULTS

Table 1 depicts the Prevalence of dental trauma according to age and sex. Of 323 children who suffered dental injuries, 198 were males and 125 were females. The difference between the distribution of dental trauma in age groups of 8-10 and 11-12 in both the sexes was found to be statistically insignificant ($p > 0.05$). The difference between the distribution of dental trauma in urban and rural areas in both the sexes was found to be statistically insignificant ($p > 0.05$).

Table 2 shows that in male children, 106 suffered dental trauma due to falls, 20 suffered injuries due to collision, 24 suffered trauma due to sports, 6 due to road traffic accidents. 42 male children were unaware of the cause of dental trauma. Table 2 shows that dental trauma is significantly ($p < 0.001$) associated to the cause of injury.

Table 3 shows In 323 children who had suffered traumatic anterior teeth, Type I ie fracture involving enamel and very little dentin (78.6%;254/323) was the most common injury, followed by Type II (15.8%;51/323), type IV injuries were 3%(10/323), type III injuries were 6%(6/323). The least common was Type VII (0.3%; 1/323) and Type V (0.3%; 1/323).

Among 2000 children who were examined, 247 had inadequate lip coverage and 1753 had adequate lip coverage (Table 4).

Table 5 shows that in trauma group, 42.7% had increased overjet. Table 5 shows that overall chisquare value of overjet is statistically highly significant ($p < 0.001$).

DISCUSSION

The present cross-sectional study was a survey about prevalence, causes and associated risk factors of traumatic injuries to permanent anterior teeth in school going children in the age group of 8-12 years in Rohtak.

Prevalence of Anterior Teeth Trauma

This study found a prevalence of 16.1% traumatic dental injuries in 2000 school going children aged between 8-12 years. This result corroborates the assertion that dental injuries among children frequently present the prevalence between 10% and 20%⁶. Prevalence of traumatic

Table 1: Distribution of traumatic cases according to age and sex

Age Group	Sex		Total
	Male (%)	Female	
8-10	49(24.7%)	33 (26.4%)	8 (25.4%)
11-12	149 (75.3%)	92 (73.6%)	241(74.6%)
Total	198	125	323

Chi Square =0.110, $p > 0.05$

Table 2 : Distribution of traumatic cases according to causes of injury and sex

Cause	Traumatic cases		Total
	Male	Female	
Fall	106	86	192
Collision	20	27	47
Sports	24	5	29
Road Traffic Accident	6	2	8
Biting Hard	0	2	2
Don't Know	42	3	45
Total	198	125	323

Chi Square =38.94,, $p < 0.001$

Table 3: Distribution of traumatic cases by cause of injuries and type of fracture

Causes	Type of Fracture							Total
	Type I	Type II	Type III	Type IV	Type V	Type VII	Type VIII	
Fall	141	41	4	7	0	0	0	192
Collision	40	4	1	2	0	0	0	47
Sports	23	3	1	1	1	0	0	29
Road Traffic Accident	5	2	0	0	0	1	0	8
Bite-Hard	2	0	0	0	0	0	0	2
Don't Know	44	1	0	0	0	0	0	45
Total	254	51	6	10	1	1	0	323
	78.6%	15.8%	1.8%	3%	0.3%	0.3%		100%

Table 4 : Over all distribution of cases according to lip competency

Lip Competency	Group		Total
	Traumatic	Nontraumatic	
Incompetent	169	78	247
Competent	154	1599	1753
Total	323	1677	2000

Chi square= 546.12, $p < 0.001$

dental injuries found in this study (16.1%) was higher than those found in the studies done by Tangade P.S⁷ (4.41%), Tandon S⁸ (13.8%). Soriano E P⁹ et al observed prevalence of dental injuries to be 10.5%. Prevalence of traumatic dental injuries found in this study (16.1%) was lower than those found in the studies done by Tovo¹⁰ (17%), Traebert¹¹ et al (17.3%) and Garcia Godoy F¹² who reported prevalence rate of 28.4%.

Prevalence of Anterior Teeth Trauma according to sex

In the present study, boys (18.4%) presented more traumatic dental injuries than girls (13.6%) in the ratio of (1.5:1) and significant gender influence on the occurrence of trauma was observed with more boys (18.4%) than girls (13.6%). This corroborates the other studies from different part of the world (Nick- Hussein N et al²³ Malaysia; Rocha¹³ et al, Brazil; Rai S et al¹⁴; Ravn J¹⁵). Tangade P.S⁷ reported a prevalence of 4.96% in males and 3.33% in females, which was found to be significant. In a study conducted by Cortes¹⁶, it was found that boys were 1.7 times more likely to have dental injuries than girls. Tovo¹⁰ in a study reported no significant difference between boys and girls and this is in contrast to the present study. This disparity may be attributed to difference in sociodemographic and behavioral factors.

Prevalence of Anterior Teeth Trauma according to age

In the present study, 74.6% of the children who suffered dental injuries were eleven and twelve years (11-12 years) of age, while the younger age group of eight to ten years (8-10 years) suffered far less injuries (25.4%). The difference between

Table 5 : Overall distribution of cases according to incisal overjet

Incisal Overjet	Trauma Group		Total
	Trauma Group	Non trauma group	
Decreased	8 (5.9%)	113 (94.1%)	121
Normal	212 (12.9%)	1409 (87.1%)	1621
Increased	94 (42.7%)	126 (57.3%)	220
Open Bite	10 (25.6%)	29 (74.4%)	39
Total	323	1677	2000

Chi square= 136.85, $p < 0.001$

the distribution of dental trauma in age groups of 8-10 and 11-12 in both the sexes was found to be statistically insignificant ($p > 0.05$). The fact that the prevalence of dental injury increased with age does not mean that the older children were more vulnerable, but due to the fact that the measurement of dental injuries is cumulative. The peak occurrence of trauma was found to vary in different studies. In a study conducted by Cortes¹⁶, the prevalence of traumatic injuries to permanent incisors was 8% at the age of nine years, 13.6% at twelve years and reached 16.1% at the age of fourteen years. Saroglu I and Sonmez¹⁷ reported that the trauma most frequently occurred at 11 years of age. Andreassen J O and Ravn JJ¹⁸ reported peak incidence of trauma at 9-10 years for both sexes. Ravn JJ¹⁵ reported that the largest number of injuries in both the sexes occurred in the age of 8-9 years. The results of the present study is in contrast to a study by Oikarinen K, Kassila O¹⁹ in which the prevalence was highest in the age group 7-10 years for girls and in the age group 11-15 for boys.

Prevalence of Anterior Teeth Trauma according to teeth affected

The most commonly affected tooth in this study was the maxillary central incisor (88%), followed by the maxillary lateral incisor (6.2%). This is in agreement with the findings of Saroglu I et al¹⁸, Tovo et al¹⁰, Gabris et al²⁰, Cortes¹⁶ and Glendor²¹. In a study by Adekoya CA²², it was reported that maxillary central incisors were most frequently

affected (74.3%). The finding that maxillary incisors are the teeth most frequently traumatized is corroborated in a study by Lam et al²³ and national studies^{5,24,25}. In the present study, out of 528 teeth affected by trauma, 497(94.1%) were maxillary teeth and 31(5.9%) were mandibular teeth. This is similar to the findings of Saroglu¹⁸ who reported that maxillary arch was involved in 95.72% of traumatic cases.

Prevalence of Anterior Teeth Trauma according to cause of trauma

In the present study, fall was the most frequent cause of dental trauma, occurring in 192 (59.4%) of all subjects, irrespective of the sexual variation (male-106 & female-86). This finding is in accordance with the studies done by Rai (45.40%)¹⁴, Soriano(30%)⁹. The next highest group of injury in the present study is due to collision(14.7%). This result is similar to the study by Nicolau B²⁵ who found collision to be the cause in 15% of the traumatic cases. In comparison with the present study, collision as the cause of injury was reported by Soriano⁹ at a higher(18.2%) percentage and in a study by Saroglu¹⁸ at lesser percentage 8.66% of dental injuries. In the present study, 45 children(13.9%) were unaware of the cause of injury. This can be compared with studies by Soriano⁹(22.7%), Rai⁵(6.7%), Nicolau B²⁵(40.6%), Traebert¹¹(40%). This may be attributed to the study being retrospective and that several children didn't remember the origin of trauma. Nicolau B²⁵ had found that unknown etiology accounted for 40.6% of the injury in his study and concluded that as often, when damage is due to violence, the victim tends to report unknown cause.

The present study also showed that sports activities(8.9%) and road accidents (2.5%) accounted for less percentage of dental traumas concurring with other studies by Soriano⁹ and Ravn¹⁵. Our finding is similar to a study by Soriano⁹ in which etiology of sports (8.2%) and road accidents (2.7%) was reported. Saroglu¹⁸ observed injuries due to sports(3.9%) and traffic accidents(8.6%).

Prevalence of Anterior Teeth Trauma according to type of trauma

In the present study sample, class I fracture ie fractures involving enamel (78.6%) were the most

frequent type of traumatic dental injuries observed, corroborating the findings of other studies (Cortes et al¹⁶, Tovo et al¹⁷ and Soriano et al⁹). The present study is in agreement with study by B Bastone³ in which it was reported that uncomplicated crown fracture without pulp exposure was the most common injury to permanent dentition in most studies. In the present study, the second most frequent type of fracture is type II (15.8%). The above findings are consistent with the findings of Rai¹⁴, Garcia Godoy¹². These results from the present study are similar to a study by Al-Majed²⁶, in which the most prevalent dental trauma type in 12-14 year-old Saudi boys was fracture of enamel only, representing 74.3% of teeth injured. The proportions of enamel and dentin fracture were 15.2%. No type VIII injury was observed in this survey. This result is much similar to the study of Rai S¹⁴.

Prevalence of Anterior Teeth Trauma according to overjet

The results of the present study showed a significant association between the presence of dental trauma and increased overjet. This finding concurred with findings of other studies done by Soriano⁹, Tangade P S⁷, Al Majed²⁶, Tandon S⁸ and Kahabuka²⁷. The results of the present study differs from a study by Tandon S⁸, who showed relation between incidence of overjet and prevalence of fractured incisors was not statistically significant.

Prevalence of Anterior Teeth Trauma according to lip coverage and locality

In the present study, 52.7% of traumatized children had incompetent lips. Compared to non-trauma group, this factor was highly significant. These results are in concurrence with Traebert¹¹, Cortes¹⁶. They found that children with inadequate lip coverage were less likely to have a traumatic dental injury than their normal counterparts. The present study showed no statistical difference between prevalence of trauma in rural and urban area. This result is corroborated by Hamdan M. A.²⁸ and is contrast to a study by Adekoya²³.

Prevalence of Anterior Teeth Trauma according to treatment done

This study showed that 97.3% of children with dental trauma remained untreated. This can

be compared with (2.4%) reported by Al Majed²⁶ and 1.68% of cases having undergone treatment by Rai¹⁴. In a study by Nik Hussein N N²⁹, it was found that the proportion of anterior teeth requiring treatment was 91% as compared to 97.3% in our study.

In a study by Traebert¹¹, only 27.6% of traumatized were treated and this is higher than the present study. Tovo¹⁰ et al reported in their study that 20%(7) of the children who suffered dental trauma sought treatment and this value is higher than the present study. In a study by Hamilton³⁰ F.A et al, it was found that only 47% of the traumatized teeth needing treatment received any, and 59% of which was inadequate. This is in contrast to our study (2.7%) children having undergone treatment.

CONCLUSIONS

Dental fractures must receive special attention since they may disturb the affected children's mastication and phonetics as well as adversely affecting the physical appearance and committing the patient to lifelong dental maintenance. Dental injuries are preventable and preventive and promotive programmes should be encouraged to reduce the prevalence of dental injuries in children. Public Health Education regarding the epidemiology of dental injuries and its prevention through health promotion may play a major role in reducing the prevalence of traumatic dental injury and avoiding the cost of treatment in developing countries.

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