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Original Research Article

Prevalence of dental trauma in permanent anterior teeth in 6-12-year-old children in school going children of East Delhi

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ABSTRACT

Background: Traumatic dental injury affects many children and adolescents, and it considered a challenging public health problem. Injuries involving permanent teeth are one of the most common types of trauma to the maxillofacial area. The prevalence of traumatic dental injuries varies greatly, and it ranges from 4% to 58%
Methods: A cross-sectional survey was carried among 700 school children aged 6 and 12 years in East Delhi. A list of primary and secondary schools of East Delhi area was obtained. A multistage random sampling technique was adopted to select the study population. The children aged 6-12 years with signed consent and in whom permanent anteriors had erupted were included in the study. The oral examination was conducted by a single calibrated examiner using WHO oral health assessment Performa 2013.
Results: Overall prevalence was 7.71%. Dental trauma was 1.90%, 10.27% and 10.12% respectively in Group I, Group II and Group III respectively. Female reported with 7.57 % and males with 10.81% (p=0.001). Maxillary Central incisors were found to be the most frequent teeth to be injured.
Conclusions: Parents may lack information regarding the consequences of dental trauma and don't report for dental consultation. Along with seeking dental care, patient must be educated about the use of protective mouth guards while playing contact sports which may help to reduce the incidence and severity of dental injuries.

Keywords: Anterior teeth, Trauma, Injury

INTRODUCTION

Traumatic dental injury (TDI) is a significant public health concern and presumed to be the fifth most prevalent dental disease in the world. According to meta-analysis of the worldwide global burden of TDI reported a prevalence of 15.2% in permanent dentition alone.[1] It is often associated with minor accidents, such as fall or contact with blunt objects while playing.[2] Traumatic injuries to the anterior teeth among the young children are most common problem.[3] Dental trauma results in fractured, displaced or lost teeth can have significant negative functional, esthetic and psychological effects on children.[4] The most frequent traumatic dental injuries occur between the age group of 2 and 4 years and between 8 and 10 in both genders.[5] The most frequently affected teeth are the maxillary central incisors. The most common types of traumatic dental injuries to permanent teeth are enamel fractures, enamel and dentine fractures, and enamel and dentine fractures with pulpal involvements.[6] Dental trauma is also a source of distress for both the parents and children. A number of predisposing risk factors like incompetent lips and increased incisal overjet are needed to considered.[7] During the school age group, children actively indulge in outdoor play. Though these activities are markers of growth and development of the child but careless activities, loss of balance and impaired movements increase the possibility of injuries.[8] Trauma to the tooth followed by pulpal hyperemia, alteration in the blood flow in the pulp, and over time can cause pulpal necrosis. The damaged apical vessels interfere with the reparative process and the prognosis of such tooth.[9] Delhi is the most populous state

of the country. Although literature search shows very few studies in North East Delhi region on the epidemiological data regarding the prevalence of traumatic injuries, which is very essential to formulate an action plan to combat them. Hence, this study was conducted to assess the prevalence of traumatic injuries to the anterior teeth amongst the school-going children of North East Delhi in the age group of 6 -12 years of age.

METHODS

A cross-sectional survey was carried out in four government and six private schools among 700 school children aged 6 and 12 years in East Delhi. Based on previous Indian studies, a sample size of 597 children was sufficient. Adding 10% absentee and non-consent, the sample size increased to 664. Henceforth, it was decided to take 700 children as the sample size of the study. Before enrolling in the study, written consent and informed consent were obtained from the school authorities and the child's parents or caretakers, respectively. A list of primary and secondary schools of East Delhi area was obtained.

A multistage random sampling technique was adopted to select the study population. It was selected on the basis of ease of accessibility. In the first stage, 10 representative schools from the list of schools of the area were identified randomly. In the second stage, by using a computer-generated random number table based on the enrollment registration number of each student in the school, 70 children were selected randomly from each of the ten selected schools. The children aged 6-12 years with signed consent and in whom permanent anteriors had erupted were included in the study. Children with developmental anamolies of teeth or children undergoing orthodontic treatment or children in whom the permanent anterior teeth had not yet erupted were excluded. Also, the children in whom the permanent anteriors were lost due to caries or cause other than trauma or those having partial/complete anodontia involving permanent anteriors were not included in the study. The oral examination was conducted by a single calibrated examiner using WHO oral health assessment performa 2013.[10] The clinical examination was conducted with the use of a plane mouth mirror to assess the prevalence of traumatic dental injuries. The examination was conducted in a well-ventilated classroom under natural daylight. Then the examination of traumatic dental injuries was recorded on maxillary and mandibular anterior teeth. 6-12-year-old children were divided into three groups: Group I: 6-8 years, Group II: 8-10 years and Group III: 10-12 years. The survey data were coded and results were analyzed using "Statistical Package of Social Sciences" (SPSS) 20 software. Data analysis included descriptive statistics (frequency distribution and cross tabulation). Chi-square test was employed to compare qualitative data and determine the statistical significance. The level of statistical significance was set at $p<0.05$.

RESULTS

The (Table 1) shows the number of children examined in group and gender. Out of 700 children, 381were male and 319 were female. The (Table 2) compares different groups to the prevalence of trauma.

Table 1: Profile of study population.

Group	Male, N (%)	Female, N (%)	No. of children, N (%)
Group I	117 (55.71)	93 (44.29)	210 (100)
Group II	140 (55.34)	113 (44.66)	253 (100)
Group III	124 (52.33)	113 (47.67)	237 (100)
Total number of children	381 (54.43)	319 (45.57)	700 (100)

Table 2: Prevalence of dental trauma in 6-12-year-old children examined in the study.

Group	Total no. of children	No. of children with trauma	Prevalence (%)	P value
Group I	210	4	1.90	0.001**
Group II	253	26	10.27	
Group III	237	24	10.12	
Total	700	54	7.71	

**p value <0.001 is statistically highly significant

Table 3: Prevalence of dental trauma in 6-12-year-old children (gender wise).

Gender	Total no. of children	No. of children with trauma	Prevalence (%)	P value
Male	370	40	10.81	0.001**
Female	330	25	7.57	

**p value <0.001 is statistically highly significant

Overall prevalence was 7.71%. Dental trauma was 1.90%, 10.27% and 10.12% respectively in Group I, Group II and Group III respectively. Chi-square test was applied and association between group and trauma were found to be

highly significant (p=0.001). The (Table 3) shows between gender wise prevalence of Dental trauma. Female reported with 7.57 % and males with 10.81% (p=0.001). According to (Table 4) 59.7% of injured teeth had injury involving only enamel while 1.19 % involved pulp.

Table 4: Nature of trauma.

Group	Total children	No sign of injury	No. of teeth injured	Enamel fracture only	Enamel & dentine fracture	Pulp involvement	Treated injury/missing teeth due to trauma/other damage/excluded teeth
Group I	210	206	5	4	1	0	0
Group II	253	227	31	21	7	3	0
Group III	237	213	31	15	11	5	0
Total	700	646	67	40 (59.7)	19 (28.35)	8 (1.19)	0

Out of 700 only 54 children had suffered dental trauma in which 67 teeth were found to be injured. In total 67 teeth were injured in 54 children. Out of 67 teeth injured, 45 were Maxillary Central incisors followed by 13 Maxillary Lateral incisors. Hence Maxillary Central incisors were found to be the most frequent teeth to be injured (Figure 1).

Table 5: Distribution of injured teeth in the maxillary and mandibular arch.

Tooth	No. of teeth injured
Maxillary central incisor	45
Maxillary lateral incisor	13
Mandiblar central incisor	4
Mandiblar lateral incisor	2
Maxillary canine	3
Mandibular canine	0
Total	67

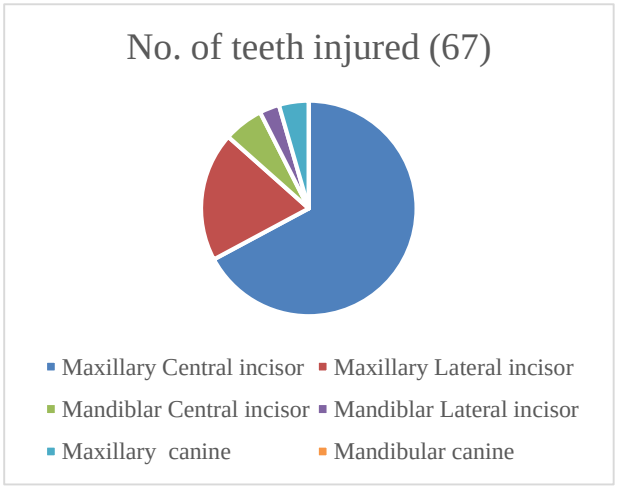

Figure 1: Distribution of injured teeth in the maxillary and mandibular arch.

DISCUSSION

Trauma to the child dentition is an important issue, since fracture of one or more teeth, especially the anterior, may result in pain, loss of function, poor aesthetics and psychological trauma.[11] Traumatic dental injuries constitute a true dental emergency and require immediate assessment and management. Traumatic dental injury is not a result of disease but a consequence of several factors that may include demographics or risk factors like overjet, overbite that will accumulate throughout life if not properly treated.[12] This study identified the prevalence of traumatic dental injuries to the permanent anterior teeth in 6-12-year-old school children The prevalence of traumatic dental injuries worldwide ranges from 6 to 37%.[11]

The prevalence of traumatic injuries to the anterior teeth in 6 to 12 years old age group was found to be 7.71% in the present study. Various factors have influenced the prevalence of traumatic dental injuries in various countries, such as classification for trauma used, research methodology, consideration of diagnostic criteria, number of patients, method of patient examination, and cultural and behavioral differences between the study location and countries.[13] The most common etiologies behind traumatic dental injuries are falls, road traffic accidents, collisions and sporting activities.[14] Males accounted for 40 (10.8%) affected children in the present study, whereas females accounted for 25 (7.57%). Overall, males experienced more traumatic injuries than the females with male to female ratio of 1.4:1. Gupta et al showed a male to female ratio of 2:1 in south Kanara district.[15]

There has been a general agreement in the literature about male predominance of dental trauma has been reported in the majority of the previous studies.[11,14,16,17] This is may be due to the fact that males tend to be more energetic and involved in more activities and vigorous games and outdoor games with higher trauma risk than girls. The fact that girls experienced a low prevalence of dental trauma might be partially explained by there being a higher level of maturity in girls' behavior compared with the boys, who incline towards risk-taking behaviors.[18] However, there is one study in Jordan which reported that there were no gender differences.[19] Because of their exposed position in the oral cavity, maxillary central incisors are affected by traumatic injury at significantly higher rates than other teeth. Of the injured teeth evaluated in this study, 83.33% were central upper incisors. This rate is comparable with the rates reported in the literature.[20,21] The reason can be

explained by the fact that in the vertical plane, the maxillary arch is located more anteriorly than the mandibular arch as a result of which the impact of injury would be more on the maxillary arch and the upper jaw is rigid and the lower jaw is movable which leads to the predisposition of certain teeth to injury. A majority of injuries occurred in the maxillary central incisor followed by the maxillary lateral incisor which could also be due to early eruption of the maxillary central incisor than the maxillary lateral incisors and, thus, are at risk for a longer period of time. Most of the children had only one tooth traumatized (78.1%). When one tooth is traumatized, the majority of the force of impact is dispersed by the fractured tooth and no more teeth are traumatized.

The highest occurrence of dental injury was found in the age interval of 9-10 years of age.[22,23] Similar finding observed in present study with Group II (10.27 %) with maximum prevalence. This could be attributed to the fact that children are usually more active in this period of life and often lack motoric coordination. The present study found that most common injuries were of enamel fracture (59.7 %), followed by the fracture involving enamel and dentin (28.35%), this finding is similar to other studies by Gupta et al, Andreasen et al and Rai et al.[15,24,25] The prevalence of traumatic dental injuries worldwide ranges from 6 to 37%.[14,26,27] The prevalence of traumatic injuries in our study was found to be 7.71% Group I reported with prevalence of 1.9% Group II with 10.27 % and Group III with 10.12%. Rai SB et al observed a prevalence of 5.29% among 3 to 16 years old school going children in South Kanara.[24] Gupta et al in 2002 found a prevalence of 39.26% in 8 to 10 years old children in south Kanara.[15] Hashim et al reported prevalence of 9.8%.[18] Perhaps no single dental problem has a greater psychological impact on parents and children than the loss or fracture of a child's front teeth.[28]

CONCLUSION

Parents may lack information regarding the consequences of dental trauma and don't report for dental consultation. Along with seeking dental care, patient must be educated about the use of protective devices such as mouth guards which may help to reduce the incidence and severity of dental injuries during sports. Recommended prevention methods include childproofing the home, orthodontic treatment of protruding teeth, and education of the public regarding the management of luxated/exfoliated teeth and where to seek care following injury to the teeth. Identifying the etiological factors makes it possible to establish preventive measures aimed at avoiding future injuries.

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