

Prevalence of Traumatic Dental Injuries among School Going Children in Farukhnagar, District Gurgaon

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Abstract

Background: Dental trauma is a significant problem in children which requires immediate attention. Dental injuries may occur throughout life, but Traumatic Dental Injuries (TDI) is a very significant problem among children.

Objective: To assess the prevalence and role of risk factors in traumatic dental injuries (TDI) on 12 and 15 year old school going children of Farukhnagar (Gurgaon), Haryana.

Methods: A cross-sectional survey was conducted among 12 and 15 year old school going children. The schools were selected by random sampling from Farukhnagar block. The demographic detail was recorded on a structured questionnaire. The data regarding the traumatic injuries was recorded using Elli's classification of traumatic dental injuries (TDI)

Results: Prevalence of TDI was found to be 12.8% in which maxillary central incisors were the most common tooth affected due to trauma, surprisingly majority of TDIs were untreated.

Conclusion: There is a substantial amount of untreated TDI so it is crucial to generate and implement health promotion strategies and facilitate dental care in schools

Keywords: Permanent Teeth, School Children, Trauma

INTRODUCTION

One of the greatest assets a person can have is a "smile" that shows beautiful, natural teeth. An untreated and unsightly fracture of an anterior tooth can affect the behavior of a child, his progress in school and can have more impact on their daily living.¹ Trauma to anterior teeth is undesirable and prevention of this is beneficial to the personality development of the child.

Dental injuries may occur throughout life, but Traumatic Dental Injuries (TDI) are a very significant problem among children. The main etiology being accidents like falls, fights and during sports.² They are associated with biological, socio-economic, psychological and behavioural factors. The predisposing dental risk factors include increased incisal overjet, openbite, protrusion and lip incompetence.³

During the school age, children actively indulge in outdoor play, especially organized bodily contact play. Careless activities increase the possibility of injuries. Though these activities are markers of growth and development of the child, loss of balance and impaired movements are the result of traumatic injuries.⁴

The problem of fracture anterior teeth is a perplexing one to the parent, child and especially the dentist.¹ The behavior of child, as well as his progress in school and especially his psychological stability can be affected by an untreated and unsightly fracture of an anterior tooth.

Recent studies have shown that there is decrease in the incidence of dental care owing to the development and implementation of various programmes in the prevalence of dental caries. However, TDI are on the rise and are the

3rd largest cause for the mortality of teeth but the treatment of TDIs tends to be neglected.⁴ Though the majority of the studies on TDI are on permanent teeth in adolescents were conducted in Europe and Americas but there are few studies from Asia and Africa. There is evidence that the prevalence of TDI is prevalent in India and Haryana being the prosperous state encouraging sports and providing infrastructure and facilities to students more than any other state in India, hence the present study was carried out in Farukhnagar block, district Gurgaon to estimate the prevalence of traumatic injuries to the anterior teeth in government and private school children and to find out dental risk factors related to traumatic injuries to permanent anterior teeth in 12 and 15 years school going children of Haryana, India.

MATERIALS AND METHODS

A cross-sectional survey was carried out in six government and six private schools among 671 school children aged 12 and 15 years in Farukhnagar block, district Gurgaon, Haryana. The sample size determination was done by conducting pilot study and minimum sample size to satisfy the requirement was estimated to be 672 children with 20% allowable error. A multistage sampling technique was adopted to select the children from Farukhnagar block which formed one of the four blocks of Gurgaon district. It was selected on the basis of ease of accessibility. There are 48 government schools and 6 private schools in Farukhnagar block. 6 schools were randomly selected from government schools and all the private schools were included with a sampling by a probability proportional to the school size.

The school children of age 12 and 15 years formed the study population taking care of selecting almost equal number of boys and girls. Before examining the children, consent was obtained from the concerned authorities of the respective schools and ethical clearance was obtained from the ethical committee of S.G.T Dental College.

The children aged 12 and 15 with signed consent and in whom permanent anteriors had erupted were included in the study. Children with severe dental fluorosis graded using Dean's criteria for dental fluorosis, developmental anomalies 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.

A close-ended questionnaire was prepared to collect data. Sociodemographic data included age and sex.

Nonclinical data collected included place of injury, cause of injury, sign and symptoms of injury and treatment undertaken due to injury. The oral examination was conducted by a single calibrated examiner using a Ellis's classification (Table 1) in a preformed proforma. The clinical examination was conducted with the use of a plane mouth mirror to assess the prevalence of traumatic dental injuries and a CPITN probe to measure dental risk factors like incisal overjet, overbite and lip competency. The examination was conducted in a well ventilated classroom under natural daylight. Type III clinical examination was performed. The school children were made to sit on a stool, the examiner would stand in front of them. Then the examination of traumatic dental injuries was recorded on maxillary and mandibular teeth.

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

A total of 671 children aged 12 and 15 years were examined from government (363) and private (308) schools (Graph 1). The overall prevalence of TDI to the anterior teeth was found to be 12.81%. The observed prevalence of dental trauma was higher in boys (58.1%) (Graph 2) than in girls (41.86%). There was no statistical difference between traumatic dental injuries between government and private school children, nor with respect to age or sex (Tables 1 and 2). The permanent maxillary central incisors were the most common teeth affected due to trauma and accounted for approximately 93.75%, out of which, the permanent left maxillary central incisor accounted for 57.8% of the injuries followed by the permanent right maxillary central incisor with 35.93% (Graph 3). Enamel fracture (65%) was the most common type of TDI in both arches, followed by fractures involving both enamel and dentin (27%) and only (8%) involving pulp (Table 3, Table 4). The majority of TDIs occurred at home and at school during physical leisure activities such as playing sports and followed by teeth misuse like opening bottles with teeth. Regardless of the dental injuries, it was found that 88.37% of the subjects did not receive any dental evaluation or control of the problem (Table 5). No significant findings were found in relation to risk factors associated with traumatic dental injuries (Table 6).

RESULTS

Table 1: Demographic characteristics of study subjects found inflicted with dental injury on clinical examination

	Government	Private	P value*
Age group			
12yrs	18	18	0.194
15yrs	31	19	
Total	49	37	
Gender			
Male	26	24	0.174
Female	24	12	
Total	50	36	

*Chi square test was applied

Table 2: Comparison of prevalence rate between government and private school

Type of school	Traumatic dental injury	With no traumatic dental injury	Total	P value*
Government	47	313	363	0.649
Private	39	272	308	
Total	86	585	671	

Table 3: Frequency distribution of traumatic injuries according to affected teeth

Injured teeth	School		Total
	Government	Private	
13	0	0	0
12	2	2	4
11	24	22	46
21	26	20	74
22	2	0	2
23	0	0	0
33	0	0	0
32	0	0	0
31	0	0	0
41	0	0	0
42	2	0	2
43	0	0	0

Table 4: Distribution of TDI according to fracture

Type of elli's dental injury	N
Type I	62
Type II	26
Type III	08
Type IV	0
Type V	0
Type VI	0
Type VII	0
Type VIII	0
Type IX	0

} Not Found

Table 5: Frequency distribution of 12 and 15 years old children with Traumatic Dental Injuries

Parameter assessed for dental injury	Government	Private	Total	P value
Time of injury				
Same day	0	0	0	0.036
4-7 days	0	3	3	
8 days- 3 weeks	1	0	1	
3 weeks- 3months	4	8	12	
3months- 1 year	3	0	3	
>1 year	39	28	67	
Total	47	39	86	
Place of injury				
Home	21	34	55	0.000
Street	4	0	4	
School	16	5	21	
Other places	6	0	6	
Total	47	39	86	
Cause of injury				
Sports	28	15	43	0.011
Teeth misuse	18	17	35	
Violence	1	0	1	
Accidents	0	7	7	
Total	47	39	86	
Symptoms/outcome of injury				
Pain	5	4	9	0.006
Swelling	2	7	9	
Sensitivity in the area	9	1	10	
Discoloration of tooth	3	0	3	
Nothing happened	28	27	55	
Total	47	39	86	
Whether any treatment was taken for injury				
Treatment taken	2	8	10	0.046
Not taken	45	31	76	
Total	47	39	86	
Time elapsed between injury and time of treatment				
Same day	2	2	4	0.049
After more than one day	0	4	4	
Total	2	6	8	
Type of treatment received				
Medication without any procedure	0	6	6	0.006
Some treatment procedure	2	0	2	
Total	2	6	8	
Outcome after treatment (mention after how much time)				
Residual problem felt/ persisted	0	2	2	0.107
No residual problem	0	4	4	
Total	0	6	6	

DISCUSSION

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.

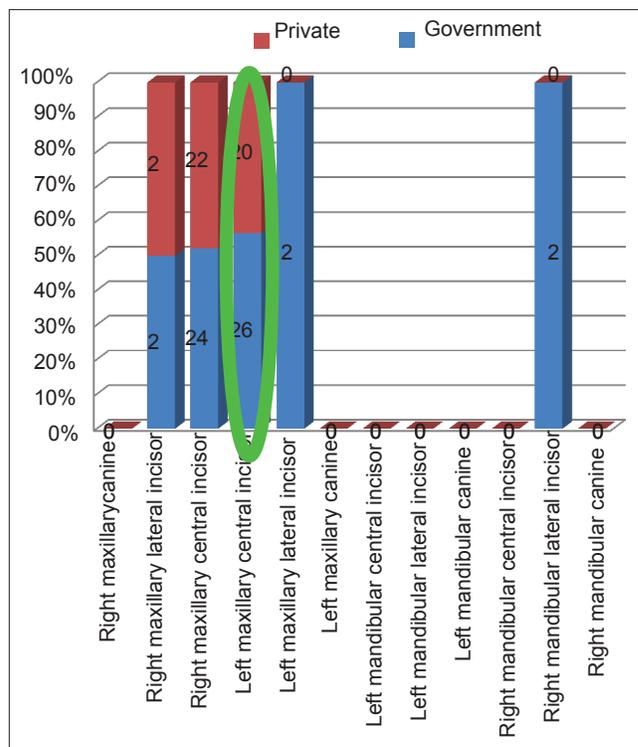
This cross-sectional survey identified the prevalence of traumatic dental injuries to the permanent anterior teeth in 12 and 15 year old school children of government and

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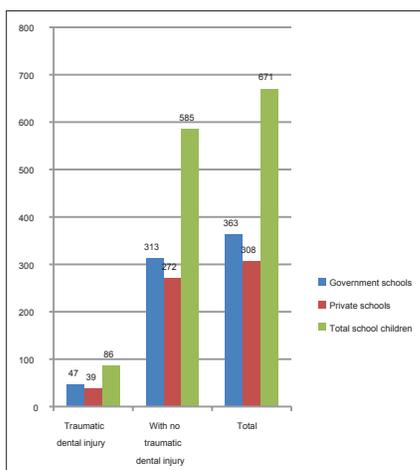
Table 6: Distribution of dental abnormalities among the children with dental injury on clinical examination

Type of dental abnormality	Government	Private	Total	P value
Over jet				
1-2mm	26	24	50	0.239
2-4mm	13	10	23	
>4mm	8	5	13	
Total	47	39	86	
Overbite				
No overbite	18	11	29	0.249
1-2mm	22	17	39	
2-4mm	6	5	11	
>4mm	1	6	7	
Total	47	39	86	
Lip				
Adequate	45	38	83	0.225
Inadequate	2	1	3	
Total	47	39	86	

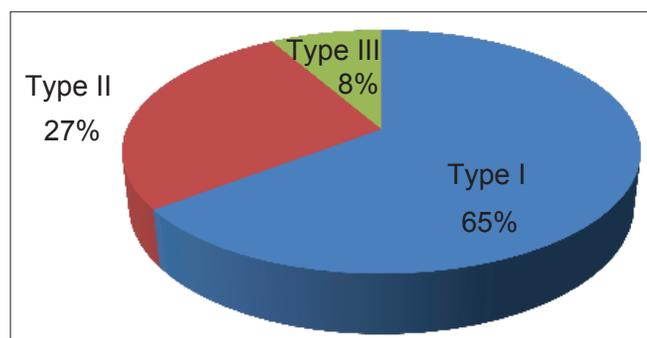
*Chi square test with Yate's Correction was applied **Fisher's exact test was applied



Graph 3: Frequency of type of tooth affected



Graph 1: Prevalence of traumatic dental injuries among school going children



Graph 2: Frequency of type of trauma seen. Note: Elli's classification 4 to 8 was not observed in the study population

private school as 12.8%. A similar observation was reported by Gupta K; Tandon S et al⁴ (2002) in South Kanara school children where a marginally higher prevalence of 13.8 % of TDI was observed, another study reported a

percentage of 15.1% among 12 year school children of Davangree, South India by Ravishankar TL et al⁵ (2010), similarly Kumar A et al⁶ (2011) observed a prevalence of 14.4% among 12 to 15 year old school children in Ambala district, Haryana. Dua R et al⁷ observed a prevalence of 14.5% among 7 to 12 year old school children in Dera Bassi, another recent observation made by Patel MC et al⁸ (2012) found a prevalence of 8.79% in Vadodara city.

An interesting piece of information observed was that the type of school (government or private) to which each individual had been exposed ceased to have statistical significance even though TDI was seen more in government school children, contradictory to a study carried out in 2013 by Ahlawat B et al⁹ where children attending private schools presented more traumatic injuries.

The most common form of injury were fractures involving only the enamel followed by fractures in enamel and dentin (O'Brien, 1994)¹⁰ comparable to present study. In the present study, enamel fractures dominated (67%) followed by enamel-dentin fractures (27%) and discoloration (8%).

The maxillary teeth are more frequently traumatized than mandibular teeth. The most frequently affected teeth were the maxillary central incisors, similar findings were observed by many studies^{4,5,8,9}. This probably relates to the vulnerable position of the maxillary central incisors. In addition, these teeth are frequently protruded and may

have inadequate lip coverage. In our study, association with risk factor like overjet, overbite and lip competency was non-significant.

In the present study it was found that the boys are more affected by trauma than girls, which corroborates the findings of other studies by Ravishankar et al⁵, Ahlawat B et al⁹, Patel et al⁸, Altun C et al¹¹, David J et al¹² and Cavalcanti AL et al¹³. This may be attributed to the behavioural factors, with the boys tending to be more energetic, more physical and inclined toward vigorous outdoor activities as compared to girls.

The majority of TDIs occurred at home and at school during leisure activities including contact and non contact sports. They were the main activities causing children to fall and were related to the aetiology of TDIs. The findings are similar to those in other reported studies Altun C et al¹¹ and Adekoya- Sofowora CA et al.¹⁴

Parents may lack information concerning the consequences of trauma to the teeth, as 97.7 % of the traumatic injuries in our study, did not result in a professional dental consultation to assess the problem. This finding is similar to a study conducted by Rai SB; Munshi AK¹⁵ on South Kanara school children. They reported a TDI prevalence of 5.29 %, out of which only 1.68% of the cases with traumatized teeth had undergone treatment. In case of the present study, this may be due to the lack of dental awareness amongst the parents. 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.¹⁶

Identifying the etiological factors makes it possible to establish preventive measures aimed at avoiding future injuries. This is especially so when in today's scenario the concept of conservation, retention, and prevention of tooth structures is topmost on the list of priorities. Improvements in the physical environment, closer supervision of children and adoption of health safety policies are likely to have a positive impact on the prevention of traumatic dental injuries. Families and the educational authorities must provide safe environment for children to play such as provision of specific and appropriate public places for sports activities with impact absorbing surfaces which could minimize injuries when children fall.¹⁷ It is also important that children should be supervised while they are playing to minimize the rate at which they fall and sustain TDIs and early orthodontic treatment in predisposed children may be an effective preventive strategy.

The teaching of injury epidemiology and injury prevention to healthcare workers and to the parents should be

improved. Health promotion policies should aim to create an appropriate and safe environment as well as increase awareness of such hazards. Dental emergencies should be dealt with high proficiency and should provide prompt standard of care, as such these injuries are the target of dental emergency care providers. In many countries, the majority of 12-year-old children have untreated dental trauma, with risk of pain, disfigurement and spreading infections with pulpal involvement. This condition can result in tooth loss at a relatively young age. Relief of pain is the predominant treatment demand of populations. People from disadvantaged communities do not visit clinics for preventive intervention or for restorative treatment to preserve their teeth. This attitude can be changed by education and motivation and demand for more preventive treatment and changes in lifestyle conducive to good oral health. As such changes will take time, to bring about the changes; oral health promotion (OHP) is the cornerstone of oral care. Oral health promotion forms an integral component of BPOC¹⁸ (Basic Package of Oral Care) to bring awareness of what is possible. The successful introduction of BPOC in a community relies to a large extent on good communication among all concerned. Traditional western oral health care should be replaced by a service that follows the principles of Primary Health Care. This implies that more emphasis should be given to community-oriented promotion of oral health. Treatment that is affordable for governments and individuals should also receive more attention. Using this approach, the level of untreated dental disease will become manageable. A package of oral care (BPOC) aims to reach all people at a much lower cost than traditional oral health services. Oral Urgent Treatment (OUT), one of the components of BPOC, provides basic emergency oral care. Services are targeted at the emergency relief of oral pain, management of oral infection and dental trauma (TDI) through Oral Urgent Treatment (OUT). Access to this component of basic oral care is a fundamental right for everyone. Therefore, governments must take the responsibility to establish and maintain a functional OUT service that is accessible and acceptable to the entire population.

All these efforts are thus expected to improve the present scenario and bring down the figures we have in our studies.

CONCLUSION

An effort can be made to reduce the prevalence of traumatic injuries by taking into consideration the following measures:

1. The use of intraoral and extraoral devices which protects the face and teeth from trauma.
2. Educational programs where by the children and their

parents are given information regarding the preventive and treatment aspects of traumatic injuries to teeth.

3. Health promotion policies should aim to create an appropriate and safe environment.

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