

## Traumatic dental injuries in preschoolers: A Neglected and rising epidemic in India

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### Abstract

Traumatic Dental Injuries (TDI) are significant problems in children, but its incidence is significantly increasing in toddlers and preschoolers in the recent years. TDI result in functional, aesthetic and psychological disturbances accompanied by great concern from the child and the parent as it may affect social activities such as speaking, laughing. Keeping these factors into consideration. The present cross-sectional study was planned to assess prevalence, causes and other related factors of TDI in children of age 0-5 years from five North Indian States. Results from the studies indicate that single tooth injury was predominant with maximum children experiencing injuries in playgrounds. Results also indicate that there is need for encouraging parents to visit the dentist with their child at an early stage.

**Keywords:** Traumatic Injuries, Prevalence, Dental Trauma, Examination

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### 1.0 Introduction

Traumatic dental injuries (TDI) to primary teeth are a developing and challenging public health problem to oral health professionals, and it has been seriously neglected. Dental trauma in primary teeth is important as besides causing pain and loss of function, has the potential for periapical sequelae which can adversely affect the development of the permanent teeth and the developing occlusion [1]. In spite of the relevance of this subject, there are few epidemiological studies with an emphasis on dental trauma among preschool children [1-7].

Epidemiological data provide a basis for evaluating the concepts of effective treatment, resource allocation and planning within any health environment [8]. The prevalence of dental trauma in various epidemiological studies has also been found to differ considerably [8-10]. A recent study reported a very high prevalence of 76.13% of traumatic dental injuries in primary dentition [11]. This variation may be caused by a number of factors such as differences in data collection method, sample selection and the

place where the study was conducted [12]. Moreover, among the existing studies, very few emphasizes the relation between overjet and trauma in primary teeth [7,13]. whereas other studies concentrate on the permanent teeth [14-15]. This demonstrates the need to evaluate these aspects in the deciduous dentition, for a greater understanding of the prevalence of trauma in primary teeth is of importance to the planning of dental care service, informing the parents about the prevention of accidents and improvements in the quality of care.

This study was thus carried out to with the aim to evaluate the prevalence of dental trauma in the primary teeth in a large population to achieve better results. The type of fracture, causative factors and various other correlates were studied to delineate a valuable information on TDI to preschoolers of North India.

### 2.0 Materials and Methods

The area of study was expanded to 5 North Indian states for better critical analysis of results.

**Table-1: Sample distribution and Prevalence of TDI in different states**

State	Total no. of Children	Boys	Girls	No. of Children Showing TDI	Prevalence (%)
Punjab	1266	695	571	175	13.8%
Himachal Pradesh	1060	560	500	225	21.2%
Haryana	950	490	460	109	11.5%
Chandigarh(U.T.)	1310	625	685	124	9.5%
Rajasthan	980	520	460	239	24.4%
<b>Total</b>	<b>5566</b>	<b>2890</b>	<b>2676</b>	<b>872</b>	<b>15.7%</b>

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1500 children from each state in the age group of zero to five years were selected by simple random sampling technique, but only those who came back with parental consent and those completely abiding by inclusion criteria were finally included in the study and evaluated. Only public schools and certified day care centers in urban area were included to avoid bias on the basis of socioeconomic status. The final sample distribution is depicted in Table-1.

### 2.1 Inclusion criteria

The following inclusion criteria were required for participation:

- (i) no tooth lost because of succession or reasons other than traumatic injury;
- (ii) Absence of structural loss in anterior teeth as a result of caries.

### 2.2 Non-clinical data collection

Authorization was obtained from the schools and day care centers to

undertake the research. After meeting with the institution directors, A letter was sent to the parents of the selected children explaining the aim, characteristics, and importance of the study, and term of informed consent to be duly filled by the parent. The willing parents were called on a specific day fixed for each particular school or day care center. Interviews with the children's parents/guardians were then carried out and forms were filled

The forms included questions regarding the mother's level of schooling, history of dental injuries including cause, sucking habits, dental care following the trauma and an examination of hard and soft tissues. The chronological age was the criterion for deciding the age group.

Type of fracture	Number	Percentage (%)
Enamel fracture	226	25.9
Crown fracture without pulpal involvement	131	15
Crown fracture with pulpal involvement	45	5.2
Crown Discoloration	61	7
Lateral Luxation	186	21.3
Intrusive Luxation	17	1.9
Avulsion	63	7.2
Mobility(due to displacement, Injuries to supporting tissues, suspected root fractures)	143	16.4

**Table-2: Type of Tooth Trauma**

### 2.3 Clinical data collection

The children were examined at the school or day care centre. Dental examinations were carried out by one dentist to avoid inter-examiner

variability. Only upper and lower anterior teeth deciduous teeth (central incisors, lateral incisors and canines) were examined by one trained and calibrated

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examiner using a mouth mirror and dental probe in natural light. The examiner used appropriate individual cross-infection protection equipment and all instruments and necessary materials were packaged and sterilized.

The evaluation of lip competency took place at the beginning of the clinical examination and without the child noticing the observation. Adequate lip coverage was defined as the upper lip completely covering the upper incisors in the resting position, whereas inadequate lip coverage was considered when the upper lip did not completely cover the upper incisors in the resting position (16). Traumatic injuries to the maxillary and mandibular primary incisors and canines were recorded according to the method described by Andreasen (12). Clinically observed traumatic injuries were recorded as follows:

- Crown discoloration: change in the crown coloration to darker tones when compared to that of the adjacent teeth;
- fracture of the crown: enamel only, enamel and dentin with or without pulp exposure;
- Subluxation: increased dental mobility without displacement, taking into account the physiological mobility and comparing with the homologous tooth;
- Lateral luxation: tooth displacement to a non-axial direction;
- Intrusive luxation: tooth displacement inside the alveolus;
- Extrusive luxation: tooth displacement outside the alveolus and

- Avulsion: tooth prematurely lost if compared with the homologous tooth.

Prevalence of traumatic dental injuries was calculated. To compare the prevalence among different age groups and between males and females, the chisquare test was used; a value of  $P < 0.05$  was regarded as significant. Statistical analysis was performed by using software (Statistical Package for Social Sciences version 15.0; SPSS Inc, Chicago, USA)

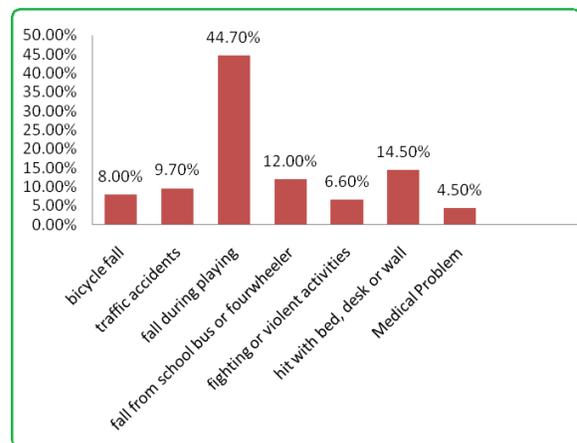


Figure-1 : Causative factors of TDI (percentage wise)

### 3.0 Results and discussion

The results were separately obtained for each state, but they were compiled owing to the vicinity of the regions and the ease of calculation and analysis. The prevalence of TDI in separate states is shown in Table-1. The total prevalence calculated for all 5 states in the study was 15.7%. In the total sample, boys suffered more traumatic injuries than girls but there was no significant difference between both sexes except in the state of Rajasthan where boys (72.8%) were significantly more affected than girls (27.2%) ( $p < 0.05$ ). The

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maxillary arch was involved in 96.4% of cases. 71.2% of the children had experienced trauma to a single tooth, whereas 22.8% had two teeth affected and 6% had 3–6 teeth affected. The maxillary central incisors were the most frequently traumatized teeth (81.6%) followed by lateral incisors (13.8%), rest percentage comprising of TDI showing involvement of multiple teeth. Enamel fracture was the most common type of fracture seen in affected patients.(Table-2).

The most common cause of injury was falls during playing which were significantly higher than other causative factors like hit or traffic accidents. Medical problems here refer to patients suffering from cerebral palsy or prone to syncope thus predisposing them to unexpected falls and thus fracture. (Figure-1). A comparison of causative factors was also made between boys and girls, although no significant findings were obtained. There were also positive significant associations between dental trauma and mother's education level. The children whose mothers hold a graduate or higher degree accounted with less TDI(36.2%) than the ones whose mothers were educated only up to secondary school or less(63.8%) ( $p < 0.005$ )

Most incidents of TDI (42%) occurred in playgrounds or parks, followed by home (25%) and schools (21%). Children attending day care centers (4.8%) were accounted with least no. of injuries. 7.2% of subjects didn't remember the place of accident. Neither the presence of non-nutritive sucking habits ( $p = 0.445$ ) nor incompetent lip ( $p = 0.086$ )

was statistically significant in relation to the prevalence of TDI.

A considerable group of children with a history or signs of dental trauma (72.2%) did not receive any dental evaluation or control of the problem. Only 16.8% of children reported to dental clinics for the treatment with the chief complaint of pain. Rest 11% of subjects with TDI were guided by local quacks or inexperienced dentists, not to go for any treatment as the primary teeth are of no value and will be replaced by permanent.

Traumatic dental injuries in primary dentition in children have been reported in different parts of the world (1,3-6,11,13,17). Though the present study was conducted with the aim to report prevalence, causes and correlates of traumatic dental injuries in primary dentition, the authors at the same time intend to highlight the factors behind the increasing rate of TDI in India and provide awareness among parents and caretakers regarding the same.

The overall cumulative prevalence of TDI reported in the study was 15.7% which was similar to some previous studies [18,19,20] but high when compared to a study of Indian preschool children which found the prevalence of dental trauma to be 6% [21]. Another recently published study on Indian children in age group of 4-6 years showed a very high prevalence of 76.13%. [11]. This variation in prevalence has been related to many factors, such as type of study, trauma classification, sample and diagnostic criteria, limited age groups, and geographic and behavioral differences between study locations and countries (22). Whereas males tend to experience more TDI than females in the

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permanent dentition [14-16], there does not appear to be a sex difference in TDI in the primary dentition. However, recent studies show a reduction in this difference, which may reflect a change in girls' behavior in playing sports traditionally regarded as boys' games [23, 24]. However, in the present study, it was only in the state of Rajasthan that boys experienced significantly higher no. of TDI as compared to girls. This might be explained by the observation that the social setup and cultural reservations of the region don't allow them to be involved in vigorous outdoor activities.

Falls were the etiological factor with the greatest expressivity for dental injuries among various other causes like hit with wall, traffic accidents or violent activities. This is similar to findings from previous studies [25, 26]. In the present study, playground or parks were the places where children experienced maximum injuries which was in accordance with another Indian study [11], but differ from studies by Garcia-Godoy et al. [26] and Gabris et al. [27] who found that the child's home is the location in which dental injuries occur with the greatest frequency. This however in both situations, stresses the importance of making parents/guardians aware of measures that can prevent accidents, explaining that greater attention should be paid with regard to the children's physical environment and not leaving children unattended while playing in playgrounds. This is also supported by the finding in the present study that children of mothers with less years of

education had a greater prevalence of trauma ( $P < 0.005$ ). This may be due to the fact that the mothers with greater knowledge regarding health issues make greater efforts to prevent accidents that could compromise the physical, social and psychological wellbeing of their children, thereby highlighting the importance of awareness.

As demonstrated by other authors, the majority of observations concerned a single injured tooth [4,6,28]. In the present investigation, most of the children had only one traumatized tooth (71.2%) with the maximum involvement of maxillary central incisors (81.6%) which is again in agreement with the literature on dental trauma [29,30]. According to literature data, crown fractures are the most common injuries in the permanent dentition, while in the deciduous dentition, the luxation injuries are the most frequent ones [8,10]. Some authors have indicated that the supporting structures — alveolar bone and periodontal ligament — in the primary dentition are resilient, thereby predisposing dislocations rather than fractures [8,26,31] The current investigation however revealed that in the North Indian population, enamel fracture (25.9%) was most prevalent type of dental trauma, followed by lateral luxation (21.3%). Several previous studies on different populations have produced similar results [20, 27].

A considerable finding from the study which needs attention was that majority (72.2%) of subjects who experienced injury did not seek any dental consultation. This indicates a low level of awareness among the parents about the importance of treatment. Another

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reason could be that on suffering any injury, people usually rush to a nearby medical practitioner or hospital where dentists are not available or else the fear of dentist keep them away. At the same time 11% of parents of affected individuals presented a distressing scenario of malpractice of dentistry in India as these were guided by local dentists of the region to neglect the problem as primary teeth were concerned. This again highlights the unawareness among general population as well as health practitioners of the nation.

### 4.0 Conclusion

Traumatic injuries in preschool children and toddlers are a common problem, and several studies have reported that the prevalence of these injuries has increased during the past few decades. More epidemiological studies from representative populations using standardized classifications are required in order to understand the complexities of dental trauma

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epidemiology. Identifying the etiologic 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. The teaching of injury epidemiology and injury prevention to health care workers and to the parents should be improved. There is need to implement educational and preventive strategies aimed at minimizing the menace of fall, accidents and increasing the benefits of seeking immediate treatment of fractured teeth. Dental emergencies should be dealt with high proficiency and providing prompt standard care for such injuries should be the target of dental emergency care providers. All these efforts are thus expected to improve the present scenario and bring down the figures we have in our studies.

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