

## **Review Article**

### **Prevalence of Dental Trauma -A Review**

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**Abstract:** Tooth trauma has been and continues to be a common occurrence that every dental professional must be prepared to assess and treat when necessary. It has no prescriptive method for occurring, possesses no significant predictable pattern of intensity or extensiveness and has the uncanny knack for occurring at times when dentists are least prepared or when the dental office is closed. Dental trauma is a common event in children from an early age, since children are learning to walk and discover their environment, thus being subject to frequent falls. Traumatic injuries in primary teeth result mainly from indoor injuries, such as falling from baby carriages, falling from stairs, or falling against hard objects. The purpose of this article is aimed to present the prevalence of dental trauma, particularly in young patients.

**Keywords:** Dental trauma, children, indoor injuries.

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#### **INTRODUCTION**

Multiple causes contribute to tooth trauma [1]. The frequency of traumatic dental injuries varies considerably. The variation reflects a number of factors.

Prevalence of dental trauma was studied by various authors based on factors like, cause of the injury, type, sex and site of occurrence. The two most significant factors are age and sex [2]. The other factors are site, type, place of injury and the season in which the injuries occur.

#### **REVIEW OF LITERATURE**

Ravn [2] studied that dental injuries increase during the winter months in Copenhagen, Denmark. Hedegard and Stalhane [1] identified falls and collisions as the dominating cause of dental trauma in 2582 children aged from 7 to 15 years in Swedish children. Ravn[3] reported that falls and collisions frequently occur in school children, commonly with normal play activities, a greater predilection exists for occurrence during the school years.

Galea [4] observed that the severity of injuries appeared to increase when there was an associated injury to the lower lip, while one third of the accidents occurred in subjects with some form of malocclusion. Female subjects with prominent maxillary incisors and incompetent lip closure often had multiple injuries to

the supporting structures of the teeth. He studied that accidents within and around the home have been reported as being the major source of injury to the primary dentition, while accidents at home and school accounted for most injuries to the permanent dentition. He studied that dental trauma involving two teeth were more frequent than one. Garcia-Godoy [5] observed that male: female ratio of 0.9:1.0 in three private schools in the Dominican Republic and 1.1:1.0 in public school children.

Davis and Knott [6] found that one tooth was more frequently injured than multiple teeth in most prospective studies conducted at school dental services and general clinics. Burton et al. [7] and Hamilton et al [8] studied the prevalence of dental trauma in high school children, ranged between 6 percent in an Australian study to 34 per cent in an English study.

Liew and Daly [9] and Martin et al [10] in their study observed a relatively higher male: female ratio of 2.6:1.0. These two studies examined patients attending after hour clinics, which resulted in a higher incidence of 18-23 years old, compared to other studies. Kania, [11] reported that uncomplicated crown fracture without pulp exposure was the most common injury to the permanent dentition. He determined that the incidence of trauma to the anterior permanent teeth in 6-12 year

old school children was 1.7 patients / 100children/year while involving 2.1 teeth/100 children/year.

Kaba and Marechaux, [12] revealed a prevalence of trauma to permanent teeth in children aged 6-18 years of 11 per cent. Hunter et al. [13] reported that increased frequency of dental trauma with incompetent lip closure.

Bijella et al. [14] observed a insignificant difference between males and females ratio of 1.3:1.0. He examined trauma to the primary teeth in a house-by-house survey in Brazilian children aged 10-72 months. This study found a high prevalence of 30 per cent of children with traumatized primary teeth. However, injuries such as concussion, root fracture and alveolar bone fracture were also included in this study. He observed that the prevalence rates of trauma to the primary dentition peaked at age 10-24 months in this Brazilian study.

Forsberg, [15] reported that displacement (luxation) of teeth has occurred more frequently in the younger age groups and indicated that the supporting structures (alveolar bone and periodontal ligament) in the primary dentition are resilient, thereby favoring dislocations rather than fractures. He found that maxillary central incisors were the most frequently injured teeth in both the primary and secondary dentitions. He observed a relatively high prevalence of traumatized teeth in children aged 7-15 years (30 per cent) which included traumatized primary teeth. He identified falls and blows as the most common cause of dental trauma from a population of 286 patients with traumatic dental injuries. 69.9% of the men and boys were injured by falls and 86.7% of the women and girls were injured by falls.

Andreasen [2] reported that 13% to 39% of all dental injuries are sports related. He reported among 434 cases, that 82% of the teeth traumatized were maxillary incisors, 64% central incisors, 15% lateral incisors, and 3% canines. Men and boys sustained 2 to 3 times more injuries when compared to women and girls, and with most patients between the ages of 8 and 15 years. In 434 cases, only a slight difference existed in the percentage of dental trauma incurred by each sex of 434 cases of trauma.

Onetto et al. [16] observed that a high percentage of patients receiving injuries had suffered previous dental trauma. He observed that the male: female ratio was 0.9:1.0 for children less than seven years old.

Hargreaves et al. [17] found an overall prevalence of trauma to be 16 % in primary school children. The black population had a prevalence of 13 % and the white population a prevalence of 21%. He studied the prevalence rate of primary tooth trauma was

15% and found that it was common at age 1-2 years (10%) & most common at 4 years (20.6%). Enamel fracture accounted for 71.8%, followed by fracture of dentin (11.2%), tooth loss (8.2%) and discoloration without other sign of injury (5.6%) among 1466 children of South African examined.

Hamilton et al. [18] observed that significantly more children in the lower socio-economic groups received injuries compared with the higher socio-economic status. Rai and Munshi, [19] studied the cause of dental trauma among children of South Kanara district of Karnataka and found that the leading cause of injury was undefined falls. He studied that enamel fracture was the most common form of dental injury among those children. He studied that among 238 cases, 5.29% have suffered incisor and canine fracture and maxillary central incisors were commonly affected both in the primary and permanent incisors. He studied that dental trauma was more prevalent among the boys (72.27%) than the girls (27.73%).

Robson Frederico and Cunha, [20] studied prevalence of dental trauma in 1654 patients aged 0–3 years who attended the Baby Clinic of the School of Dentistry at Araçatub, Brazil. The prevalence of traumatic injuries was found to be 16.3% and found that falls were more often the etiology for dental injuries (58.3%) and the maxillary central incisors (86%) were the most commonly involved teeth.

Gupta et al. [21] showed that 39.26% of the teeth were fractured among age group 8-10 years and 60.74% among 11-14 year age group. He studied that 68.76% of dental trauma occurred at home followed by school (20.39%), playground and road accidents (10%). Most cases of class 1 and class 2 type of fracture occurred in the house followed by the school. He observed that the male: female ratio was 2:1 for dental traumatic injuries. For class 1 fracture male: female ratio was 5: 1 among age group 8-10 and 11-14 years. He observed that class 1 fractures were the most common followed by class 2 and class 3, with significantly lesser involvement of class 5.

Roch and Cardoso [22] reported that, maxillary central incisors were most affected and the most frequent types of crown fractures are fractures of enamel and enamel dentin among children in a study done in Brazilian school. Tapias et al [23] reported the prevalence of traumatic crown fractures to permanent incisors was 17.4% in junior schools in Mosteles, Spain. Falls were the most frequent cause of dental trauma (43.9%). Boys and children with overbite were a higher risk of crown fractures.

Skaare and Jacobsen [24] reported that 48% of dental injuries occurred at school, and half of leisure time injuries occurred during children play in Oslo, Norway. Sports and accidents represented only 8% of

the total number of injuries and injuries done by violence representing 8% of the injuries. Sarheed *et al.* [25] studied the prevalence of traumatized permanent teeth among visual and hearing impaired children in Saudi Arabia and found that incisor teeth involved in all the dental injuries. Trauma was noted in 9% of visual impaired and 11.4% of hearing impaired children. Gender difference were apparent in the hearing impaired children with male having higher levels of traumatized teeth

Pugliesi *et al.* [26] studied the prevalence of dental trauma in children aged 0-3 years and found that hard tissue injuries were the most frequently involved (52%) with a predominance of enamel crown fractures (41.4%), followed by concussion (12.6%) and intrusion (11.6%) among 302 children. Bauss, [27] studied the prevalence of traumatic injuries to the permanent incisors in candidates for orthodontic treatment and found that maxillary central incisors were the most frequently affected teeth (79.6%) and the most common types of trauma were fracture of enamel and dentin without pulpal involvement (42.7%) and fracture of enamel (33.8%).

Marcos Pascoal Pattussi, [28] studied the association between social capital and dental injury among 1302, 14- to 15-year-old adolescents in 39 schools of Distrito Federal, Brazil and found that the prevalence of dental injury was significantly lower in neighborhoods with higher levels of social capital, especially among boys.

Mariana Machado Teixeira de Moraes Costa [29] evaluated the dental records of 2,200 patients with special needs admitted to the special care clinic of the School of Dentistry of Araçatuba, Brazil, between 1998 and 2003. Of the records that were analyzed, 500 patients who had cerebral palsy were selected for this study. Information regarding age, gender, type of palsy and dental trauma was collected and statistically analyzed. It was observed that 10.6% of the total number of 500 subjects had sustained dental trauma. The number of traumatized teeth was 84. Enamel or enamel/dentin fractures were the most frequent types of traumatic injury (84.9%). The permanent maxillary central incisors were the most commonly affected teeth (50%). The frequency of traumatic injuries showed no significant correlation with the type of cerebral palsy or gender. Having epilepsy was not a statistically significant risk factor ( $p > .05$ ) for dental trauma.

Jainara Maria Soares Ferreira [30] assessed the prevalence of dental trauma as compared to the prevalence of dental caries in children aged 3-59 months. A cross-sectional study was carried out during the National Immunization Day for Polio in Recife, northeast Brazil. A total of 56,142 teeth were examined and the prevalence of dental trauma was 14.9%. Dental fracture was the most prevalent injury observed in 516

teeth (0.9%), followed by discoloration in 191 (0.9%), intrusion in 12 (0.02%) and extrusion in five (0.008%). The most affected teeth were the upper central incisors and the prevalence of dental trauma altered significantly with age and family income. Dental trauma was most prevalent from 2 to 5 years of age. The prevalence of dental caries was 14.3%. The results showed that the prevalence of dental caries and dental trauma was similar, and that both caused the same amount of damage to dental health in the target population.

Vivian Carvalho [31] did a study on frequency of intrusive luxation in deciduous teeth and its effects and concluded that children with ages ranging from 1-4 years were the most affected with falls being the main cause of intrusion. Of the total 221 intruded teeth 128 (57.9%) were totally intruded and 93 (42.1%) partially. Pulp necrosis/premature loss and color change were the most frequent sequelae in both total and partial intrusions. Both types of intrusion caused eruption disturbance. There was no significant correlation between the child's age at the time of intrusion and the frequency of subsequent sequela on primary injured teeth and between the age at the time of injury and the developmental disturbances on permanent teeth

Bugra Ozen [32] investigated the prevalence and etiology of dental trauma in children aged 2-15 in the Eastern Black Sea Region of Turkey. Trauma was found to occur most frequently in girls aged 8 years and boys aged 10 years. The majority of injured teeth were the permanent maxillary central incisors in both primary and permanent dentitions. Single-tooth injury was predominant in all age groups. Children with an overjet greater than 3 mm accounted for a greater percentage of dental injuries than those with an overjet less than 3 mm. Overjet was not found to have a significant effect on the number of teeth involved in a traumatic dental injury. The most common cause of dental trauma was 'falls' with the frequent type of injury being enamel-dentin crown fracture without pulpal exposure in permanent dentition and lateral luxation in primary dentition. He also concluded that families and health-care systems need to provide safe and appropriate first-aid treatment for traumatic dental injuries, with follow-up treatment by dental-health providers.

Flavia Torquato Dutra [33] estimated the prevalence of dental trauma among 1- to 4-year-old children and evaluated the association between dental trauma and demographic, socioeconomic, and clinical factors. The prevalence of dental trauma was 47%; among the 407 children examined. The most prevalent type of alteration due to dental trauma was enamel fracture (85%), followed by enamel-dentin fracture without pulp exposure (11%) and enamel-dentin fracture with pulp exposure (3%). The main location where the trauma occurred was at home (89%), with the most common cause reported by parents being accidents while running, playing, or crawling (79%).

Patel MC [34] measured the prevalence of anterior teeth fracture and their association with predisposing factors such as lip coverage, molar relationship, overjet, and variables such as age, sex, cause, and place of trauma. The prevalence of dental injuries in the Vadodara city was high and it has a great potential to be considered as an emerging public health problem.

Cristiano Susin [35] assess the prevalence and severity of TDI (traumatic dental injuries) and its association with socio-demographics and physical characteristics in the anterior permanent teeth of 12-year-old Brazilian schoolchildren. He showed a high prevalence of TDI in 12-year-old Brazilian schoolchildren. Socio-demographic data and school achievement were associated with TDI.

### CONCLUSION

The importance of anterior permanent teeth regarding esthetics and function during speech cannot be over emphasized. Facial trauma that results in fractured, displaced or lost teeth can have significant negative functional, esthetic and psychological effect on children

The most common injuries to permanent teeth occur as a result of falls. All sporting activities have an associated risk of orofacial injuries due to falls, collisions and contact with hard surface. Pulpal complications, appearance of a vestibular sinus tract or colour change of the crown associated with sinus tract could arise from fractured tooth. The successful treatment being dependent on the age of the child at the time of trauma, type and severity of the injury, and the period between dental trauma and care.

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