The Prevalence and Etiology of Dental Trauma Among 5-72 Months Preschool Children in South-Eastern Anatolia, Turkey.

Emin Caner TUMEN[1], Ozkan ADIGUZEL[2], Sadullah KAYA[3], Ersin UYSAL[4], Izzet YAVUZ[5], Fatma ATAKUL[6]*

[1]Assist. Prof., DDS PhD, Dicle University, Faculty of Dentistry Department of Pedodontics Diyarbakir/TURKEY.
[2]Assist. Prof., DDS PhD, Dicle University, Faculty of Dentistry Department of Operative Dentistry Diyarbakir/TURKEY.
[3]Assist. Prof., DDS PhD, Dicle University, Faculty of Dentistry Department of Operative Dentistry Diyarbakir/TURKEY.
[4]Assist. Prof., DDS PhD, Dicle University, Diyarbakır Vocational High School, Department of Technique Programs Diyarbakir/TURKEY.
[5]Assoc. Prof., DDS PhD, Dicle University, Faculty of Dentistry Department of Pedodontics Diyarbakir/TURKEY.
[6]Professor and Chair, DDS PhD, Dicle University, Faculty of Dentistry Department of Pedodontics Diyarbakir/TURKEY.

Abstract

The main objective of this study was to assess the epidemiology of traumatic dental injuries to the primary teeth in children from 5 to 72 months, all atendees in 11 public nursery schools in South-Eastern Anatolia, Turkey.

A total of 657 children (346 boys and 311 girls) of both sexes participated in the study. Traumatic dental injuries were classified according to the modified classification proposed by Ellis. An interview was carried out by two trained and calibrated examiners, and clinical oral examinations included distribution of dental injuries by age and sex, etiology of dental trauma, prevalence of affected teeth and type of damage.

All results were analyzed using the Statistical Package for Social Sciences (SPSS) software, version 15.0. The prevalence of traumatic dental injuries was 5.02%. There was greater involvement of boys (78.8%), of children aged 37–48 months (11.6%) and of the maxillary central incisors (92.68%). Falls were more often the etiology for dental injuries (66.7%). Most children with a traumatic dental injuries experienced traumatic injuries to one tooth (3.81%), while 1.21% had two traumatized teeth and 94.9% had no traumatic dental injuries. The most common crown fracture was in enamel only (65.9%), followed by discoloration teeth (14.6%).

The prevalence of dental injuries in Turkish preschool children was very low. The present study findings emphasize the importance of encouraging parents to visit the dentist with their child at an early stage. Moreover, traumatic dental injury is widespread in the population; it has both physical and psychological effects, it is treatable; and, most importantly, it is preventable.

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Introduction

Epidemiologic studies have focused on the investigation of the prevalence or incidence of dental injury. The prevalence of dental trauma in preschool children is a continuing clinical and dental public health problem[1, 2].

An oral traumatic injury can frequently lead to tooth lesions, affecting both supporting dental structures and hard tissues[3]. Moreover the dental injuries represent serious problems affecting children physically, esthetically and psychologically, and traumatic injuries to the primary teeth can affect the development and eruption of the permanent teeth, but more attention has been given to injuries of permanent teeth than primary teeth[4-8]. Despite the importance of these problems, there are few reports available on the epidemiology of injuries to the teeth of children in developing countries. Also, the causes of dental injuries have rarely been studied in cross-sectional surveys including both developing and developed countries[2].

The prevalence of dental trauma in various epidemiological studies has been found to differ considerably[9-11]. 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].

Nevertheless, few studies are available about the prevalence of traumatic injury to the

Corresponding author:
Assist. Prof. Dr. Emin Caner TUMEN,
Dicle University Faculty of Dentistry Department of Pedodontics
Diyarbakir/TURKEY

Phone: + 90. 412. 2488101/3406
Fax: + 90. 412. 2488100
E-mail: emin.caner@isnet.net.tr

primary dentition in children aged 5–72 months.

The literature report that children aged 3-4 years have a higher incidence of trauma, with no difference between boys and girls[13]. The most frequent cause is a fall against a hard object[12,14-16]. The maxillary central incisors were the most vulnerable to injury. Single tooth injury was predominant in all age groups[13,15].

Because of the presence of so little information on the prevalence and etiology of traumatic dental injuries in 5-72 months Turkish preschool children the main objective of this study was to assess the epidemiology of traumatic dental injuries to the primary teeth of preschool children in South-Eastern Anatolia, Turkey.

Material-Methods

A cross-sectional survey was carried out in South-Eastern Anatolia, Turkey in 2007-2008. The study involved 657 children 5-72 months of age attending 11 urban public nursery schools. The schools showed great similarity in their environment (child care, medical care and diet). A total of 346 boys and 311 girls were examined. Of these children, 7 were at the age of 5-12 months; 35 at 13-24 months; 194 at 25-36 months; 181 at 37-48 months; 197 at 49-60 months, and 43 at 61-72 months, respectively.

A sample of 30 children was used to train the examiners (ECT, ÖA) and test the feasibility of the dental examinations. No changes were made to the methodology previously proposed. Ethical clearance was obtained from the Ethical Committee of the Faculty of Dentistry, University of Dicle.

Local authorities (Health Council and The Education Council) provided the necessary information for the construction of a sample frame. The following information was obtained: name of all nursery schools in Diyarbakır, their addresses and total number of children (679) in each nursery school by age. A letter was sent to the parents of the all children explaining the aim, characteristics and importance of the study, and asking for their participation. Negative consent was accepted without any prejudice being attached to the children who had opted not to participate. Of these 679 children all attending nursery schools; 22 of them were excluded because of their parents' being unwilling to participate in the study.

All dental examinations were carried out by two dentist (ECT, ÖA) who participated in a training and calibration exercise for the criteria used to identify dental injuries. The dental examination for traumatic dental injuries included only maxillary and mandibular primary incisors. The criteria used to assess traumatic dental injuries were derived from a modified version of Ellis' classification[17].

It included fracture of the crown involving the enamel only, fracture of the crown involving enamel and dentin, fracture of the crown involving the pulp, tooth missing due to trauma. In addition to those criteria the presence of tooth discoloration was recorded. Pulp involvement was assessed through the presence of discoloration and presence of fistulous tract without signs of caries. Root fractures and pulp status recorded in Ellis' classification were not recorded in this study because dental radiographs or pulp tests are not appropriate for epidemiological surveys.

The children were examined in a chair at nursery schools during class hours in predetermined order in a private room under natural light. Some of these parents sometimes helped to hold very young children. Gauze squares, cotton buds and sterile sets of plane mouth mirrors, periodontal probes were packed in sufficient quantities for each day. The examiners wore new gloves for each clinical examination. Data were collected through clinical oral examinations.

All results were analyzed using the Statistical Package for Social Sciences (SPSS) software, version 15.0 and the MedCalc demo version 9.4.2.0. Data analysis included descriptive statistics (frequency, distribution). Statistical significance for the association between the occurrence of traumatic dental injuries and distribution of dental injuries by age and sex, etiology of dental trauma, prevalence of affected teeth and type of damage was determined using Chi-square test and Fisher's exact test. The level of significance was set at 5%.

Results

The prevalence of traumatic injuries in primary incisors was 5.02% : 7.5% in boys and 2.3% in girls. The difference was statistically significant (P=0.0037). Aged 37-48 months experienced more trauma (11.6%), the difference was statistically significant (P<0.01) (Tab. 1). There were no significant differences in the prevalence of traumatic dental injuries between boys and girls in all specimens (P>0.05). Besides boys suffered more traumatic injuries than girls and when each age was analyzed separately, there was statistically significant difference between both sexes (P=0.0015). Of a total of 657 children, 25 had suffered one tooth traumatic injuries (3.81%), eight had suffered two teeth traumatic injuries (1.21%) and 624 had no traumatic dental injuries (94.98%). The differences were statistically significant (P<0.05).

	Traumatic dental injuries				
	Yes		No		P-Value For Fisher's Exact Test
Age (months) and sex	n	%	n	%	
5–12					
Boys	0	0.0	2	100.0	
Girls	0	0.0	5	100.0	-
All	0	0.0	7	100.0	
13–24					
Boys	0	0.0	16	100.0	
Girls	0	0.0	19	100.0	-
All	0	0.0	35	100.0	
25–36					
Boys	3	2.9	102	97.1	
Girls	2	2.2	87	97.8	P= 1.000
All	5	2.6	189	97.4	
37–48					
Boys	19	20.2	75	79.8	
Girls	2	2.3	85	97.7	P= 0.000
All	21	11.6	160	88.4	
49–60					
Boys	4	3.7	104	96.3	
Girls	1	1.1	88	98.9	P= 0.380
All	5	2.5	192	97.5	
61–72					
Boys	0	0.0	21	100.0	
Girls	2	9.1	20	90.9	P= 0.488
All	2	4.7	41	95.3	
5-72					
Boys	26	7.5	320	92.5	
Girls	7	2.3	304	97.7	P= 0.002
All	33	5.02	624	94.98	

Tab. 1 Prevalence and distribution of dental injuries in the primary dentition, by age in months and sex Diyarbakır, Turkey (n=657) *X^2= 9.512

The main causes of tooth injury were falls (66.7%), collisions with objects (24.2%), sports (6.1%) and traffic accidents (3%) (Tab. 2). When the etiology was analyzed by gender, falls, and collisions with objects were the most frequent causes of tooth injuries in boys and girls.

Etiology	Total	%
Falls	22	66.7
Collision	8	24.2
Sports	2	6.1
Traffic accidents	1	3.0
Total	33	100.0

Tab. 2 Etiology of dental traumas in preschool children.

The group of teeth most affected was maxillary incisors (97.56%), with the central incisors being the most frequently involved (92.68%) (Tab. 3).

Affected teeth	n	(%)
Maxilary right central incisors	25	(60.98)
Maxilary left central incisors	13	(31.7)
Maxilary right lateral incisors	1	(2.44)
Maxilary left lateral incisors	1	(2.44)
Mandibular left central incisors	1	(2.44)
Total	41	(100.0)

Tab. 3 Prevalence of affected.

The maxillary arch was the most affected (97.56%), the difference was statistically significant between the right and the left side (P=0.0139). The maxillary primary right central incisor showed the highest percentage of injured teeth when only one tooth was involved (41.46%), followed by the maxillary primary left central incisor (14.63%).

The most common crown fracture was in enamel only (65.9%), followed by discoloration teeth (14.6%). Crown fracture of enamel and dentin following trauma occurred in 12.2% of those with traumatic dental injuries. The prevalence of fracture of the crown involving the pulp, missing teeth due to trauma and presence of fistulous tract without signs of caries were similar with 2.43% (Tab. 4). In this distribution, there were no significant differences between boys and girls (P> 0.05).

Type of dental injuries	n	%
Crown fracture of enamel only	27	65.9
Crown fracture of enamel and dentin	5	12.2
Crown fracture involving pulp	1	2.43
Missing teeth following a trauma	1	2.43
Presence of fistulous tract without signs of caries	1	2.43
Discoloration	6	14.6
Total	41	100

Tab. 4 Distribution of affected teeth in relation to different types of dental injuries, Diyarbakır, Turkey (n=41).

Discussion

The present study provides information on the etiology and prevalence of dental trauma among Turkish preschool children aged 5-72 months. The findings of this research extend and corroborate earlier findings[4,7,18-21] regarding certain epidemiological characteristics of traumatic dental injuries present in preschool children. The present research showed that according to gender, boys had more injuries in all groups. Many other authors also reported a similar pattern[22-25].

According to retrospective and prospective studies reported in the literature, the prevalence of traumatic injuries involving the primary dentition ranged from 4% to 37%[4,26-32]. With increased knowledge of possible sequelae to traumatized teeth, dentists can understand better how to treat these teeth and how to deal with potential complications. Careful attention should be paid when comparing studies dealing with the prevalence and distribution of different types of injury involving the primary dentition because it varies according to the place where the study is conducted, the type of study applied, and the classification used to categorize the injuries[5,6,9,33,34].

The prevalence of traumatic dental injuries may have increased with age. This is due to its

cumulative effect. In a Swedish study oral injuries were most frequent during the first 10 years of life, decreasing gradually with age and were very uncommon after the age of 30, whereas non-oral injuries were seen most frequently in adolescents and occurred throughout life[35].

Several studies have demonstrated that the majority of traumatic dental injuries occur during childhood. The literature reports that the highest incidence of dental trauma is observed in children aged 12-36 months because the child is in the process of gaining mobility and independence, yet lacks full coordination[5,9]. The first peak in traumatic dental injuries appears at 2–4 years of age. By the age of 7 years, 28% of the girls and 32% of the boys have suffered a traumatic dental injuries to the primary dentition. Furthermore the parents' anxiety in seeking dental care is higher in very young children, even after small traumatic accidents, which can affect the incidence in this age group[11]. However, in retrospective studies, it has been stated that more traumatic dental injuries are recorded in older children probably because the register of injuries to hard tissues is usually cumulative[36,37]. On the contrary, our investigation data has showed that the group aged from 37 to 48 months was the most affected by trauma.

The number, location, type and severity of dental injuries per person differ according to their age and the cause of the damage[9]. The majority of studies found that trauma to primary teeth usually involved a single tooth, and rarely more than two teeth[18,28,36,38,39]. In this study, it was observed that the majority of the affected preschool children (3.81%) had one traumatized tooth, while 1.21% had two damaged teeth. No child had more than two damaged teeth. This proportion is similar to that reported in the literature[13,15,16,40]. The explanation for the difference in numbers of teeth involved in the traumatic episodes may be the individual characteristics of the children and the varied methodologies of the studies.

The etiology of the dental injuries of the group studied was basically a fall (66.7%), in agreement with other studies[12,14]. The high incidence of these falls is explained by the developing motor coordination at the age of the study population[4,25,40].

The anterior teeth are the most commonly traumatized. The maxillary central incisors are generally more proclined than the mandibular centrals and tend to be the first to receive a direct blow producing a fracture. In addition, the maxilla is fixed to the skull which makes it rigid, while the mandibula, being a flexible part, tends to reduce the impact forces directed on the mandibular anterior teeth by movement[41]. In the present study, the maxillary central incisors were the teeth most affected (92.68%), and these findings are very similar to those reported by other authors[13,15,22-25,40,42-44].

Fractures of crowns involving the enamel only were the most common type of injury in the group studied. This finding corroborates previous researchers[18,38,39,41,45]. In other published studies, crown fractures were also the most common type of injury, with prevalences ranging from 63.8% to 90% of trauma involving primary teeth[19,21,36,46].

In the present research, enamel fractures dominate (65.9%) followed by discoloration (14.6%) and enamel–dentin fracture (12.2%). The highest number of crown fractures observed (77.0%) was also found in other retrospective studies conducted in preschool children[13,16,44]. However, in previous investigations[22,24], it has been reported that the most common injuries were luxations.

Conclusions

The prevalence of dental injuries in Turkish preschool children was very low. The present study findings emphasize the importance of encouraging parents to visit the dentist with their child at an early stage. Moreover, traumatic dental injury is widespread in the population; it has both physical and psychological effects, it is treatable; and, most importantly, it is preventable. In order to reduce the frequency of traumatic dental injuries in preschool children and to avoid its financial consequences, there is a great need for more efforts and health promotion policies to encourage preventive strategies.

In addition, preventive educational program should be instituted in Turkey, directed at parents and preschool teachers to inform them about the importance of traumatic dental injuries and the benefit of immediate attendance for dental treatment. With the help of this educational program sequelae of traumatic dental injuries would be also minimized considerably.

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