

# Prevalence of Traumatic Injuries to the Anterior Primary Teeth in Preschool Children in Rasht, Guilan, 2012

## Original Article

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## Abstract

**Introduction:** Dental trauma is a very significant problem in primary dentition. It has a physical, esthetic and psychological impact on the child and his/her parents. The purpose of this study was to assess the prevalence of traumatic injuries to the anterior primary teeth and determining factors in 2-5-year-old children in Rasht, 2012.

**Materials and Methods:** This research was a cross-sectional study. In order to examine for the signs of trauma to their anterior primary teeth, 748 two to five year-old children of kindergartens in the city of Rasht were chosen. A questionnaire regarding the demographic data of their children and history of the trauma were sent to the parents. The statistical analysis was chi-square test.

**Results:** The prevalence of traumatic injury to anterior primary teeth was 23.8%, with no significant differences between boys and girls. Enamel fractures were the most common traumatic injury (76.5%). The most common cause, location and seasonal variation of the trauma were respectively falling (95.6%), at home (59.8%) and summer (78.3%). There were more traumas in Children with increased over jet than those with normal or decreased over jet.

**Conclusion:** The dental trauma in primary dentition is an accident that occurs due to children's development stage, even when they are cared for by mothers at home. There is a need for an educational program specifically directed at parents to inform them about the immediate dental treatment in case of traumatic dental injuries.

**Key words**•Child •Dentition •Primary, Prevalence • Injuries

## Introduction

Traumatic injuries to primary teeth are serious problems especially in young children due to their effect on appearance, chewing ability and the development of middle third of the face leading to undesirable dental habits.<sup>(1)</sup> In addition, because of the close anatomic relationship, primary teeth can transmit trauma to developing permanent tooth germs.<sup>(1,2)</sup> Biological predisposing factors for dental trauma include increased over jet and inadequate lip coverage.<sup>(3,4)</sup>

When young children begin to sit up, crawl, stand up, walk, run and explore their surrounding environments, the risk of traumas increases due to their lack of motor coordination and reflexes.<sup>(1)</sup> In primary dentition, studies have found prevalence estimates of 9.4-15%<sup>(3,5,6)</sup>, 17.4%<sup>(1)</sup>, 30.8%<sup>(7)</sup> and up to around 39%.<sup>(4)</sup> In another study by Went et al. evaluating the traumatic dental injuries among preschool children in south Brazil, the prevalence of dental trauma was 36.6%.<sup>(8)</sup> This variation may be caused by differences in sample selection methods, age groups, the diagnostic criteria and the place where the study was conducted.

How and where dental trauma occurs, the types of trauma and etiological factors are sources of important information to dentists, with which they can inform parents on how to prevent dental injuries best. The aims of this study were to assess the prevalence of dental trauma to primary teeth in children between 2 and 5 years of age and determine the etiological and predisposing factors. In addition, whether or not there was any difference in the prevalence of such injury with regard to gender and age.

## Materials and Methods

A cross-sectional study was carried out on 748 children aged 2 to 5 years attending kindergartens in the city of Rasht. Using a

cluster random sampling technique, 22 kindergartens were selected from different geographic areas of the city.

First, Physical examination of the children was performed. Afterwards, a self-administered questionnaire including demographic data and specific questions regarding the cause of trauma, the place it happened, the age of child when the teeth were traumatized, were sent to parents. Parents were asked if the child's teeth were displaced, discolored, fractured and/ or had mobility as a result of a trauma. A trained examiner clinically examined all subjects for signs of previous dental trauma to their anterior primary teeth. Each child was seated in a chair under natural light and the examiner sat in front of the child. The teeth were dried with dental gauze; a mouth mirror and a pen light were used for the examination.

The classification criterion used followed the Andreasen's method<sup>(9)</sup> taking into account the occurrence of dental trauma in primary teeth.<sup>(10,11)</sup> Pulp involvement was assessed through the presence of discoloration and fistula without signs of caries.<sup>(3)</sup>

Root fracture was not recorded in this study because taking radiographs is not appropriate for epidemiological surveys. The presence of anterior open bite was assessed based on lack of vertical overlap of the incisors in the occlusal position.<sup>(12)</sup> Over jet was categorized as more than 3mm; equal or less than 3 mm.<sup>(4)</sup>

Data were analyzed using the chi-square test in the statistical program SPSS 16. The level of significance was set at  $P < 0.05$ .

## Results

The total number of children examined was 748, of whom 405(54.1%) were boys and 343(45.9%) girls. The prevalence of traumatic injury to anterior primary teeth was 23.8%, with no significant differences between boys and girls ( $P=0.09$ ). (Table 1)

The highest prevalence of trauma was seen in the 3- 4 year-old children (51.1%) followed by 2-3 year olds (32.6%). Enamel fracture was the most common traumatic injury (76.5%). (Table 2) The teeth most commonly affected were the maxillary central incisors (62%) followed by the maxillary lateral incisors (29.5%). From 178 questionnaires which were distributed to parents, 92 were returned to the kindergartens. Table 3 describes the etiology of trauma and the place of occurrence according to the answers of parents. The most common etiology and place of occurrence of the trauma were respectively falling (95.6%) and at home (59.8%). Most injuries occurred in summer (78.3%). In this study, none of the injured children visited a dentist for dental treatment. A significant relationship was observed between the prevalence of traumatic injury and increased over jet ( $p < 0.0001$ ). (Table 4) There was no significant relationship between occurrence of trauma and over bite. ( $p = 0.3$ )

**Table 1. Prevalence of dental trauma according to gender in 2-5-year old children**

Variables	Trauma at clinical examination		P *
	Yes N (%)	NO N (%)	
Boys	106 (26.2%)	299 (73.8%)	0.09
Girls	72(21%)	271(79%)	
Total	178(23.8%)	570(76.2%)	

\*chi-square

**Table 2. Distribution of traumatic injuries by type in 2-5-year old children**

Trauma Type*	N	%
Enamel Fracture	150	76.5
Enamel-Dentin Fracture	30	15.5
Tooth Mobility	4	2
Extrusion	0	0
Lat. Luxation	0	0
Intrusion	3	1.5
Avulsion	4	2
Crown Discoloration	5	2.5

\*considering that a child may present more than one type of injury

**Table 3. Distribution of children bearing dental trauma according to etiology and place of occurrence**

	Variables	N	%
Etiology	Falls	8	95.6
	Traffic accident	3	3.3
	Child abuse	1	1.1
Trauma place	Home	55	59.8
	Kindergarten	24	26.1
	Street	12	13
	others	1	1

\*chi-square

**Table 4. Distribution of over jet in examined children**

Over jet	With Trauma N (%)	Without Trauma N (%)	P*
>3 mm	60 (44.1)	76 (55.9)	0.001
≤ 3mm	118 (19.2)	494 (80.7)	

\*chi-square

## Discussion

The present study was undertaken with the main aim of assessing the prevalence of traumatic injuries in children aged between 2 and 5 years, and determining whether or not there was any difference in the prevalence of such injury with regard to gender and age.

The overall prevalence of dental traumatic injuries in this group was 23.8%. It is important to bear in mind that the incidence of dental trauma is always underreported in surveys, owing to bias resulting from the healing of symptoms. In our study, reports on the history of trauma were confirmed by parents. We did not ask all the parents because some of them were not able to remember the injury or the type of it or its location. Some authors state that in many cases parents neither remember nor are aware of the injury and its causes.<sup>(13,14)</sup> Furthermore, a lot of questionnaires regarding children with trauma were not returned

to kindergartens. (Only 92 questionnaire were returned). We evaluated trauma to periodontal tissues according to the signs of discoloration and fistula. Minor luxation injuries like concussion and subluxation do not leave a visible permanent marker and we could not identify them.

The prevalence of dental trauma found in this study was similar to that of Kirzioglu et al.<sup>(15)</sup> and Yagot et al.<sup>(17)</sup> However, it was lower than that of Rodriguez et al.<sup>(16)</sup>, Wendt et al.<sup>(8)</sup> and Robson et al.<sup>(4)</sup> and was higher than that of Ferreira et al.<sup>(6)</sup>, Hasan et al.<sup>(5)</sup> and Oliveira et al.<sup>(3)</sup>

Reasons for this difference in the reported prevalence can be offered by the fact that different researchers adopted different diagnostic criteria, sample size, age group under investigation, and study area.<sup>(1, 5)</sup> In agreement with most studies<sup>(4, 5, 8, 16-19)</sup>, the present study found that enamel fracture was the most common traumatic injury (76.5%). However, some authors reported luxation injuries as the most frequent injury in preschool children.<sup>(1, 20, 21, 23, 24)</sup>

Most of the later studies were conducted in the emergency room of a hospital, pediatric dentistry clinic of a university or private practice which increases the chance of reporting more severe injuries. Another possible explanation for the high prevalence of enamel fracture in this study is that luxation injuries in the primary dentition tend to heal spontaneously without treatment and may have been undiagnosed during examination and parents may have not noticed such an injury or forgotten the details of earlier injuries.<sup>(5)</sup>

As related in other studies, the maxillary central incisors were the most affected teeth.<sup>(1, 3, 5, 6-8, 16, 18)</sup> In this study, children between 3 and 4 years of age experienced the most injuries followed by 2-3 years of age. This was in agreement with previous studies which showed that the peak of dental trauma in preschool children is usually in the

2- 4 age group.<sup>(3, 17, 25, 26-28)</sup> Hasan et al. found that more than one-third of injuries occurred between 36 and 48 months.<sup>(5)</sup> Children at this age still do not have well established muscle coordination, and have a tendency to fall and injure their teeth.<sup>(5, 9, 25, 28)</sup> Confirming the other studies<sup>(1, 5, 8, 18, 20)</sup>, the main cause of trauma in primary dentition was falls and most injuries occurred at home. Injuries among preschoolers occur more often at home or inside, but injuries among school-aged children occur more often at school, on the playground or outside.<sup>(18)</sup>

Our results showed that gender was not a statistically significant factor of dental trauma which is in agreement with findings of other recent studies.<sup>(1, 5, 7, 8, 25, 26)</sup> It could be accounted for by the fact that preschool boys and girls are exposed to the same risk factors and there is no difference among the games and sports they play.

A significant relationship was observed between the prevalence of traumatic injury and increased over jet. This finding is similar to that of Robson et al.<sup>(4)</sup> and Burden.<sup>(30)</sup> According to Nguyen et al.<sup>(29)</sup>, children who have finger sucking habits can acquire increased over jet, which is a risk factor for injuries to the upper incisors.

However, this may not be true for all groups of children and in one study no correlation was found between over jet and the dental trauma in the primary dentition of the children of Saudi Arabia.<sup>(31)</sup>

We have to notice that in a cross-sectional study, the prevalence of traumatic dental injuries is always underestimated because of healing of symptoms. Incidence studies to verify dental trauma in children would be ideal.

## Conclusion

The present study concluded that dental trauma in primary dentition is an accident that occurs due to children's development

stage, even when they are cared for by mothers at home. There is a need for an educational program specifically directed at parents to inform them about the benefit of home care, and immediate dental treatment in case of traumatic dental injuries.

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