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# Evaluation of the traumatic dental injuries in mixed dentition

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**Abstract**
The aim of this study is to determine the types and causes of traumatic dental injuries in children with mixed dentition stage who have high socioeconomic status and admitted to private dental clinics. The records of 89 patients aged 6-12 years, who were admitted to a private dental clinic in Istanbul. Analyzed and data were obtained as a result of retrospective evaluation. Dental trauma is seen more frequently in boys (62.92%), meanwhile an increase in the number of trauma was observed around the age of 9 years, there was a statistically significant relationship. ($p<0.05$) The most common cause of trauma was falling during sports activities. The most common dental trauma is enamel fracture. (64.65%) As in the previous studies, similar symptoms were obtained in children, but it was demonstrated that precaution should be taken and traumatic dental injuries should be evaluated carefully before trigger of trauma.

**Keywords:** dental injuries, endodontics, pediatric dentistry, trauma

## 1. Introduction
Traumatic dental injuries are an important dental health problem that is frequently observed in childhood period, in which emergency treatment is a necessity [1, 2, 3] and frequently affects the quality of life [4]. Functional, phonetic and aesthetic disorders, as well as psychological problems in children and family, occur after dental injuries that children are frequently exposed to [5, 6, 7]. It is necessary to know the etiology, distribution and results of the trauma in order to take preventive measures against dental traumas, to prevent physical and psychological problems that may occur, and to decide the effective and accurate treatment [8, 9].
In the literature, there are studies that have examined the prevalence, etiology, sex, formation of trauma and treatments [5, 6, 7, 10]. However, it has been seen that almost all of these studies [5, 6, 7]. were performed in low socioeconomic regions and university clinics and few studies [10]. were conducted in high socioeconomic regions or private dental clinics. The aim of this study was to determine the type of traumatic dental injury and predisposing factors in children with mixed dentition stage and with high socioeconomic status who applied to a private clinic for treatment and to encourage the preparation of educational programs to guide the medical doctors and parents who will intervene after the traumatic injury.

## 2. Materials and methods
The clinical records of 89 patients, who were admitted to a private dental clinic in Istanbul between 01 February 2018 and 31 January 2019, were reviewed and data were obtained as a result of retrospective evaluation. The study was carried out with the permission of Istanbul Medipol University Medical Research Ethics Committee on the date of 05.07.2019 with 528 issues.
Retrospective data were collected from the clinical notes and radiographs in the patient records and standard forms, in which the age, sex, the time elapsed until the first treatment, and the type of trauma includes, where and when the traumatic dental injury takes place. In the classification of traumatic dental injuries, classification was used, which is created by the world health organization and modified by Andreasen and Andreasen [2].
The data were analyzed using computerized Statistical Package for Social Sciences (SPSS) 21 for windows (SPSS Inc, Chicago, IL, USA). ANOVA test was used to compare the means of multiple variables. An Independent-Samples T-test was used to compare the means of two variable, while Chi-Square test was used when proportions were compared. The level of statistical significance was chosen at $p< 0.05$.

## 3. Results
It was found that 116 teeth were affected by trauma in 89 pediatric patients (56 boys and 33 girls) aged 6-12 years who applied to our clinic between 01 February 2018 and 31 January 2019 for dental trauma. It was found that there was a higher rate of boys (62, 92%) and a statistically significant difference. ($p<0.05$) It was observed that dental trauma occurred at the age of 9 years (25.84%), but there isn't any statistically significant difference. ($p>0.05$) The relationship between age and sex is shown in Table 1.

**Table 1:** Age and gender

| Age | Girl | Boy | Total |
|---|---|---|---|
| 6 | 1(% 1.12) | 2(%2.24) | 3(% 3.37) |
| 7 | 1(%1.12) | 3(%3.37) | 4(%4.49) |
| 8 | 2(%2.24) | 5(%5.61) | 7(%7.86) |
| 9 | 9(% 10.11) | 14(%15.73) | 23(%25.84) |
| 10 | 8(%8.98) | 12(%13.48) | 20(%22.47) |
| 11 | 7(%7.86) | 9(%10.11) | 16(%17.97) |
| 12 | 5(%5.61) | 11(%12.35) | 16(%17.97) |
| | 33(%37.07) | *56(%62.92) | 89(100%) |

*statistically difference

When it was examined how the trauma is triggered, it was seen in the first place that is because of falls during sports activities (46.06%) and the number of traumas in school

(35.95%) was quite high related to falls. Data are in table 2.

**Table 2:** Causes and gender relations

| Causes | Girl | Boy | Total |
|---|---|---|---|
| Fall (sports activity) | 15(%16.85) | 26(%29.21) | 41(%46.06) |
| Fall (in school) | 12(%13.48) | 20(%22.47) | 32(%35.95) |
| Impact | 4(%4.49) | 7(%7.86) | 11(%12.35) |
| Traffic accident | 2(2.24%) | 3(3.37%) | 5(5.61%) |

As we evaluated in terms of the time elapsed between the time of trauma and the time of treatment; the rate of patients who applied for treatment on the same day was 34.83%, the rate of patients who applied within 1-3 days was 44.94%, and the rate of patients who applied more than 1-year later 13.48%. Data are shown in table 3.

**Table 3:** Time elapsed between trauma and the time of treatment

| Time | n(%) |
|---|---|
| 0-24 hours | 31(%34.83) |
| 1-3 day | *40(%44.94) |
| 1 week | 1(%1.12) |
| 1 month | 1(%1.12) |
| 3 month | 1(%1.12) |
| 6 month | 3(%3.37) |
| 1 year+ | 12(%13.48) |

*statistically difference

The most common type of dental trauma is enamel fracture (64.65%), followed by dentine-enamel fracture (14.65%). The types of dental trauma are shown in table 4.

**Table 4:** Types of dental trauma

| Concusion | 2(1.72%) |
|---|---|
| Subluxation | 5(4.31%) |
| Lateral luxation | 1(0.86%) |
| Intrusive luxation | 2(1.72%) |
| Extrusive luxation | 3(2.58%) |
| Avulsion | 3(2.58%) |
| Enamel fracture | 75(64.65%) |
| Dentin enamel fracture | 17(14.65%) |
| Pulp exposure | 8(6.89%) |

## 4. Discussion

Traumatic dental injuries are one of the most common pathologies in childhood period. Studies have shown that the prevalence of dental trauma is high in children with mixed dentition stage [11, 12]. As a result of dental injuries in children with mixed dentition stage, incisors whose root development has not been completed are frequently affected and vital / devital endodontic treatments may be necessary as a result [13]. Therefore, treatment of dental injuries during mixed dentition stage is important.

Many studies [14, 15, 16]. Have reported that dental injuries are common in permanent dentition between the ages of 9-10 years, and in some studies [7, 17]. It is reported that the incidence of dental trauma is more in 8 years. In our study, similar to other studies [14, 15, 16] it was found that it reached its peak at the age of 9 (25.84%) and observed at a very high rate at the age of 10 (22.47%).

When the publications are reviewed, it is seen that there are many studies investigating the relationship between sex and traumatic dental injury (TDI). In our study, as in similar studies [18, 19] the rate of TDI in boys (62.92%) was higher than in girls (37.07%). This situation could be explained by the reasons that boys are more active especially in sports activities and they do outdoor sports more [20] and play physical violence games within themselves. Some studies have reported an increase in the incidence of TDI due to increased participation in contact sports, especially in girls in developed countries [21].

It is stated that the most effective factor in the occurrence of trauma is environment and activity [3, 12, 22, 23, 24, 25]. When we examine the data obtained in our study, it is seen that dental injuries are more common result of falls during sport activities (46.06%). In similar studies [26, 27], traumatic dental injuries have been shown to occur more frequently in sport activities. In addition, adelosans, whose families have high socioeconomic status, were more likely to be injured due to reasons such as cycling, skateboarding and falling during riding than those with low socioeconomic status [28]. However, whether the socioeconomic status of the family is a risk factor for TDI in children seems to be controversial, according to studies [29, 30], there was no relationship between socioeconomic level and dental injury in the studies conducted with preschool children. Children with high socioeconomic status have higher incidence of TDI. [31, 32]. We think that the reason for the higher number of injuries due to sport activities is that children with high socioeconomic status, who apply to our clinic are encouraged to engage in more sport activities.

In studies that measure the time between trauma and admission to the dentist, the mean admission time is very different [33, 34]. The reasons are as follows: ignored dental traumas, difficulty in accessing the dentist, dental trauma and priority given to other injuries [35]. In our study, the rate of admission was calculated in the first 24 hours after trauma as 34.83%, and between 1-3 days after trauma as 44.94%. It is considered that the duration of admission after trauma is between 1-3 days, if dental trauma and other injuries are found, the priority is given to other injuries or the family wants the child to be treated by pediatric dentist.

The most common type of injury in permanent teeth is enamel fracture (64.65%), which is similar to previous studies [36, 37, 38, 39]. However, the rate of incidence of enamel dental fracture in permanent teeth after traumatic dental injury was measured as 14.65%, which is similar to previous studies [40]. There are many studies [7, 21, 25, 34]. Indicating that uncomplicated crown fracture is the most common type of injury in permanent teeth. It seems that data we obtained in our research are consistent.

Avulsion is a very serious form of injury and its prognosis depends on interventions from the time of the accident to the replanting of the tooth [2, 41, 42]. Avulsion in permanent dentition has an incidence of 0.5% to 3% among dental traumatic injuries [41, 42]. It was obtained at a rate of 2.58% in our study.

## 5. Conclusion

Although traumatic dental injuries are accepted as a public health problem, they are more common in children of families with high socioeconomic status due to the increase in sport activities. Injuries that may occur during these activities can be prevented by education programs or by simple measures such as supervision, mouth guard usage during activities. However, in order to reduce post-traumatic complications in permanent dentition, parents' awareness becomes important.

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