

Original article

Epidemiological survey for dental trauma among 12-year-old children in Erbil City, Iraq

Mohamed Salim Younus and Karam Ahmed
Faculty of Dentistry, Tishk International University, Erbil, Iraq

ABSTRACT

Background: Dental injury and trauma are some of the most important public health concerns among school children that may require immediate management, as they could result in consequences affecting the child aesthetically, psychologically and socially. **Purpose:** The aim of this study was to determine the prevalence of dental trauma, the type of fracture, the most commonly affected tooth and the effect of gender on the occurrence of dental trauma. **Methods:** The methodology of this study was a cross-sectional survey consisting of a questionnaire and an oral examination which was conducted on 12-year-old public primary school children. Schools were selected from five different areas of Erbil city in Iraq. **Results:** The results indicate that 16.3% of the sample were affected with dental trauma in both genders. Maxillary central incisor was the most commonly affected tooth, and the majority of dental traumas were untreated. The most common type of dental trauma was simple enamel fracture. **Conclusions:** Child students are at great risk regarding dental trauma, which may affect their social activity especially within their school life.

Keywords: dental trauma; prevalence; school students

Correspondence: Mohamed Salim Younus, Faculty of Dentistry, Tishk International University, Erbil, Kurdistan region, Iraq.
Email: mohamed.salim@tiu.edu.iq

INTRODUCTION

Trauma was defined as a physical damage or wound caused by an outside force (external) which may cause death or permanent disabilities,¹ and the term dentoalveolar trauma represented alveolar injuries (mandible and maxilla), teeth injuries (fractures, avulsions and luxation) and all soft tissue wounds (lips, gingiva and tongue), ranging from bruising to extreme laceration.² Damage implies offended, hurt or harmed tissue that will stimulate a dystrophic and/or provocative response from the affected area.³ Dental injury may be a harm to the mouth—including teeth, lips, gingiva and tongue—and commonly incorporates a broken or lost tooth.¹ Tooth wounds were portrayed as a break, luxation or separation, in spite of the fact that a combination of wounds may happen within the same tooth.⁴

Dental injury is a significant and serious health problem, as it may lead to many problems including pain and loss of function, as well as aesthetic, social and psychological issues for the child and their guardians (the entire family).

Traumatic wounds primarily influence children, with an incidence peak of 2–4 years and 8–10 years of age, affecting boys more than girls.^{5,6} Most dental damage was related to falls, mainly while using bicycles or skateboards. Others were related fundamentally to playing football as well as other contact sports, particularly hockey, rugby, judo and karate.^{7–9}

The predominance of dental trauma was high throughout the world and affected primary and permanent teeth, in spite of the fact that the oral cavity comprises as little as 1% of the entire body.¹⁰ It has been depicted in some studies that the predominance of dental and facial wounds within a population may reach as high as 35 % of registered cases.⁷ Study on Iraqi mothers showed a low level of knowledge regarding the methods of management and prevention of dental trauma.¹¹ Though the researchers found many interesting aspects in this field, the study was planned to evaluate the prevalence of dental injuries, the type of fracture, the most commonly affected tooth, and the effect of gender on the occurrence of dental trauma.

MATERIALS AND METHODS

Before starting the research, written approval was obtained from the ethical committee at Tishk International University (TIU) (No. 27 on 20/11/2019). The sample chosen for this cross-sectional survey consisted of 416 child students (188 boys and 228 girls), and this sample was selected from 5 different geographic areas (to cover the entire topography of Erbil city) including 10 primary schools randomly selected in Erbil city, Iraq. The subjects were all 12-year-old school students (according to their birth date). The purpose and importance of the research were explained and discussed with the authorities in the selected schools to ensure their full cooperation during the diagnosis of the students. Written consent forms were sent to students' parents, explaining the procedure and the reasons for the study through the school authority.

The questionnaires included information about where, when, and how many times tooth trauma occurred, to supplement the visual examination of traumatic tooth or teeth recording. Only the children who submitted duly signed forms were included in the study (all the students had the choice as to whether or not they wanted to participate in the research). The ethical statement of this research will include: Approval from the directorate of education was taken before starting the diagnosis.

The following instruments were used for diagnosis: disposable dental mirrors, disposable dental probes, disposable tweezers, gloves and masks. The examined students were seated on their chair in their classes, and the examiner was standing in front of the chair for diagnosis. The criteria of García-Godoy was used for assessing the dental trauma.¹²

Visual and tactile examinations were used for determining the type of dental injuries. No radiographs were taken so the fracture root was not recorded. Anterior teeth with restorations were excluded if the cause of the restoration was not confirmed to be due to trauma. We chose this index because it is simple and has been widely used in

most of the previous studies. Furthermore, this classification was appropriate for retrospective studies.

The inclusion criterion in this study was that the 12-year-old students (their parents) agreed to participate in the survey. The exclusion criteria were students younger or older than 12 years old, parents or children that refused to participate in the research or cases with incomplete documentation, and students under orthodontic treatment. Statistical Package for the Social Sciences software (SPSS), version 20 (IBM, New York, USA), was used for data analysis and processing. The collected data was grouped and placed in tables and a Chi-square test was used to compare the results (χ^2). All the values were considered statistically significant at $p < 0.05$.

RESULTS

The sample consisted of 416 primary school students from ten different public schools in Erbil governorate. 188 of the sample subjects were male (45.2%) and 228 were female, (54.8%) all with an age of 12 years. The distribution of students according to gender is summarised in Table 1. The prevalence of dental trauma was shown to be 16.3% in the total sample and girls showed a higher prevalence of dental trauma (18.4%) in contrast with the boys (13.9%). However, this difference in prevalence was statistically non-significant ($p > 0.05$), as shown in Table 2.

Table 3 shows that from 68 students who experienced trauma, the most prevalent kind was enamel fracture, while the least common was enamel dentine pulp fracture with high significant differences at $p < 0.001$. The result showed that the teeth most commonly affected by trauma were upper centrals, while the least affected teeth were lower canines with high significant differences at $p < 0.001$, as shown in Table 4.

Table 5 shows that from the 68 students who had trauma, the dental trauma occurred mainly at home, followed by school. The least common places were in the street and park,

Table 1. Distribution of sample according to gender

| Gender | No. | Percentage (%) |
|--------|-----|----------------|
| Boys | 188 | 45.2 |
| Girls | 228 | 54.8 |
| Total | 416 | 100 |

Table 2. Prevalence of dental trauma among male and female students

| Dental trauma | Boys | | Girls | | Total | |
|---------------|------|------|-------|------|-------|------|
| | No. | % | No. | % | No. | % |
| No | 162 | 86.1 | 186 | 81.6 | 348 | 83.7 |
| Yes | 26 | 13.9 | 42 | 18.4 | 68 | 16.3 |
| Total | 188 | 100 | 228 | 100 | 416 | 100 |

($\chi^2=0.67$, $p=0.238$)

Table 3. The types of dental trauma

| Types of trauma | Percentage (%) |
|-----------------|----------------|
| E. fracture | 91.2 |
| D. fracture | 5.9 |
| E.D.P fracture | 2.9 |

($\chi^2=210.67$, $p < 0.008$)

Table 4. The teeth affected with trauma

| Tooth | Percentage (%) |
|---------------|----------------|
| Upper central | 67.6 |
| Upper lateral | 8.8 |
| Upper canine | 5.9 |
| Lower central | 2.9 |
| Lower lateral | 5.9 |
| Lower canine | 2.9 |

($\chi^2=121.35$, $p < 0.001$)

Table 5. The students' distribution according to the place of trauma

| Dental trauma | Home | School | Street | Park | Total |
|---------------|------|--------|--------|------|-------|
| Male | 14 | 10 | 2 | 0 | 26 |
| Female | 30 | 10 | 0 | 2 | 42 |
| Total | 44 | 20 | 2 | 2 | 68 |

($\chi^2=23.46$, $p<0.026$)

Table 6. The distribution of students according to the cause of trauma

| Dental trauma | Falling down | Struck by object | Bicycle accident | Violence | During playing | Unknown cause | RTA | Total |
|---------------|--------------|------------------|------------------|----------|----------------|---------------|-----|-------|
| Male | 10 | 4 | 2 | 0 | 4 | 4 | 2 | 26 |
| Female | 20 | 16 | 2 | 2 | 0 | 2 | 0 | 42 |
| Total | 30 | 20 | 4 | 2 | 4 | 6 | 2 | 68 |

($\chi^2=42.32$, $p<0.001$)

Table 7. The percentage of students visiting the dentist for treatment

| Gender | Dental visit by percentage (%) | |
|--------|--------------------------------|------|
| | Yes | No |
| Boy | 15 | 85 |
| Girl | 23 | 77 |
| Total | 20.6 | 79.4 |

($\chi^2=4.817$, $p=0.108$)

with a statistically significant difference ($p<0.05$). From the total number of traumatised students, falling down and being struck by an object were the most prevalent reasons for the dental trauma in both genders, followed by the other causes with high significant differences at $p<0.001$, as shown in Table 6. The number of students visiting the dentist for dental treatments was only 20% (23% female and 15% male), while the number of students not visiting the dentist was 79.4% (77% female and 85% male) with statistically non-significant differences ($p>0.05$), as seen in Table 7.

DISCUSSION

The most common dental injury could be a broken or displaced tooth. The study showed that (16.3%) of the sample had a dental trauma, which was in agreement with other studies that found the prevalence to be 15.1%, 14.4%, 14.5%, 18.5% and 16.3% respectively; this study was higher than that founded by others which found dental trauma prevalence to be 10.2%, 5.68% and 6.3%.^{13–19} Within the present study, the high prevalence of dental injury requires proficient planning and intervention to prevent and decrease its rate. Girls were found to have more dental injuries in comparison with boys, similar to the result found by Rajab et al.,²⁰ while other studies showed different results.^{21,22} This finding may be because of a higher number of girls than boys in our sample.

Enamel fracture (91.5%) was most prevalent in the school children followed by enamel-dentin fractures (5.9%), which was comparable to the result found by other

studies.^{22–24} The tooth that was most highly affected with dental trauma was the maxillary central incisor (67.6%), followed by upper laterals, (8.8%) which confirms by Bendo et al. and Prasad et al.^{25,26} This finding could be attributed to the early eruption and the protrusive position of these teeth.

Home was the most common place for an injury to happen, followed by school. This finding was comparable to other studies.^{27,28} This result may be due to the fact that the students spend most of their time at home instead of at school or other places. From the whole number of traumatised students, falling down and being struck by an object were the most common reasons for dental injury in both genders, which was comparable to results found by other studies.^{17,18,23,24} The rate of children that visit the dental practitioner for dental treatment was (20.6%), which was comparable to research by Prasad et al.,²⁶ which found that the majority of dental injuries were untreated. This result might be related to the fact that most of the traumas were enamel-dentin fractures which are not seen as situations that need urgent treatment.

Dental trauma is a critical public dental health issue among school children which needs prompt treatment. Dental injury can result in aesthetic, psychological, social and therapeutic problems. It can be concluded from this study that dental trauma was highly prevalent among the sample of students. Moreover, dental trauma was more common among girls than boys, simple enamel fractures were discovered to be the most widely recognised type of dental trauma, and the maxillary central incisors were the most influenced tooth by dental injury. The most widely recognised cause of dental trauma was falling, followed by being struck by an object, and dental trauma most frequently occurred at home followed by school. Finally, high levels of untreated traumatised teeth were found in this study.

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