

Original article

## Dental traumatic injuries during the COVID-19 pandemic: A retrospective study

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### ABSTRACT

**Background:** Although dental trauma has been reported at various frequencies worldwide, as far as we know there are few data regarding the frequency of dental trauma during the pandemic period. **Purpose:** This study aims to retrospectively evaluate the data of pediatric patients who were admitted to the Department of Pedodontics in a university hospital due to dental trauma during the COVID-19 pandemic. **Methods:** Between April 2020 and December 2020, the clinical records regarding admissions to the Harran University Faculty of Dentistry Pedodontics clinic due to dental trauma were examined. The age and gender of the patient, type of trauma, teeth affected by the trauma, and treatment methods applied after the trauma were recorded. The data obtained were analyzed using the independent sample t-test for intergroup comparisons and Pearson chi-square test for categorical variables with the help of Statistical Package for the Social Sciences version 23.0. **Results:** The data of 43 patients (27 males and 16 females) aged between 1–13 years (mean age:  $9.13 \pm 3.20$ ) who were admitted to the clinic with trauma complaints during an eight-month period were evaluated. It was determined that the most common trauma types in the pandemic period were simple crown fracture (25.6%) and subluxation/lateral luxation (23.3%). During the pandemic, 34.9% of all cases were “falling at home”, while “falling at school” was 14.0% (using the Pearson chi-square test). **Conclusion:** The COVID-19 pandemic period has affected many aspects of social life as well as the number of patients who were admitted for dental trauma and the causes of trauma. Multicenter studies are needed for more accurate results.

**Keywords:** COVID-19; dental traumatic injuries; medicine; pediatric dentistry

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### INTRODUCTION

Traumatic dental injury (TDI) is a public health problem with high prevalence in childhood.<sup>1,2</sup> With the widespread use of preventive medicine, the incidence of caries, tooth loss, and periodontal problems in childhood and adolescence has been reduced, but the frequency of TDI has not decreased.<sup>3</sup> TDI can cause temporary (bleeding, pain, discoloration, and tooth loss) or permanent (anterior teeth malformation, alveolar bone loss, and insufficient jaws growth) effects in the teeth. Such injuries negatively affect not only the patients but also the parents physically, emotionally, and psychologically.<sup>4</sup> While TDI in the preschool period usually occurs because children are unable to balance, school-age children are more likely to suffer from falls while playing sports or playing games.<sup>5</sup> In addition, TDI in children is

associated with reasons such as collisions, falls, sports activities, car and bicycle accidents, and predisposing anatomical factors such as overjet and inadequate lip coverage.<sup>6</sup> However, susceptibility to injury is often related to the physical, social, and personal environment.<sup>1,7</sup> It is suggested, therefore, that investigation of the determinants of TDI should not be limited to individual factors. Social and living conditions, income distribution, and health policies are important aspects of the distribution of such diseases and should be studied with the same intensity and attention.<sup>8</sup> According to the world literature, rates of adolescents presenting evidence of TDI varies from 7.9% to 26.6%.<sup>9,10</sup> In studies conducted, the incidence of TDI in deciduous teeth was reported to vary from 7% to 42%,<sup>11</sup> while this rate in permanent teeth was found to be 20% in the age range 8–12 years.<sup>12,13</sup> Although TDI has been

reported at various frequencies around the world and has been found to be associated with many different factors, there is no data on the frequency of TDI during the COVID-19 pandemic period. The significant impact of COVID-19 includes the decrease in the number of patients, where cases have been reported to visit the dental clinic mainly due to dental trauma and oral infection.<sup>14</sup>

The COVID-19 pandemic process has affected many areas of our lives. It is known that in this process, applications to dental hospitals have decreased, and dentists only intervene in emergencies. The aim of this study is to investigate the effects of the pandemic process, which significantly changed social life, on TDI and to compare the results of our study with the studies conducted before the pandemic.

## MATERIALS AND METHODS

In this study, the records of patients aged 0–13 years who were admitted to Harran University Faculty of Dentistry, Department of Pediatric Dentistry with a complaint of dental trauma in 2020 were examined. Ethics committee approval (22/03/24) was obtained from the ethics committee of Harran University Faculty of Dentistry for the study.

All data of the patients (age, gender, affected tooth, cause of trauma/type, and treatment procedure) were obtained from standard trauma-registration forms. Causes of trauma were classified as falling at home, falling at school, sports/cycling, fighting/assault, and collision/hitting any place or object. Trauma types have been classified as simple crown fracture, complicated crown fracture, root fracture, complicated crown-root fracture, alveolar fracture,

intrusion, avulsion, rotation, subluxation/lateral luxation, and concussion. The treatments applied to the patients were recorded as restorative treatment, pulp capping treatment, amputation, fixation, reimplantation, root canal treatment, reposition plus root canal treatment, and follow-up. Also, the patients who had a splint applied were identified, and the relationships between splint application and trauma types and causes were evaluated.

The data were analyzed using Statistical Package for the Social Sciences version 23.0 (SPSS Inc., Chicago, IL, USA). The median, minimum–maximum, and percentage values were calculated for descriptive statistics. The normality of the data distribution was tested using histograms and the Kolmogorov-Smirnov test ( $p > 0.05$ ). As the data were normally distributed, the independent sample t-test was used for intergroup comparisons. The relationships between categorical variables were calculated using the Pearson chi-square test ( $p < 0.05$ ).

## RESULTS

Data of 43 patients (27 males and 16 females) aged 1–13 years (mean age:  $9.13 \pm 3.20$ ) who were admitted to the clinic with trauma complaints during an eight-month period were evaluated. Table 1 shows the distribution of trauma types by gender in the pandemic period. It was determined that the most common trauma types in the pandemic period were simple crown fracture (25.6%) and subluxation/lateral luxation (23.3%). No statistically significant relationship was found between trauma types and gender.

The distribution of trauma causes by gender in the pandemic period is shown in Table 2. In the pandemic

**Table 1.** Trauma type distribution by gender in the pandemic period

Type of Trauma	Men N (%)	Women N (%)	Total N (%)	P value
Simple Crown Fracture	7 (16.3%)	4 (9.3%)	11 (25.6%)	0.506
Complicated Crown Fracture	4 (9.3%)	4 (9.3%)	8 (16.3%)	
Root Fracture	1 (2.3%)	1 (2.3%)	2 (4.7%)	
Complicated Crown-Root Fracture	1 (2.3%)	0 (0.0%)	1 (2.3%)	
Alveolar Fracture	3 (7.0%)	0 (0.0%)	3 (7.0%)	
Intrusion	1 (2.3%)	2 (4.7%)	3 (7.0%)	
Avulsion	3 (7.0%)	0 (0.0%)	3 (7.0%)	
Rotation	1 (2.3%)	0 (0.0%)	1 (2.3%)	
Subluxation/Lateral Luxation	6 (14.0%)	4 (9.3%)	10 (23.3%)	
Concussion	0 (0.0%)	1 (2.3%)	1 (2.3%)	
Total	27 (62.8%)	16 (37.2%)	43 (100.0%)	

**Table 2.** Trauma cause distribution by gender in the pandemic period

Cause of Trauma	Men N (%)	Women N (%)	Total N (%)	P value
Falling at Home	12 (27.9%)	3 (7.0%)	15 (34.9%)	0.509
Falling at School	3 (7.0%)	3 (7.0%)	6 (14.0%)	
Sports/Cycling	5 (11.6%)	3 (7.0%)	8 (18.6%)	
Fighting/Assault	3 (7.0%)	3 (7.0%)	6 (14.0%)	
Collision/Hitting any Place or Object	4 (9.3%)	4 (9.3%)	8 (18.6%)	
Total	27 (62.8%)	16 (37.2%)	43 (100.0%)	

period, 34.9% of all cases were “falling at home,” while those for “falling at school” were 14.0%. No statistically significant relationship was found between the causes of trauma and gender. The distribution of treatment methods applied to trauma patients in the pandemic period by gender is shown in Table 3. It was observed that the most common treatment during the pandemic period was restorative treatment (27.9%). A comparison of the patients with and without splint treatment, according to the causes of trauma, is given in Table 4. Splint treatment was unnecessary in 65.1% of trauma cases in the pandemic period. No statistically significant relationship was found between the causes of trauma and splint treatment ( $p>0.05$ ). The comparison of the patients with and without splint treatment, according to trauma types, is given in Table 5. A statistically significant relationship was found between trauma types and splint treatment ( $p<0.05$ ). While splints were not used in 90.9% of simple crown fractures, splints were applied in 100% of avulsions, alveolar fractures, and rotations.

## DISCUSSION

TDIs constitute a serious oral-dental problem, as their treatment is costly, has a significant impact on the oral health-related quality of life of the population, and is often required due to preventable injuries.<sup>15</sup> Traumas related to deciduous and permanent teeth can negatively affect the ongoing development of teeth and jaws of the individual. With the correct diagnosis and effective treatment, the effects of trauma are minimized, and in this way the development of teeth and jaws can continue in a healthy manner. In studies conducted before the pandemic, it was reported that men were more exposed to trauma.<sup>16–18</sup> In our study, however, no statistically significant difference was found between gender and trauma.

When the studies in the literature have been examined, it has been determined that the incidence of crown fractures varies from 10% to 50%.<sup>3,17–19</sup> It has been reported that luxation injuries are more common than crown fractures in primary dentition.<sup>19,20</sup> Rocha and Cardoso stated that

**Table 3.** Distribution of treatment method applied to trauma patients by gender

Treatment	Men N (%)	Women N (%)	Total N (%)	P value
Amputation	1 (2.3%)	1 (2.3%)	2 (4.7%)	0.093
Fixation	3 (7.0%)	0 (0.0%)	3 (7.0%)	
Root Canal Treatment	6 (14.0%)	4 (9.3%)	10 (23.3%)	
Pulp Capping Treatment	1 (2.3%)	0 (0.0%)	1 (2.3%)	
Reimplantation	3 (7.0%)	0 (0.0%)	3 (7.0%)	
Reposition + Root Canal Treatment	1 (2.3%)	0 (0.0%)	1 (2.3%)	
Restorative Treatment	7 (16.3%)	5 (11.6%)	12 (27.9%)	
Follow-up	5 (11.6%)	6 (14.0%)	11 (25.6%)	
Total	27 (62.8%)	16 (37.2%)	43 (100.0%)	

**Table 4.** Relationship between trauma cause and splint application

Cause of Trauma	Splint Used N (%)	Splint Not Used N (%)	Total N (%)	P value
Falling at Home	7 (46.7%)	8 (53.3%)	15 (100.0%)	0.381
Fighting/Assault	3 (50.0%)	3 (50.0%)	5 (100.0%)	
Falling at School	1 (16.7%)	5 (83.3%)	6 (100.0%)	
Collision/Hitting any Place or Object	1 (12.5%)	6 (87.5%)	7 (100.0%)	
Sports/Cycling	3 (37.5%)	5 (62.5%)	8 (100.0%)	
Total	15 (34.9%)	28 (65.1%)	43 (100.0%)	

**Table 5.** Relationship between trauma type and splint application

Type of Trauma	Splint Used N (%)	Splint Not Used N (%)	Total N (%)	P value
Avulsion	3 (100.0%)	0 (0.0%)	3 (100.0%)	0.005*
Intrusion	1 (33.3%)	2 (66.7%)	3 (100.0%)	
Complicated Crown Fracture	3 (37.5%)	5 (62.5%)	8 (100.0%)	
Complicated Crown-Root Fracture	0 (0.0%)	1 (100.0%)	1 (100.0%)	
Simple Crown Fracture	1 (9.1%)	10 (90.9%)	11 (100.0%)	
Root Fracture	2 (100.0%)	0 (0.0%)	2 (100.0%)	
Subluxation/Lateral Luxation	1 (10.0%)	9 (90.0%)	10 (100.0%)	
Alveolar Fracture	3 (100.0%)	0 (0.0%)	3 (100.0%)	
Rotation	1 (100.0%)	0 (0.0%)	1 (100.0%)	
Concussion	0 (0.0%)	1 (100.0%)	1 (100.0%)	
Total	15 (34.7%)	28 (65.3%)	43 (100.0%)	

the incidence of both types of injuries (51.5%, 48.5%) was similar, and there was no statistically significant difference.<sup>21</sup> Ludwig et al., in a study examining the effect of COVID-19 on trauma, reported that dental trauma was seen least in the pandemic period, and this rate was 18%.<sup>22</sup> Yang et al., in their study during the pandemic period in 2020, determined that the rate of complicated crown fracture was 62.5% and that of subluxation was 31.0%.<sup>23</sup> In our study, simple crown fracture was the most common type, with a rate of 25.6%, followed by luxation injury, with a rate of 23.3%. It appears that this proportional difference is due to the difference in the prevention measures and bans taken in the countries during the COVID-19 period and the sample size.

When the literature has been reviewed, it has been determined that traumatic injuries mostly occur as a result of “fall” and, second, as a result of “impact.”<sup>24–26</sup> Gabris et al., Ramaiah et al., and Gassner et al. reported that traumatic injuries are more common as a result of sports injuries.<sup>27–29</sup> Yang et al., in their study investigating the causes of TDI, found most occurrences were as a result of falls and traffic accidents (35.0%, 36.7%) in 2019, while TDI due to falls occurred at a rate of 89.5% in 2020.<sup>23</sup> In the study by Elbay et al., they determined that 27.4% of TDIs occurred in the park, 26.9% at school, and 21.1% at home.<sup>30</sup> In our study, “falling at home” ranks first with a rate of 34.9%. The authors think that this difference is due to the rules and bans applied within the scope of COVID-19 measures.

When the treatment procedure after trauma is examined in our study, the first order is “treatment with restoration” and the second is “follow-up.” These results are consistent with similar studies in the past.<sup>24,31–33</sup> In addition, unlike the studies in the literature, a statistically significant relationship was found between trauma type and splint treatment in our study. While splints were not used in 90.9% of simple crown fractures, splints were applied in 100% of avulsions, alveolar fractures, and rotations. Since there are very few studies examining the effect of the COVID-19 period on dental traumas, some parameters could not be discussed.

In conclusion, the COVID-19 pandemic period has affected many aspects of social life as well as the number of patients who have been admitted for dental trauma and the causes of trauma. The increase in the rates of dental trauma at home during the pandemic period is an indication regarding the awareness of parents about dental trauma and the need to increase social awareness in terms of early intervention in trauma cases.

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