

# School Teachers' Knowledge and Attitudes about the Emergency Management of Traumatic Dental Injuries in Turkey

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**Objective:** The emergency management of traumatized teeth is critical to their long-term outcomes. In school-aged children, most traumatic dental injuries (TDI) occur at school and teachers are often required to manage dental trauma (DT) emergencies. Therefore, the aim of this study was to determine teachers' knowledge and attitudes about TDI. **Research design:** Survey in 147 randomly selected schools in 53 cities in Turkey. A questionnaire enquiring about demographic data, knowledge of DT, and knowledge of first aid related to DT was distributed to primary school teachers. **Results:** 1,634 completed questionnaires were returned (65% response rate). 92.5% of the teachers were not satisfied with their DT knowledge, and almost all (97.8%) had never received DT training, although 28.1% had witnessed at least one case of DT. In the case of tooth avulsion, 26.4% believed that an avulsed tooth would be permanently lost, whereas 28.9% knew that a permanent tooth could be replanted. **Conclusions:** Knowledge of emergency management of TDI among schoolteachers in Turkey is inadequate, and training on their emergency management should be provided.

**Keywords:** Trauma, emergency treatment, child, primary school teacher

## Introduction

Traumatic dental injuries (TDI) are serious oral health problems with a widespread prevalence from infancy to adolescence. TDI comprise 5% of all injuries requiring treatment in people and are seen frequently in children, especially those aged 5 to 12 years (Andreasen *et al.*, 2007). In addition, TDI have been reported to be the fifth most common disease in humans (Petti *et al.*, 2018).

The experience of TDI in primary teeth is about 30% and approximately 20% in permanent teeth. Maxillary incisors are the teeth most affected, which can cause functional, aesthetic, and psychological problems in children (Andersson, 2013).

Most TDI occur at home during leisure time or at school (Andersson, 2013). In preschool children, falls are the most common etiological factors, whereas in school-age children, contact sports, physical violence, and traffic accidents are among the most common causes (Guedes *et al.*, 2010). When TDI occur at school or in its surroundings, the prognosis of traumatized teeth depends on the emergency management available; this is often provided by lay people such as parents, teachers, and coaches at the site of the accident (Cortes *et al.* 2002). In almost all cases of TDI, immediate and appropriate management is an important determinant of prognosis, particularly in cases of avulsion (Andreasen *et al.*, 2007). Therefore, the potential role of schoolteachers in children's oral health and TDI is considerable (Glendor *et al.*, 2000).

Recent studies in different countries have reported that schoolteachers have inadequate knowledge about dental trauma (DT) and its emergency management (Marcano-Caldera *et al.*, 2018; Pithon *et al.*, 2014; Tzimpoulas *et al.*, 2020). Despite their importance, the literature

contains only a few studies of TDI in Turkey (Arikan and Sönmez, 2012; Bayrak *et al.*, 2012; Caglar *et al.*, 2005). Furthermore, a recent systematic review reported that the awareness level in several areas of the world was still unknown (Tewari *et al.*, 2020).

The aim of this study was to determine schoolteachers' knowledge and attitudes about TDI in Turkey. The results are expected to provide information that can help design, organize or refine first aid and teacher training courses that are often lacking on this important topic, and to increase awareness on this issue across primary school teachers.

## Method

The study protocol was approved by the Clinical Research Ethics Committee of Kutahya Health Sciences University (ref. no.: 2020/06-1, date: 01.04.2020). The authors confirm that this study was conducted in full accordance with the World Medical Association Declaration of Helsinki. The study complied with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

The number of primary schoolteachers in Turkey was obtained from Republic of Turkey Ministry of National Education 2020 statistics. A sample of 1006 teachers was chosen to yield a 95% power to detect differences when Type-1 error was 5% and effect size was 0.1, using the G\* Power statistics program (ver. 3.1.9.4) (Collins, 1986). Additional individuals were approached to account for teachers who declined to take part.

Turkey is a transcontinental country straddling Western Asia and Southeastern Europe with a population of 83.2 million people across seven geographical regions

of Marmara, Central Anatolia, Mediterranean, Aegean, Southeastern Anatolia, Black Sea and Eastern Anatolia (in order of descending population density). Compulsory primary education is provided in schools for all children between the ages of 6–14. The teachers were selected for across the age range of children. The sampling frame was obtained from the list of schools published on the official website of the Republic of Turkey Ministry of National Education. The schools were randomly selected from this list and included at least 10 schools from each of the seven geographical regions. A total of 147 schools across 53 cities with different socioeconomic characteristics (18 high, 19 average, 16 low) were invited to participate. The study population consisted of both public and private primary school teachers.

A survey was designed using an online platform (Google Forms, [https://www.google.com/intl/tr\\_tr/forms/about/](https://www.google.com/intl/tr_tr/forms/about/)), and a link was mailed electronically to a total of 2,387 teachers. The teachers received a written explanation about the study before participation; the first page of the questionnaire included the consent to participate, the introduction to the study, the importance and benefits of participation, and a statement of confidentiality. All the participants read the first page and were informed that their participation in the study was entirely voluntary. Informed consents were obtained before the onset of the survey.

The participants were asked to select the answers that most accurately expressed their knowledge and attitudes about TDI and their emergency treatment. The questionnaire was modified from those used in previous similar studies (Bayrak *et al.*, 2012; Caglar *et al.*, 2005; Chan *et al.*, 2001; Fux-Noy *et al.*, 2011; Marcano-Caldera *et al.*, 2018; Pithon *et al.*, 2014) and consisted of three parts (Tables 1–3). The first part enquired about the teachers' personal and professional profiles; the second part about their medical and non-medical knowledge of DT; and the third part contained questions based on an imaginary case involving an avulsed tooth.

The returned questionnaires were analyzed, and the results were expressed as frequency distributions. A chi-square test was used to identify the differences in responses for different variables. The data were analyzed using SPSS software (version 20.0; SPSS Inc, Chicago, IL, USA), and the significance level was established at 5% ( $p < 0.05$ ).

## Results

A total of 1,634 completed questionnaires were received from 147 schools. The teacher response rate was 68.5%. The personal and professional profiles of the teachers are summarised in Table 1. Less than half (46%) of the participants were male, and 54% were female. Teachers aged between 30–39 years made up the largest group of participants (37.9%), and about 60% had more than 10 years of work experience. Half (49.9%) had received first aid training, 2.2% had received DT education, and 28.1% had witnessed a DT. A large majority (92.5%) of the teachers were not satisfied with their knowledge about DT management.

Most teachers (71.9%) regarded DT as an emergency (Table 2). This figure rose to 90.8% of the teachers who had witnessed a DT, with 64.5% of those who had not

**Table 1.** Demographic characteristics of 1634 schoolteachers

Characteristics	%
Gender	
Male	46.0
Female	54.0
Age	
20–29	19.7
30–39	37.9
40–49	29.1
> 50	13.3
Geographical Region	
Marmara	17.3
Black Sea	15.6
Mediterranean	15.4
Central Anatolia	14.1
Eastern Anatolia	13.0
Aegean	12.7
Southeast Anatolia	11.9
Type of school	
Private school	10.2
Public school	89.8
Work experience	
< 5 y	17.8
5–10 y	22.6
> 10 y	59.6
General first aid training	
Yes	49.9
No	50.1
First aid training for dental emergencies	
Yes	2.2
No	97.8
Dental trauma witnessed	
Yes	28.1
No	71.9
Satisfied with dental trauma knowledge	
Yes	7.5
No	92.5

witnessed a DT regarding it as an emergency ( $p < 0.001$ , Chi Sq). The answers given to this question were similar across genders. Almost half (45.3%) regarded first aid for DT as a purely professional matter that did not require the intervention of the teacher.

Approximately one quarter of participants (26.4%) believed that a tooth that comes out of the mouth will be permanently lost. While 28.9% of the teachers thought that avulsed permanent teeth should be replanted, 59.7% thought that primary teeth should not be replanted. 41.8% of the teachers believed that professional help should be provided immediately. Responses to this question were similar across genders.

In a scenario in which a nine-year-old boy had been hit in the face with a softball and his upper front teeth knocked out, 54.2% of the teachers answered that the teeth were permanent. More female than male teachers (61.2% vs. 46.1%,  $p < 0.001$ , Chi sq.) thought that the

**Table 2.** Knowledge about dental trauma among 1634 schoolteachers

Questions	%
Dental trauma requires immediate management.	
Strongly disagree	0.7
Disagree	1.5
I do not know	25.9
Agree	39.4
Strongly agree	32.5
In case of dental trauma, no teacher intervention is required because this is a purely professional matter.	
Strongly disagree	4.0
Disagree	16.7
I do not know	34.0
Agree	28.2
Strongly agree	17.1
If a tooth comes out of the mouth due to knocking, the tooth will definitely be lost.	
Strongly disagree	7.1
Disagree	21.2
I do not know	45.4
Agree	19.5
Strongly agree	6.9
Do you think a permanent tooth that has been knocked out should be replanted?	
Yes	28.9
No	24.7
Not sure	46.4
Do you think a primary tooth that has been knocked out should be replanted?	
Yes	5.9
No	59.7
Not sure	34.4
How urgent is it to seek professional help in case of knocked out teeth?	
Immediately	41.8
Within 30 min	24.1
Within a few hours	23.8
Before next day	10.3
A nine-year-old boy was hit in the face with a softball, and because of this accident, his upper front teeth were knocked out. Are the damaged teeth likely to be primary or permanent teeth?	
Primary teeth	31.8
Permanent teeth	54.2
Not sure	14.0
Do you question the tetanus vaccine in the case of a knocked-out tooth?	
Yes	44.7
No	4.5
Not sure	50.8
If your student came to you with a knocked-out tooth, who would be your first contact to seek treatment?	
Pediatric dentist	67.1
General dentist	21.0
Medical doctor	11.9

teeth were permanent. Most (58.3%) teachers aged 30-39 years thought that the teeth were permanent ( $p < 0.001$ , Chi sq. compared to other age groups). Almost half (44.7%) stated that the tetanus vaccine was important in the process of tooth replantation. This proportion was greater amongst teachers who had received first aid training than among teachers who had not (50.4% vs. 39%,  $p < 0.001$ , Chi sq). Two thirds (67.1%) of teachers would contact a pediatric dentist first for treatment of a student who came with a knocked-out tooth after an accident. Responses to this question were unrelated to receipt of first aid training.

In a scenario involving a 12-year-old girl who had fallen, knocked out an upper front tooth, did not have the tooth and whose mouth was bleeding, most (55.8%) teachers responded that they would get girl to bite on a handkerchief to control the bleeding and refer her to the nearest dentist (Table 3). Almost two thirds (65.5%) of the teachers would gently wash the tooth before replantation. Responses to this question were unrelated to teachers previously witnessing a DT. One third (32.4%) of the teachers would clean an avulsed tooth with antiseptic solution. Answers given to these questions were unrelated to previous receipt of DT education. Finally, 38.5% of teachers would store an avulsed tooth in ice/iced water during transport to a dentist.

## Discussion

Failure to perform appropriate emergency care or arrange timely professional treatment of DT can lead to more costly, time-consuming treatments or undesirable consequences such as tooth loss (Andersson, 2013). Emergency management is an important determinant of prognosis, particularly in cases of avulsion (Andreasen *et al.*, 2007). After making sure that the avulsed tooth is a permanent one, it should be found and held by the crown. Ideally, it should be replanted immediately to prevent further damage to the periodontal membrane, cleaning if necessary, under cold running water for a short time first. The young person should bite on a handkerchief to keep the tooth in place. If this is not possible, the tooth should be kept in a suitable storage medium (a glass of milk or in saline) and immediate emergency dental treatment should be sought (Fouad *et al.*, 2020). At least half of school-age children experience DT at school and in its surroundings, and the first intervention is often provided by a teacher (Cortes *et al.* 2002). Therefore, the aim of this study was to evaluate primary school teachers' knowledge and attitudes of TDI in Turkey and the results are expected to guide the organization of education courses for teachers.

Most of the teachers who participated in the survey were female and were aged between 30-39 years. This situation reflects the profile of primary school teachers in Turkey, where 61.9% are women (OECD, 2021).

First-aid training and DT training are of great importance in managing TDI (Fouad *et al.*, 2020). Almost half of the participants in our study had received first-aid training, while a very small proportion had received DT training. Although most teachers were not trained in DT, 28.1% of the participants had witnessed TDI in their schools. However, Antunes *et al.* (2015) state that

**Table 3.** Knowledge about management of an avulsed tooth among 1634 schoolteachers

Questions	%
A 12-year-old girl fell and her upper front tooth was knocked out. It was found that the girl's mouth was bleeding and the tooth was missing. What would you do?	
To control the bleeding, get the girl to bite on a handkerchief and refer her to the nearest dentist.	55.8
Look for the tooth and put it back into the socket, and then take her immediately to the nearest dentist.	6.9
Put the tooth in liquid and take her immediately to the nearest dentist.	37.3
The knocked-out tooth fell to the ground and was covered in dirt, but you decide to replant the tooth back into the socket. What would you do?	
Replant a tooth back into the socket without any pretreatment.	5.1
Gently wash the tooth before replantation under tap water.	65.5
Scrub the tooth gently using a toothbrush.	29.4
If you decide to wash the tooth, what would you use?	
Tap water	23.8
Distilled water	6.8
Saline solution	23.7
Antiseptic solution	32.4
Alcohol	13.3
Which storage medium would you prefer when transporting an avulsed tooth to the dentist?	
Paper tissue	34.5
Tap water	8.8
Saliva	7.5
Milk	10.7
Ice/Iced water	38.5

most of the teachers who witness DTs can only detect large fractures and avulsed teeth (Antunes *et al.*, 2015). Therefore, teachers' lack of knowledge may negatively affect the prognosis of traumatized teeth due to incomplete and incorrect interventions or delays in the provision of professional emergency treatment.

Most participants regarded TDI as an emergency and felt that the intervention should be carried out immediately or within 30 minutes. Although the teachers were aware of the urgency of TDI, only a few of them could intervene when a trauma occurs. This suggests that teachers see the trauma as an emergency; however, they avoid intervening because of a lack of information and self-confidence.

Only 28.9% knew that permanent teeth should be replanted. Equally important is knowledge about the transition periods of teeth and the ability to distinguish between primary and permanent teeth based on the age of the child. Approximately half of the teachers knew that an incisor affected by trauma in a nine-year-old child will most likely be a permanent tooth. Participants who knew the correct answer were mostly women and aged between 30–39 years, which may be related to these teachers having children of their own (Al-Jundi *et al.*, 2005).

Tetanus vaccination should be considered in TDI due to the risk of environmental contamination at the injury site. A doctor should be consulted within 48 hours (Fouad *et al.*, 2020). About half of our participants felt that a tetanus vaccine should be considered. In a earlier study in Turkey, only 28.2% of participants considered a tetanus vaccine (Caglar *et al.*, 2005). This growing proportion is a promising development in terms of teachers' awareness.

When injuries occur at school, teachers have the potential to shorten the time interval between avulsion and replantation (Glendor *et al.*, 2000). Most (55.8%) of our teachers would refer the child to the nearest dentist after checking for bleeding, but without seeking the avulsed tooth and only 37.3% would replant the tooth. Bleeding is perceived as life threatening for most people. The emphasis placed on controlling bleeding in first-aid training will cause teachers to control bleeding while delaying the replantation of the tooth, which can negatively affect the prognosis of the tooth. Teachers who refer the child to the nearest dentist without replanting the avulsed tooth may fear hurting the child or legal repercussions.

Most teachers would wash an avulsed tooth with an antiseptic solution. The apparent lack of benefit of DT training in these responses suggests that this training needs to be updated regularly. If the tooth is not replanted immediately, it should be done within the first 30 minutes. A wet environment with appropriate osmotic pressure is recommended to ensure the viability of periodontal ligament cells. In order of decreasing preference, milk, HBSS, saliva, or saline are suitable storage media. Although water is a weak environment, it is a better option than keeping the tooth dry (Fouad *et al.*, 2020). Only a low part of the participants chose milk. Most chose ice/iced water or a dry medium as the storage medium. This may be due to the popular use of ice for transportation of human organs or the idea that the tooth can be isolated from the outside environment by carrying it on a paper tissue.

These findings suggest the need to improve the level of knowledge and first-aid management of TDI among



primary school teachers in Turkey. The subject should be added to the teacher education curriculum and updated with additional periodic training. In addition, workshop and webinars for schools may be effective methods to increase the level of knowledge about emergency management of dental injuries. A Turkish study also found that educational leaflets were a successful and appropriate means of providing teachers with information regarding the management of dental injuries (Arikan and Sönmez, 2012).

There were limitations in our study. There was no statistical validation of the questionnaire, although most of the questions were taken from previously validated tools (Bayrak *et al.*, 2012; Caglar *et al.*, 2005; Chan *et al.*, 2001; Fux-Noy *et al.*, 2011; Marcano-Caldera *et al.*, 2018; Pithon *et al.*, 2014). Teachers who felt they lacked knowledge about the subject may have chosen not to participate, which may have introduced sampling bias, although the response rate of 65% is regarded as adequate.

Other studies of the knowledge, attitudes and awareness of the emergency management of TDI among schoolteachers in Turkey may not reflect all regions in the country (Arikan and Sönmez, 2012; Bayrak *et al.*, 2012; Caglar *et al.*, 2005). In this study, 1,634 teachers across all seven regions representing the socioeconomic structure of Turkey participated. The use of an online platform enabled a large and dispersed sample.

## Conclusion

Primary schoolteachers lack sufficient information about the emergency management of TDI in children. Training on the emergency management of DT should be provided to increase teachers' awareness. Teachers need to understand that when a child suffers a DT, it is often a teacher who performs the first intervention, and their intervention will determine the prognosis of the tooth.

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