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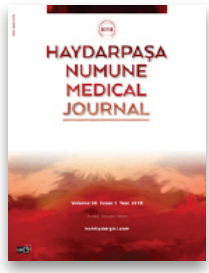

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ORIGINAL ARTICLE

Pediatricians' Knowledge and Attitudes on Emergency Management of Traumatic Tooth Avulsion

Başak Kızıltan Eliaçık

Department of Pedodontics, University of Health Sciences Faculty of Dentistry, Istanbul, Turkey

Abstract

Introduction: This multicenter cross-sectional study aimed to assess the level of knowledge and attitude of pediatricians in the management of traumatic tooth avulsion (TTA) in children.

Methods: In this study, pediatricians were invited to complete a self-administered questionnaire on the web. The survey consisted of 19 questions adapted from instruments used in previously existing questionnaires on the topic. The questions were divided into three parts: g personal and professional profiles, the attitudes of pediatricians towards TTA, and actual knowledge of the emergency management of TTA. Data from 256 respondents were analyzed using SPSS 22.

Results: Approximately 87.9% of the participants reported at least one case of traumatic tooth avulsion during their careers. Only 6.64% of the subjects received education on dental injuries. The vast majority of participants (89.1%) stressed the importance of dental trauma education. In cases of tooth avulsion, only 5.5% of the pediatricians reported that they would reimplant it. The mean knowledge score was 4.88±0.55. Regarding the knowledge of the difference between reimplanting permanent teeth and primary teeth, only 23.1% of pediatricians responded correctly. Working in public hospitals and having ten years or more professional experience had a significant effect on knowledge score (for both $p<0.001$). Only 40.42% of the participants were able to give milk response as the most suitable storage media for avulsed teeth.

Discussion and Conclusion: Based on the findings of this study, knowledge of avulsed teeth among Pediatricians in Turkey ranges from low to moderate, which highlights the need to improve the knowledge of the management of traumatic dental injuries among pediatricians.

Keywords: Attitude; child, knowledge; pediatrician; traumatic tooth avulsion.

The incidence of traumatic dental injuries (TDI) occurring in childhood has increased in recent years; this will soon exceed the incidence of tooth decay and periodontal diseases[1]. According to epidemiological studies, traumas to the oral region occur frequently: oral injuries account for 5% of all body traumas at all ages, and this rate is 18% in preschool children[2,3]. TDI specifically are observed in 85% of patients with oral trauma[4]. TDI are a social problem, as they are frequently encountered in ages of rapid development and have a high recurrence compared to other types of trauma; furthermore, they require long-term, multidisciplinary treatments[4-7].

Avulsion, one of the TDI, is defined as the complete removal of the tooth from its socket due to the trauma[8]. Avulsion injuries are more common in primary teeth than permanent teeth. In studies, the prevalence of avulsion injuries has been reported to be 0.5-16% in permanent teeth and 7-21% in primary teeth[9-12]. In addition, it has been re-

Correspondence (İletişim): Başak Kızıltan Eliaçık, Assist. Professor. Sağlık Bilimleri Üniversitesi Diş Hekimliği Fakültesi, Pedodonti Anabilim Dalı, Istanbul, Turkey
Phone (Telefon): +90 530 086 52 17 **E-mail (E-posta):** basak.eliacik@sbu.edu.tr
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ported that 75% of avulsion traumas occurring in primary teeth may also cause damage to the developing permanent tooth[10]. Avulsion is more common in the permanent dentition period between the ages of 7-9 (when the front teeth are still erupting) due to the weakness of the periodontal tissue surrounding the teeth. While fighting and sports injuries are frequently involved in the etiology of avulsion injuries in permanent teeth, the main reason for primary teeth is falling on hard surfaces[13]. While a single tooth is usually affected in avulsion cases, the most common avulsion teeth among both primary and permanent teeth are the upper middle incisors.

Although great steps have been taken today thanks to the investments made by the Ministry of Health in oral and dental health, direct access to dentistry centers can be difficult, especially for socioeconomic reasons[14]. Especially in rural areas where the integration of the dental service with the social security institution is not complete, emergency dental intervention is inevitable by medical doctors who apply to health institutions with TDI. A study conducted in Chile has shown that the first intervention place is hospital emergency services for individuals suffering from a traumatic dental injury since the dental service is not always convenient and accessible[15]. In studies conducted in different countries, the attitudes and knowledge levels of physicians and other healthcare professionals working in emergency services about TDIs, especially avulsed teeth, were investigated[16-19]. Although the results of the studies vary, it has been determined that the participants in such studies have a low level of knowledge and awareness about avulsed teeth. In the literature, there are studies that investigate knowledge and attitudes about topics, such as early caries detection, fluoride applications and nutritional problems, due to their effects on child oral and dental health. However, to our knowledge, there is not any research that has examined the knowledge and attitudes of pediatricians on avulseous dental injuries that may occur as a result of TDI[20-25].

The present study aims to evaluate the attitudes and knowledge about TDA of the pediatricians in Turkey.

Materials and Methods

This multicenter cross-sectional study survey study was conducted between April 2020 and June 2020. A link to the questionnaire was sent via a mailing database list to pediatricians employed at the different hospitals. The present study was approved by the Ethics Committee of Mepipol University (18/12/2019 decision number 10840098-604.01.01-E65339). After each participant in the survey had completed their questionnaire and submitted it, the submission was checked to ascertain that the participant had completed it in full. If unclear responses or incomplete questionnaires were found, the participant was sent another email so that they could correct the issue. Completing the questionnaire was regarded as giving informed consent. The questionnaire was created using questions whose validity and reliability were tested, previously published in the literature and used in similar studies on TDA[17,26]. The questionnaire consisted of three parts. In the first part, the participants' age, gender, subspecialty, if any, duration of professional experience and the status of the health institution they serve were questioned. In addition, questions were asked about whether they have participated in an emergency response course before and whether they have been trained on TDI during this course. In the second part, questions were asked to obtain answers regarding whether they had experienced TDA before and how they would behave when encountered. In the last part, the third part, the level of knowledge of pediatricians was evaluated. For this purpose, questions were asked about the importance of the time from the avulsion of the tooth to the health institution where it will be intervened, and how the storage conditions of the avulsed tooth should be during this period. Also, participants were asked whether the tooth type (permanent and primary tooth) is important for replantation and if the falling tooth is contaminated, how it should be cleaned. To calculate the knowledge scores of the participants, scoring was made for the questions in the third part of the questionnaire and 1 point was given to the participants for the correct answer they gave. The maximum score that can be obtained from the correct answers in this section is 9.

SPSS 22.0 package program was used for statistical analysis of the collected data. Descriptive statistical methods were used to show the distribution of the data obtained in this study, and categorical variables were compared using Shapiro–Wilk, Mann–Whitney U, Pearson correlation and Kruskal–Wallis tests. The statistical significance level was taken as 0.05 in all tests.

Results

In this study, 219 pediatricians from 11 university hospitals and 23 public hospitals responded to the survey. The information on the gender of the physicians, their professional experience, if any, the status of the organization they work for, whether they have taken an emergency aid course before, and if they have, whether there are avulsed dental injuries in the subjects of this course are shown in Table 1.

Table 1. Personal and professional information of the respondents

S1 Gender	**n (%)**
Male	144 (56.25)
Woman	112 (43.75)
S2 Professional Experience Period	
<10	101 (39.45)
>10	155 (60.55)
S3 The status of the health institution	
Public	163 (63.67)
Special	93 (36.33)
S4 The field you are working in	
General Pediatrics	211 (82.42)
Expert Minor	45 (17.58)
Q5 Have you attended an emergency response course before?	
Yes	248 (96.87)
No	8 (3.13)
Q6 Was there information about avulsed dental trauma in this course?	
Yes	17 (6.64)
No	239 (93.36)

In the questionnaire section prepared to determine participants' attitudes about TDA, the number of pediatricians who encountered TDA at least once among all participants was 225 (87.9%). Despite this, most of the respondents (91.8%) stated that they did not find the information they had for TDA sufficient, while 89.6% of the participants stated that they needed more training on this topic. Table 2 shows the distribution of pediatricians' responses regarding the emergency management of TDA. However, the majority of the participants gave the correct answer for the medical treatment (the use of antibiotics, anti-inflammatory and analgesics) which should be applied to the patient after TDA. The findings showed that the number of physicians who stated that it would be appropriate to direct the patient to a second center on manipulation was also high. As for the center to be referred, only 32 (12.5%) of the participants stated that they would refer these patients to a pediatric dentist. While 77.3% of the respondents were positive that the avulsed tooth could be saved, 76.9% did not have enough anatomical knowledge about primary or permanent teeth to make the appropriate decision about the replantation of the avulsed tooth. While all of the participants stated that the elapsed time is important for the successful treatment of the avulsed tooth, the number of those who gave the correct answer about the storage conditions of the avulsed tooth during the period after avulsion till replantation was 110 (42.97%) (Table 2). The number of participants who gave the correct answer on how to clean the avulsed tooth after contamination was 104 (40.63%).

The distribution of the answers given by the participants about what is the most suitable storage condition for avulsed tooth according to their professional experience is shown in Figure 1. Working in public hospitals and having ten years or more professional experience had a significant effect on knowledge score ($p<0.001$ for both) (Table 3). In addition, a correlation was found between the increase in service time and knowledge score ($R=0.552$, $p<0.001$) (Figure 2). No statistically significant difference was found between other demographic (gender, study area) characteristics and knowledge score.

Discussion

There is an undeniable link between children' general health and oral health in the literature[21-24]. Generally, the majority of children under the age of seven apply to a pediatrician (who is equipped with limited information about oral and dental health during their education) about their oral health instead of a dentist except in emergencies like TDI[23]. In recent years, studies have been conducted in many countries to evaluate the knowledge of professional healthcare workers on emergency management in early age caries, gum disease, and TDI[16, 20, 21, 23, 24, 26-29]. To our knowledge, our study is the first to assess the knowledge and attitudes of pediatricians in TDA in Turkey.

Because of the patient group that pediatricians treat, they frequently encounter pediatric patients who present with dental injuries as a result of trauma. The time from the occurrence of the trauma to the replantation of the tooth and the preservation of the avulsed tooth in an appropriate storage media during this period is important in the prognosis of the tooth[30]. By having information about these topics, pediatricians will have a positive contribution to the success of the treatment of TDA.

In their mini about TDI, Yeng et al.[28] stated that physicians who encountered avulsion-type dental traumas had difficulties distinguishing between permanent teeth that needed to be replanted and primary teeth, especially because they did not have an adequate information about dental anatomy. Ulusoy et al.[17], one of the publications in this review, evaluated the knowledge and attitudes of medical doctors working in emergency departments on TDA. While the rate of encountering TDA at least once in their professional life among the medical doctors forming the study group was 68.1%, the rate of physicians who thought they had sufficient knowledge in approaching this

Table 2. Pediatricians' knowledge of traumatic dental avulsion

	n (%)
Q1 What is your medical approach to a patient presenting with avulse dental trauma?	
Analgesic and anti-inflammatory	11 (4.30)
Antibiotic, analgesic and anti-inflammatory	245 (95.70)
No	0 (0.00)
Q2 What is your opinion on the prognosis of an avulse tooth?	
Recoverable	198 (77.34)
Unrecoverable	8 (3.13)
No idea	50 (19.53)
Q3 Which of the following is the correct approach to TDA treatment?	
It must be guaranteed to be the primary tooth. Permanent teeth should not be placed	12 (4.69)
It must be guaranteed to be a permanent tooth. Primary teeth should not be placed	59 (23.1)
There is no need to define the tooth type. Need to relocate both	81 (31.64)
No idea	104 (40.63)
Q4 Which of the following ideas is the correct about the prognosis of an avulse tooth?	
It will not help; the tooth will fall off again.	21 (8.20)
There is a risk of infection spreading throughout the body	40 (15.63)
Implanted teeth may be rejected as foreign bodies	57 (22.27)
Replantation can damage adjacent teeth	36 (14.06)
No idea	112 (43.75)
Q5 In order for the replacement of the avulse tooth to be successful, do you think the time elapsed from the occurrence of the incident until the intervention is important?	
Yes	207 (80.86)
No	27 (10.55)
No idea	22 (8.59)
Q6 What is the best time for an avulse tooth replacement?	
Within 30 minutes	120 (46.88)
Within 2-3 hours	91 (35.55)
Within 1-2 days	8 (3.13)
No idea	37 (14.45)
Q7 Which of the following is the most appropriate approach for re-implantation of an avulse tooth?	
If it is not in the 1st hour of avulsion, the tooth should be stored in a moist environment and shipped.	64 (25.00)
If not within 6 hours after avulsion, the tooth should be stored in a moist environment and shipped.	93 (36.33)
If not within 6 hours after avulsion, it should be stored in a dry environment and shipped.	12 (4.69)
No idea	87 (33.98)
Q8 If the tooth you are replanting has fallen to the ground and is dirty, which of the following approaches is most suitable for you?	
The tooth should be washed with an antiseptic such as chlorhexidine.	71 (27.73)
The tooth should be rubbed with soap or a disinfectant containing 70% alcohol.	18 (7.03)
The tooth should be carefully cleaned with water only	104 (40.63)
No idea	63 (24.61)
Q9 In cases where we could not perform avulse tooth replantation, which storage media may be the most appropriate one to keep the tooth in till the center where medical treatment will be applied[32].	
Milk	110 (42.97)
Saliva	54 (21.09)
Tap Water	78 (30.47)
Dry Cotton	14 (5.47)

Table 3. Correlation analysis of knowledge scores and demographic characteristics of pediatricians

Demographic Characteristics	Information scores (±SD)	p
Gender		
Male	5 (±1.67)	0.76
Woman	5 (±1.61)	
Professional experience		
<10	4 (±1.52)	<0.001
≥10	6 (±1.18)	
Subspecialty		
General Pediatric	5 (±1.68)	0.52
Minor Specialty	5 (±1.36)	
Hospital status		
Public	6 (±1.68)	<0.001
Private	5 (±1.58)	

type of trauma remained at 14.5%. In another study similar to this study, Aren et al.[31] found that only 10.32% of the physicians participating in the study had enough information about the appropriate treatment of TDA.

In their study, Sezer et al.[24], in which they investigated the knowledge and attitudes of pediatricians about general oral and dental health showed that only 25.6% of the participants found themselves competent in intervening with TDA. Similar to these studies in our study, only 5.5% of the pediatricians stated that they had sufficient knowledge for replanting the avulsed teeth. In our study, 89.1% of physicians who consider themselves inadequate, but are positive about participating in a training that can be given on this subject, is a positive result showing that pediatricians want to improve themselves in this regard. In addition, 94.5% of the participants in this study stated to receive help from a dentist to replace the avulsed tooth was more proper for the treatment approach. This rate was 96% and 94.5%, respectively, in the studies of Holan and Shmueli and Subhashraj on emergency physicians[19,26]. This result shows that emergency physicians consider TDA treatment as a technical issue. Pediatricians participating in this study also revealed that taking the expert assistance of TDA was necessary and the rate of pediatricians thought like that was close to previous studies.

In the third part of the questionnaire, we aimed to measure the knowledge level of pediatricians about the management of traumatic dental injury. 95.7% of the pediatricians who participated in this study stated that they prescribed a combination of antibiotics, anti-inflammatory and analgesics, which was the correct answer, in the medical treatment of pediatric patients who were urgently admitted after trauma resulting in tooth avulsion. In their study, Aren et al. showed that the majority of the emergency physicians (80.96%) stated that they would prescribe antibiotics and anti-inflammatory drugs following avulsion, which is considered to be the correct response to treatment[31]. The high rate found in this study revealed that the level of knowledge of pediatricians about posttraumatic infection and inflammation after dental trauma was sufficient. While 80.7% of the participants gave the correct answer to the question about the importance of the time between trauma and dental intervention on the prognosis of the avulsed tooth, it was observed that the majority of the participants did not have enough information about the correct approach and timing. The respondents correctly answered the answer to the question as "It should be cleaned carefully with water," for cleaning contaminated teeth was 40.6%.

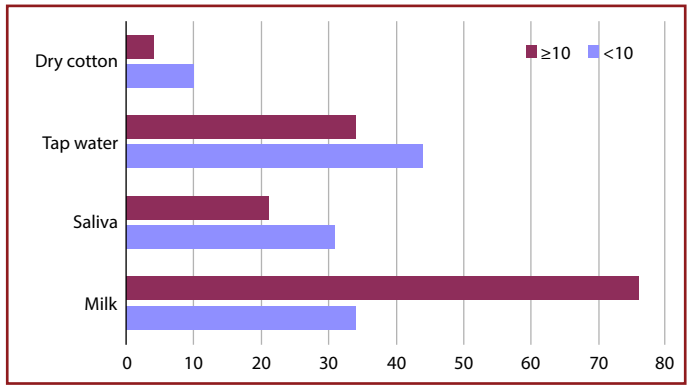

Figure 1. Distribution of the answers to the question of appropriate storage conditions of avulse tooth by duration of professional experience.

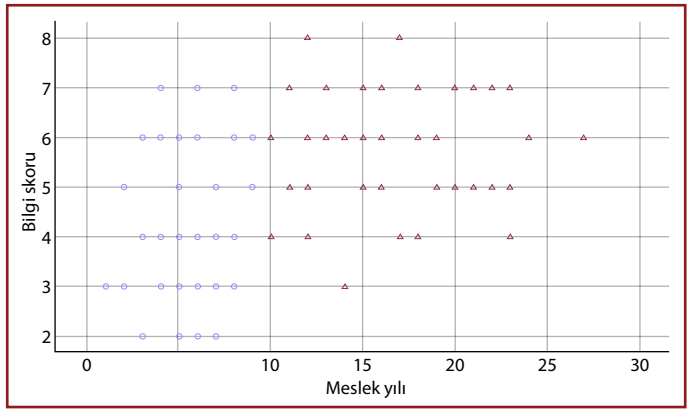

Figure 2. Correlation analysis between professional service time and knowledge scores. (R=0.552, p<0.001) ○ Pediatricians with less than 10 years of service, △ pediatricians with 10 or more years of service.

Keeping the avulsed tooth in the appropriate environment until the center where the intervention will take place plays an important role in the success of the treatment[32]. Ulusoy et al. stated that only 31.9% of the participants gave the correct answer for the suitable storage media for tooth preservation[17]. On the other hand, Aren et al. recently found this rate as 94.3% in their study conducted on emergency physicians[31]. In our study, only 43.4% of the participants answered the question as milk, which was the most suitable environment for the transport of avulsed tooth. The high difference between Aren et al. and the other two studies is due to the higher number of suitable storages offered to the participants in Aren et al. study.

In this study, we aimed to examine pediatricians' knowledge, experience and tendencies about TDA. The correct interventions to be performed by the pediatricians while managing avulsed dental traumas in pediatric patients will not only increase the survival rate of the teeth but also have a positive effect on the anxiety levels of the traumatized children and their parents. Thus, it is important to encourage awareness of emergency management modalities of pediatricians' in children who come with avulsed dental injuries; as a result of TDI. It is therefore important to encourage pediatricians' awareness of emergency management modalities, such as TDI.

Our study is a survey study. It has some limitations. Since volunteering is essential in the selection of participants for survey studies, pediatricians who had an interest and had a piece of better knowledge of dental traumas could increase the rate of correct answers to our questions. In addition, to our knowledge, this study stands out as the first study on pediatricians on avulsion dental trauma.

Due to the planning way of the study (as a questionnaire distributed to throughout Turkey via online), we could examine and compare the attitudes and knowledge of pediatricians in different regions.

In the light of the results obtained in this study, it was observed that pediatricians did not have sufficient knowledge and experience about dental trauma during their training and post-specialty training programs. It is important to make the intervention that should be addressed after avulse dental injuries by making faster and correct decisions compared to other types of dental trauma for the success of the treatment. Thus, to focus on training programs for dental traumas especially for the branches that can face this situation frequently may be appropriate.

Ethics Committee Approval: Study was approved by the Ethics Committee of Medipol University (18/12/2019 decision number 10840098-604.01.01-E65339).

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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