

Evaluation of knowledge levels and attitudes of pediatricians on traumatic dental injuries

 Osman Atas¹,  Adem Gok²

¹Department of Pediatric Dentistry, Faculty of Dentistry, Firat University, Elazig, Turkey

²Department of Restorative Dentistry, Faculty of Dentistry, Firat University, Elazig, Turkey

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Abstract

Aim: In dental trauma injuries, proper diagnosis and initial intervention are important in terms of prognosis. The aim of this study was to determine the knowledge levels and attitudes of pediatricians about traumatic dental injuries.

Materials and Methods: There were 141 specialist pediatrician and assistant pediatrician working in universities or public hospitals who participated in this cross-sectional survey study. An electronic questionnaire was developed by the authors using Google Forms. The questionnaire consists of three parts and contains 22 questions in total. In the first part, the personal information of the physicians is recorded. The second part consists of questions regarding their knowledge and attitudes about dental trauma. The third part involves photos of the two cases we took from our clinical archive, which include a crown fracture and a case of avulsion dental trauma.

Results: Almost half (44.7%) of the pediatricians had experienced traumatic dental injuries at least once. Only one-third (33.3%) of the respondents had heard the term avulsion. In the first case scenario, most of the participants (81.4%) stated that the broken tooth part should be saved. In the second case scenario, just over a third of the respondents (36.9%) said that in the case of avulsion, they would refer their patients to the dentist immediately, without doing anything. As the best storage medium, saline was answered most often (20.5%), followed by sterile sponge (19.1%), clean napkin (12.1%), and milk (11.3%). A statistically significant difference was found between procedures (recommended vs. non-recommended) for case 1 and case 2, according to professional experience ($p < 0.05$).

Conclusion: Knowledge of pediatricians about dental trauma was found to be insufficient. Pediatricians should be trained on dental trauma during their specialization or medical education, and their awareness and willingness to manage it should be increased.

Keywords: Dental trauma; knowledge; pediatricians

INTRODUCTION

Traumatic dental injuries (TDI) in children are a public health problem that negatively affects quality of life (1). TDI can lead to complex, expensive, and sometimes years-long treatments.

Inadequate dental trauma management negatively affects the growth, function, phonetics, and psychosocial development of children and adolescents (2). Therefore, rapid and appropriate treatment is required to significantly improve the prognosis of many dentoalveolar injuries, especially in children and adolescents (3). In the case of dental trauma, parents, teachers, coaches, or those around injured children are responsible for helping them (2).

In the case of TDI, children can present to a dentist, an emergency doctor, or doctors of different specialties, especially pediatricians (4). Dental trauma often leads to

more complicated treatments in the future when untreated, improperly treated, or unnecessarily treated (5). A rapid evaluation and treatment process is required to obtain the best results in tooth fractures and luxation injuries, especially avulsion injuries (6). Delays in treatment result in poor prognoses (7).

Traumatic dental injuries may have detrimental psychological effects on the traumatized child and their parents (8). Dental trauma victims and their parents can have dental treatment expectations met in the hospital in the absence of a dentist or outside the dentist's working hours (9). Primary care providers (for example, family practitioners, pediatricians, nurses, physician assistants, and emergency health technicians) can play an important role in providing primary care after dental trauma, especially for population groups with limited access to dental care (3). Pediatricians and other health care

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Corresponding Author: Osman Atas, Department of Pediatric Dentistry, Faculty of Dentistry, Firat University, Elazig, Turkey

E-mail: osman_atas88@hotmail.com

professionals should have the necessary knowledge to provide accurate and professional advice on dental injuries as well as all other matters related to childhood health (10).

This study aimed to evaluate the knowledge levels and attitudes of pediatricians, who are likely to encounter dental trauma, about emergency dental intervention, and to develop strategies for it.

MATERIALS and METHODS

This cross-sectional survey, conducted between October and December 2019, included 141 specialists and resident doctors working in university or public hospitals in the Turkish cities of Elazig, Malatya and Diyarbakir. The study was submitted to and approved by the Firat University Research Ethics Committee. The authors developed an electronic questionnaire using Google Forms. Prepared e-questionnaire forms were sent to participants via a link. It was explained to the pediatricians at the beginning of the e-questionnaire that the purpose of the study and the data would be used for scientific research. From a total number of 168 pediatricians, 141 (83.9%) completed the whole questionnaire.

The survey questions in our study were prepared with reference to the studies of Chanchala et al., Nikolic et al., Ulusoy et al., Bahammam and Ulusoy et al. (3,4,12,17). The questionnaire consists of three parts and contains 22 questions in total. In the first part, the personal information of the participants is recorded. The second part asks questions about their knowledge and attitudes toward dental trauma. The third part consists of photos of the two cases we took from our clinical archive, which include a crown fracture and a case of avulsion dental trauma (Figure 1, 2).



Figure 1. Crown fracture of maxillary right-left permanent central incisor (First case scenario)



Figure 2. Avulsion of maxillary right permanent central incisor (Second case scenario)

Data analysis

SPSS 21.0 software for Windows was used for statistical analysis. Descriptive statistical methods and the Chi-square test were conducted. The significance level was accepted as $p < 0.05$.

RESULTS

Of the 141 pediatricians who participated in the study, 62 (44.0%) were female and 79 (56.0%) were male. The sample consisted of 60 (42.6%) assistant pediatrician and 81 (57.4%) specialist pediatrician. Professional experience was based on the year of graduation from medical school. The group with 0–5 years of experience had the most respondents, with 55 (39.0%), followed by 51 (36.2%) in the group with 6–10 years of experience. Demographic information is shown in Table 1.

Table 1. Personal and professional informations of pediatricians

| Variables | Total N=141, n (%) |
|--------------------------------|--------------------|
| Gender | |
| Female | 62 (44) |
| Male | 79 (56) |
| Age | |
| 20-30 | 64 (45.4) |
| 36-45 | 63 (44.7) |
| 46 > | 14 (9.9) |
| Your title | |
| Assistant pediatrician | 60 (42.6) |
| Specialist pediatrician | 81(57.4) |
| Professional experience | |
| 0-5 | 55 (39) |
| 6-10 | 51 (36.2) |
| 11-16 | 17 (12.1) |
| 16 > | 18 (12.8) |

Table 2 presents the knowledge and attitudes of the participants regarding dental trauma. The results show that 44.7% had encountered at least one case of dental trauma. Among the participants, 63.8% stated that dental trauma is an emergency. The vast majority (87.9%) thought that training on dental trauma should be provided in medical schools. Those who were familiar with the term avulsion had a low rate of only 33.3%. Few of the participants (9.9%) stated that they would replantation a dislocated a primary tooth.

Table 2. Pediatricians' knowledge and attitudes regarding dental trauma

| Questions | Total N=141, n (%) |
|---|--------------------|
| Did you have a patient who applied to you for dental trauma? | |
| Yes once | 14 (9.9) |
| Yes several times | 49 (34.8) |
| No | 78 (55.3) |
| Have you heard of the term avulsion? | |
| Yes | 47 (33.3) |
| No | 76 (53.9) |
| No idea | 18 (12.8) |
| Have you received training on dental trauma? | |
| Yes | 14 (9.9) |
| No | 127 (90.1) |

| | |
|--|------------|
| Do you think Dental Trauma is an emergency? | |
| Yes | 90 (63.8) |
| No | 21 (14.9) |
| No idea | 30 (21.3) |
| Do you think that dental trauma education should be given in medical schools? | |
| Yes | 124 (87.9) |
| No | 5 (3.5) |
| No idea | 12 (8.5) |
| Would you put in place a dislocated primary tooth? | |
| Yes | 14 (9.9) |
| No | 88 (62.4) |
| No idea | 39 (27.7) |
| Would you put in place a dislocated permanent tooth? | |
| Yes | 29 (20.6) |
| No | 66 (46.8) |
| No idea | 46 (32.6) |

The question of "Can you replantation a dislocated permanent tooth?" was answered yes by 20.6% of the participants, while 46.8% answered no and 32.6% answered that they didn't know.

Table 3 shows the responses of the participants to the case of a complicated crown fracture at the age of nine. In first case scenario, more than half of the participants (61.7%) stated that the tooth was a permanent tooth and the majority of the participants (81.4%) stated that the broken part should be saved.

Table 3. Pediatricians' responses to complicated crown case (First case scenario)

| Questions | Total N=141, n (%) |
|---|--------------------|
| The broken teeth are likely to be | |
| Primary teeth | 33 (23.4) |
| Permanent teeth | 87 (61.7) |
| I don't know | 28 (19.9) |
| Should the broken piece of the tooth be saved? | |
| Yes | 81 (57.4) |
| No | 32 (22.7) |
| I don't know | 28 (19.9) |

Table 4 presents the responses of the participants to the case of an 11-year-old with an avulsion. There were 54.6% who indicated that it was a permanent tooth. In the management of the second case scenario, most of the participants (36.9%) stated that they would refer the patient to the dentist immediately, without any intervention. The second most common answer (31.2%) is to direct the tooth to the dentist in a suitable storage environment. As the best storage medium, saline was answered the most (20.5%), followed by sterile sponge (19.1%), clean napkin (12.1%), and milk (11.3%). When asked what to do if the tooth had fallen to the ground and was contaminated, 47.5% answered that they did not know what to do, and

36.9% said they would wash the tooth under tap water for a few seconds without rubbing it. Among the participants, 52.5% stated that they would hold a displaced tooth by its crown. The question of how long before a displaced tooth should be replaced was answered immediately by only 8.6% of the respondents, while 60.3% did not know.

In Tables 5 differences in the management of dental trauma according to participants' characteristics are presented.

Table 4. Pediatricians' responses to the case of avulsion (Second case scenario)

| Questions | Total N=141, n (%) |
|--|--------------------|
| The knocked-out tooth is likely to be | |
| A primary tooth | 30 (21.3) |
| A permanent tooth | 77 (54.6) |
| I do not know | 34 (24.1) |
| What do you do when you encounter a dental trauma like in the figure? | |
| Referral to the dentist immediately | 52 (36.9) |
| Store the tooth in a storage medium and send the child to the dentist | 44 (31.2) |
| Replant the tooth and send the child to the dentist immediately | 14 (9.9) |
| Not sure what to do | 17 (12.1) |
| There is no action to be taken for the displaced tooth | 14 (9.9) |
| Which storage medium is suitable for storing the knocked out tooth? | |
| Ice | 7 (5) |
| The saliva of the child | 10 (7.1) |
| Antiseptic solution | 1 (0.7) |
| Serum physiological | 29 (20.5) |
| Sterile sponge | 27 (19.1) |
| Milk | 18 (12.79) |
| Clean napkin | 17 (12.1) |
| I do not know | 32 (22.6) |
| Where do you hold a dislocated tooth like in the picture? | |
| From its crown (visible part of the tooth in the mouth) | 74 (52.5) |
| From the root part | 3 (2.1) |
| No matter how I hold it | 10 (7.1) |
| With sterile instrument | 15 (10.6) |
| I do not know | 39 (27.7) |

Table 5. Differences in the management of dental trauma according to participants' working characteristics

| Dental Trauma Management | Procedure | Participants | | | Professional Experience Time | | | | | DentalTrauma Experience | | |
|---|---------------------|------------------------|-------------------------|-----------------------|------------------------------|------|-------|-----|------------------------|-------------------------|----|-----------------------|
| | | Assistant pediatrician | Specialist pediatrician | | 0-5 | 6-10 | 11-15 | 16+ | | Yes | No | |
| Primary teeth replantation | Recommended (n) | 41 | 47 | X ² =1.561 | 37 | 31 | 7 | 13 | X ² =4.618 | 39 | 49 | X ² =0.012 |
| | Non recommended (n) | 19 | 34 | P=0.211 | 18 | 20 | 10 | 5 | P=0.202 | 24 | 29 | P=0.911 |
| Permanent teeth replantation | Recommended (n) | 6 | 23 | X ² =7.139 | 4 | 10 | 9 | 6 | X ² =18.680 | 17 | 12 | X ² =2.870 |
| | Non recommended (n) | 54 | 58 | P=0.008 | 51 | 41 | 8 | 12 | P=0.000 | 46 | 66 | P=0.090 |
| Broken tooth primary or permanent tooth | Recommended (n) | 31 | 56 | X ² =4.451 | 27 | 34 | 13 | 13 | X ² =6.646 | 41 | 46 | X ² =0.550 |
| | Non recommended (n) | 29 | 25 | P=0.035 | 28 | 17 | 4 | 5 | P=0.084 | 22 | 32 | P=0.458 |
| Broken piece of the tooth be saved? | Recommended (n) | 33 | 48 | X ² =0.256 | 30 | 26 | 13 | 12 | X ² =4.204 | 41 | 40 | X ² =2.714 |
| | Non recommended (n) | 27 | 33 | P=0.613 | 25 | 25 | 4 | 6 | P=0.240 | 22 | 38 | P=0.099 |
| Avulse tooth primary or permanent tooth | Recommended (n) | 33 | 44 | X ² =0.006 | 31 | 20 | 12 | 14 | X ² =10.593 | 30 | 47 | X ² =2.245 |
| | Non recommended (n) | 27 | 37 | P=0.936 | 34 | 31 | 5 | 4 | P=0.014 | 33 | 31 | P=0.134 |
| Avulse tooth procedure | Recommended (n) | 42 | 68 | X ² =3.911 | 38 | 45 | 14 | 13 | X ² =6.198 | 47 | 63 | X ² =0.773 |
| | Non recommended (n) | 18 | 13 | P=0.048 | 17 | 6 | 3 | 5 | P=0.102 | 16 | 15 | P=0.379 |
| Tooth Storage Solution | Recommended (n) | 15 | 38 | X ² =7.055 | 13 | 19 | 9 | 12 | X ² =12.762 | 25 | 28 | X ² =0.213 |
| | Non recommended (n) | 45 | 43 | P=0.008 | 42 | 32 | 8 | 6 | P=0.005 | 38 | 50 | P=0.645 |

DISCUSSION

This study was conducted to investigate the current basic knowledge level of specialist pediatrician and assistant pediatrician about dental trauma. Considering the answers provided to the questionnaire, it appears that knowledge and management of dental trauma among pediatricians is inadequate (11). In this study, 44.7% of participants reported that they had encountered at least one patient with dental trauma.

Therefore, improving knowledge and awareness among pediatricians about dental trauma is vitally important.

Research in the literature evaluating the knowledge level and attitudes of pediatricians about dental trauma is limited. While studies on this topic in Turkey are generally focused on emergency physicians, general practitioners, medical school students, and emergency medical technicians within the health community, studies on pediatricians are insufficient (6,8). This was the greatest motivation for conducting this study.

From the patient's point of view, all dental injuries are urgent, but it is important for medical doctors to know which TDI cases require urgent intervention (5). In our study, 63.8% of the participants stated that dental trauma is an emergency.

This study found that 90.1% of the participants did not receive training on dental trauma. It also determined that 87.9% of the respondents thought that training on dental trauma should be provided during medical school or specialty training. Similarly, Bahammam and Ulusoy stated that 95.1% and 78.3% of participants should receive training on the management of dental trauma, respectively (12,17).

The percentage of participants who were familiar with the term avulsion was low at only 33.3%. In the studies by Bahammam on emergency physicians and Kumar et al. on medical practitioners, these rates were found to be 68.9% and 67.5%, respectively (12,13). This may be related to examinations by pediatricians in Turkey after presenting to an emergency doctor or general practitioner.

In the current study, two basic case scenarios that pediatricians are likely to encounter were presented. In the first case scenario, photos of a patient who had a complicated crown fracture in the upper central teeth due to falling to the ground at the age of nine were included. There are two reasons for finding the broken piece of tooth. Most importantly, it ensures that the child does not aspirate it. The other purpose is to be able to restore the broken piece to its natural location. Thanks to the adhesive materials that have been developed in recent years, bonding of the broken piece provides satisfactory esthetic results. Once it is found, the restoration can be completed without any loss of substance from the remaining dental tissue (14). More than half of the participants (57.4%) stated that it is necessary to save the broken piece. Only 16% of healthcare providers who were not dentists in Brazil thought that the broken piece was necessary for treatment (15). In the current study, more than half of the pediatricians answered that it is necessary to keep the broken piece. We think this rate could be increased considerably with the training that should be conducted. Also, 61.7% of the participants correctly answered those teeth with crown fractures were permanent teeth.

In the second case scenario, 52.5% of the participants stated that a displaced tooth should be held by its crown. While Bahammam found a similar result of 51.6%, Nikolic et al. found it higher at 76%, and Venkataramana et al. found it lower at 31% (4,12,16). While 36.9% of the participants answered that they would wash a tooth that had fallen to the ground and was contaminated for a few seconds without rubbing it, 47.5% did not know what to do. This rate is lower than the findings of Venkataramana et al. and Kumar et al. (13,16), which suggest that their participants had a better understanding of the importance of not damaging the periodontal cells.

Another factor that affects the prognosis and success is extraoral time before treatment. Extraoral time ought to be reduced to maintain viability of the periodontal ligament and increase long-term reimplantation success (18). In reimplantation cases, the best results for long-term successful treatment are obtained when the extraoral time is below 20 minutes (19). According to the results, 60.3% of the participants did not have any idea about this. The rate of those who answered immediately was 8.6%, and those who said within 15 minutes was 2.1%. These results are consistent with other studies (13,17).

If early reimplantation is not possible, a suitable transport medium is an important step that can extend the extraoral time to one hour. The appropriate transport environment allows the periodontal ligament cells to survive, preventing ankylosis or resorption, which may lead to tooth loss in the future (12). Isotonic solutions are preferred as storage solutions. Theoretically, the best options for this function are Hank's Balanced Salt Solution (HBSS), ViaSpan, and Eagle's medium (20). However, as these are expensive, they may not be universally available. Milk is an ideal transport medium because it is cheap, easy to access, and allows periodontal cells to maintain their viability (10,12).

It is an isotonic liquid with the appropriate osmolarity, and it contains nutrients that allow periodontal ligament cells to survive or heal (21). A dry storage environment is definitely not recommended because it causes irreversible changes in the periodontal membrane. Also, using water as a storage medium is not preferred due to its very low osmolarity.

For the question about what they thought was the best storage environment for displaced teeth, 20.5% answered saline, 19.1% said sterile sponge, 12.7% chose clean napkin, 12.7% answered milk, and 7.1% chose the child's saliva. Compared to other studies, the result for saline was close to the study by Bahammam (21.3%), while Kumari (59.7%) and Nikolic et al. (60%) found it to be higher (4,12,13). In our study, only 12.7% chose milk, which is similar to Nikolic et al. but lower than the findings of Bahammam and Ulusoy (4,12,17). The fact that dry environment responses, such as sterile sponge and napkin, were chosen more often shows that there is a serious lack of information on this subject. Furthermore, the percentage of those who chose "I don't know" (22.6%) is quite unacceptable and a serious disappointment to the authors.

A statistically significant difference was found between the recommended and non-recommended answers given by specialist pediatrician and assistant pediatrician to case 1 and case 2 (broken primary tooth or permanent tooth, avulsed tooth management, avulsed tooth storage solutions) ($p < 0.05$) (Table 5).

A statistically significant difference was found between the recommended and non-recommended responses of the participants to case 1 and case 2 according to years of professional experience (permanent tooth reimplantation, avulsed tooth management, avulsed tooth storage solutions) ($p < 0.05$) (Table 5). Similarly, the study conducted by Bahammam found a significant difference between the answers given according to professional experience (12).

In our study, we thought that pediatricians who had encountered trauma cases would know the recommended procedures better. However, no statistically significant difference was found between the recommended and non-recommended answers in all the categories mentioned in our study (Table 5). Similarly, in the Nikolic et al. study, no statistically significant difference was found between the recommended and non-recommended responses according to dental trauma experience (4). In the study conducted by Bahammam, the physicians who encountered the avulsion case gave a statistically significant more accurate answer than those who did not (12).

Pediatricians should have the necessary knowledge to provide accurate and professional advice on dental trauma-related issues as well as on all matters related to childhood health. We think that as professional experience increases, knowledge about dental trauma management will increase.

This cross-sectional study has some limitations. It was conducted on a small sample of pediatricians in Turkey. Therefore, the findings are limited in terms of generalization to all pediatricians in Turkey. However, we think the sample is representative and the truth was clearly revealed from the survey. The lack of training and assertive action for dental injuries indicates a need for further training and changes in attitudes regarding procedures that should be undertaken by pediatricians.

CONCLUSION

This study demonstrates that although most pediatricians face dental trauma, they lack knowledge regarding its management. Therefore, studies should focus on overcoming this lack of information. In line with these results, this subject should be included in the undergraduate or specialist education curricula for pediatricians so that they have sufficient knowledge about the management of dental trauma. Communication between pediatric dentists and pediatricians should be enhanced.

Conflict of interest : The authors declare that they have no competing interest.

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