

Are student knowledge levels and attitudes about avulsion dental trauma adequate in the faculty of medicine?

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Abstract

Aim: The aim of this study was to measure the knowledge levels and attitudes of medical students in Kahramanmaraş city on traumatic dental injuries, particularly dental avulsion.

Methodology: A total of 224 students studying at the medical school in Kahramanmaraş province were included in this research. The students filled out two-part questionnaire forms containing 17 items in total. We used descriptive frequency analysis, crosstabs, and the chi-square test.

Results: Only 7.6% of the students had received relevant training on dental injuries; however, 70.6% did not find the training sufficient. In the case report on replanting a primary tooth, 70.1% of the participants agreed that the primary tooth should not be replanted. In the case report on replanting a permanent tooth, 70.5% of them stated that, although they knew the fallen tooth to be a permanent tooth, they would refer the patient to a dentist immediately because they did not have relevant knowledge for the case. Additionally, 7.6% of the participants stated that if a permanent tooth was avulsed, they would keep the tooth in milk.

Conclusion: We concluded that students majoring in medicine had insufficient knowledge levels and attitudes regarding dental injuries leading to avulsion, and we believe this subject needs to be covered by the relevant curriculum.

Keywords: avulsion, tooth, traumatic, medical school, student

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Introduction

The prevalence of traumatic dental injuries (TDIs) is high among children, with about 30% occurring in the period of primary dentition and 22% during permanent dentition (1). The most common situations resulting in TDIs are crown or root fracture, luxation injuries, avulsion, alveolar bone damage, and damage to soft tissues, gums, and pulp (2-4).

Avulsion is the most significant injury among TDIs and is defined as the complete protrusion of the tooth from the bone socket. The prevalence of this injury is

between 0.5-16% and is more common in boys than girls between the ages of 7-9, which is the period when permanent teeth erupt in children (5-12). The injury mainly occurs in a single tooth, the maxillary incisor, in the permanent dentition (8). The soft and periodontal tissues are highly affected by the injury, leading to ankylosis, tooth loss, alveolar bone damage, and inflammatory root resorption (13-15). Tooth prognosis requires appropriate treatment immediately to evolve to a positive state (2). In cases where the tooth is out of the mouth is limited to 30 minutes, the success rate becomes 90% (16).

TDIs usually cause aesthetic, functional, economic, psychological, and social difficulties in patients, which affect their quality of life (17,18). Avulsed permanent teeth may result in permanently missing teeth in patients without fundamental first aid training (19). Replanting an avulsed permanent tooth through a simple intervention ensures a reasonable prognosis for the tooth and decreases complications resulting from the injury (20).

After a TDI, patients usually present to the emergency department to receive an emergency diagnosis and treatment. Of these admissions, 5% are facial trauma cases (21). It is likely to encounter a plethora of studies scrutinizing the knowledge levels and attitudes of medical students regarding TDIs (22-24). Ultimately, this study aimed to evaluate the knowledge levels and attitudes of students majoring in medicine.

Materials and Methods

We obtained ethical approval from the Kahramanmaraş Sütçü İmam University Clinical Research Ethics Committee (decision date: 07-17-2019; decision number: 2019/13). A total of 224 medical students in their 1st-6th years at Kahramanmaraş Sütçü İmam University during the 2019-2020 academic year participated in this study.

We collected the data via a two-part questionnaire. The first part included questions about the participants' sociodemographic information, such as age and year of study (Questions 1-2), while the second part consisted of multiple-choice questions to measure participants' knowledge and attitudes regarding TDIs, especially situations requiring urgent interventions, as in the case of a dental avulsion injury (Questions 3-17). We selected the questions about avulsion injuries, a type of TDI, from among those previously used in similar studies (23, 25). The overall aim of the research was to measure the knowledge levels of medical students.

Statistical analysis

Analysis of the data was carried out with SPSS software version 26 (IBM SPSS Inc., Armonk, NY, USA). We used descriptive frequency analysis, crosstabs, and the chi-square test, and $p < 0.05$ is statistically significant.

Results

Of the total number of participants, 55.8% were female (125), and 44.2% (99) were male. The percentages of the participants by year of study were 17.4% (year 1; 39), 15.2% (year 2; 34), 19.6% (year 3; 44), 15.2% (year 4; 34), 15.2% (year 5; 34), and 17.4% (year 6; 39) (Table 1).

While 7.6% (17) of the students indicated that they had received training on dental injuries, 92.4% (207) had no training (Table 1). A significantly higher number of male students received such training compared to female students ($p = 0.039$) (Table 2).

Participants who responded "Yes" to the first question identified the sources of such training as dentists (8; 47.1%), family physicians (1; 5.9%), medical school (4; 23.5%), internet (3; 17.6%), and first aid courses (1; 5.9%) (Table 1).

When asked, "How do you evaluate the dental injury training you received?" 29.4% (5) of the students responded "Satisfactory," while 70.6% (12) found it "Unsatisfactory" (Table 1).

In response to the question, "Would you like to participate in educational programs about dental injuries?" 75% (168) marked "Yes," while 25% (56) marked "No" on the questionnaire form (Table 1).

When answering the question, "Have you ever encountered a pediatric patient whose any tooth was avulsed due to trauma?" 46% (103) of students said "Yes" and 54% (121) said "No" (Table 1).

Another question was related to the following scenario: "A 4-year-old falls down while playing in the park, and one of his/her front tooth protrudes out of his/her mouth with blood (the patient is conscious). So, which of the following treatments would you apply?" As a result, 70.1% of the students (157) responded to the question with, "Although I know I need to replant the avulsed tooth, assuming it to be a primary tooth, I would refer the patient to a dentist immediately since I do not have relevant knowledge of the case." Those who chose the option "Even though I know that I need to replant the avulsed tooth, assuming it to be a permanent tooth, I refer the patient to a dentist believing that I am not competent in its treatment" were 23.7% (53). Finally, 6.3% (14) replied "Thinking the avulsed tooth to be a permanent tooth, I replant it and refer the patient to a dentist immediately" (Table 2). Besides, the female participants chose the first option statistically more than the males (Table 3).

The next question was, "A 10-year-old falls down while playing in the park, and one of his/her front tooth protrudes out of his/her mouth with blood (the patient is conscious). So, which of the following treatments would you apply?". In this scenario, 12.1% of the participants (27) responded to the question as "Although I know I need to replant the avulsed tooth, assuming it to be a primary tooth, I would refer the patient to a dentist immediately since I do not have relevant knowledge of the case." Those who chose the option "Even though I know that I need to replant the avulsed tooth, assuming it to be a permanent tooth, I refer the patient to a dentist believing that I am not competent in its treatment" were 70.5% (158). Then, 17.4% (39) replied "Thinking the avulsed tooth to be a permanent tooth, I replant it and refer the patient to a dentist immediately" (Table 1).

To the question of "What medium would you keep the avulsed tooth in before replanting an avulsed permanent tooth?", 29.5% (66) of the students marked "Handkerchief," 25.4% (57) "Water," 7.6% (17) "Milk,"

4.5% (10) "Mouth," 16.1% (36) "Alcohol," 1.8% (4) "Toothbrush," and 15.2% (34) "Nothing" (Table 1).

While 62.9% (141) of the students answered "Yes" to the question "Do you think it is important the root tip being open or closed while replanting the permanent tooth of a pediatric patient?" 31.7% (71) remained undecided, and 5.4% (12) of them answered "No" (Table 1). There was a significant difference between the year of study and the importance of the root tip being open or closed while replanting the tooth ($p=0.020$). While the 2nd-year students regarded its importance the least, it was vice versa for the 5th-year students (Table 4).

To the question "Should antibiotic prophylaxis be administered to the pediatric patient after replanting his/her permanent tooth?" 69.2% (155) of the students answered "Yes," but 1.3% (3) responded "No" and 29.5% (66) remained undecided (Table 1). There was a significant difference between the year of study and administering antibiotic prophylaxis to the patient ($p=0.000$). While the rate of those favoring, it should be applied was the least among the first-year students, it was the highest among the fifth-year participants (Table 5).

While 77.7% (174) of the students answered "Yes" to the question "Do you think the time factor may change the treatment planning in the replantation of the permanent tooth of the pediatric patient?" 18.3% (41) remained undecided, and 4% (9) of them answered "No" (Table 1). There was a significant difference between the gender of the participants and the time factor in the treatment planning ($p=0.002$): the female students more frequently thought such a factor needed to be considered in the treatment (Table 6).

Of the students who answered "Yes" to the question mentioned above, 45% (85) marked "30 minutes" as the response to the question "Which can be considered important in terms of the time factor in the replanting of an avulsed tooth?", while 47.1% (89) favored "60 minutes" and 7.9% (15) marked "120 minutes" (Table 1). Besides, there was a significant difference between the year of study and the time span in the replanting of an avulsed tooth ($p=0.001$). While the 5th-year students less favored, it should be 30 minutes, and they mostly tended to believe say it should be 120 minutes (Table 7).

The distribution of responses to the question "Does the permanent tooth of the pediatric patient needs to be splinted after replanting?" was as follows: "Yes" (145; 64.7%), "No" (12; 5.4%), and "Undecided" (67; 29.9%) (Table 1).

While 70.5% (158) of the students thought that the pediatric patient needs to have a tetanus vaccine, 4.5% (10) believed that the vaccine was not needed. Then, 25% (56) remained undecided about the question (Table 1).

To the question "After the pediatric patient's tooth has been replanted, is it necessary to brush tooth with a soft toothbrush to maintain oral and dental health?", 53.6% (120) of the students responded "Yes," 11.6% (26) said "No," and 34.8% (78) remained "Undecided" (Table 1). There was a significant difference between the year of study and the answers to this question ($p=0.009$). While the rate of those thinking that it is needed to brush tooth with a soft toothbrush after replanting was the highest among the 5th-year students, the rate of those who did not think so was highest among the 6th-year participants (Table 8).

Table 1. Frequencies

	N (%)
<i>Gender</i>	
<i>Female</i>	125 (55.8)
<i>Male</i>	99 (44.2)
<i>Year of Study</i>	
1	39 (17.4)
2	34 (15.2)
3	44 (19.6)
4	34 (15.2)
5	34 (15.2)
6	39 (17.4)
<i>Training on TDIs</i>	
<i>No</i>	207 (92.4)
<i>Yes</i>	17 (7.6)
<i>Source of Training</i>	
<i>First aid course</i>	1 (5.9)

<i>Dentist</i>	8 (47.1)
<i>Family physician</i>	1 (5.9)
<i>Internet</i>	3 (17.6)
<i>Medical school</i>	4 (23.5)
Training Evaluation	
<i>Not sufficient</i>	12 (70.6)
<i>Sufficient</i>	5 (29.4)
Participating in Educational Programs	
<i>No</i>	56 (25.0)
<i>Yes</i>	168 (75.0)
Encountering an Avulsion	
<i>No</i>	121 (54.0)
<i>Yes</i>	103 (46.0)
4-year-old Pediatric Patient	
<i>Although I know I need to replante the avulsed tooth, assuming it to be a deciduous tooth, I would refer the patient to a dentist immediately since I do not have relevant knowledge of the case.</i>	157 (70.1)
<i>Even though I know that I need to replante the avulsed tooth, assuming it to be a permanent tooth, I refer the patient to a dentist believing that I am not competent in its treatment.</i>	53 (23.7)
<i>Thinking the avulsed tooth to be a permanent tooth, I replante it and refer the patient to a dentist immediately.</i>	14 (6.3)
10-year-old Pediatric Patient	
<i>Although I know I need to replante the avulsed tooth, assuming it to be a deciduous tooth, I would refer the patient to a dentist immediately since I do not have relevant knowledge of the case.</i>	27 (12.1)
<i>Even though I know that I need to replante the avulsed tooth, assuming it to be a permanent tooth, I refer the patient to a dentist believing that I am not competent in its treatment.</i>	158 (70.5)
<i>Thinking the avulsed tooth to be a permanent tooth, I replante it and refer the patient to a dentist immediately.</i>	39 (17.4)
Methods of Preserving an Avulsed Tooth	
<i>Handkerchief</i>	66 (29.5)
<i>Water</i>	57 (25.4)
<i>Milk</i>	17 (7.6)
<i>Mouth</i>	10 (4.5)
<i>Alcohol</i>	36 (16.1)
<i>Toothbrush</i>	4 (1.8)
<i>Nothing</i>	34 (15.2)
Importance of Root Tip	
<i>Yes</i>	141 (62.9)
<i>No</i>	12 (5.4)

Undecided	71 (31.7)
Antibiotic	
Yes	155 (69.2)
No	3 (1.3)
Undecided	66 (29.5)
Time Factor	
Yes	174 (77.7)
No	9 (4)
Undecided	41 (18.3)
Time	
30 minutes	85 (45)
60 minutes	89 (47.1)
120 minutes	15 (7.9)
Splitting the Tooth	
Yes	145 (64.7)
No	12 (5.4)
Undecided	67 (29.9)
Tetanus Vaccine	
Yes, it may be needed	158 (70.5)
No, it is not needed	10 (4.5)
Undecided	56 (25)
Toothbrushing	
Yes	120 (53.6)
No	26 (11.6)
Undecided	78 (34.8)

Table 2. Training on TDIs by gender

	Female	Male	Total	p
No	120 (96.0)	87 (87.9)	207 (92.4)	0.039*
Yes	5 (4.0)	12 (12.1)	17 (7.6)	
Total	125 (100.0)	99 (100.0)	224 (100.0)	

Table 3. Methods to be applied to a 4-year-old patient by gender

	Female	Male	Total	p
Although I know I need to replante the avulsed tooth, assuming it to be a deciduous tooth, I would refer the patient to a dentist immediately since I do not have relevant knowledge of the case.	96 (76.8)	61 (61.6)	157 (70.1)	0.039*
Even though I know that I need to replante the avulsed tooth, assuming it to be a permanent tooth, I refer the patient to a dentist believing that I am not competent in its treatment.	24 (19.2)	29 (29.3)	53 (23.7)	

Thinking the avulsed tooth to be a permanent tooth, I replante it and refer the patient to a dentist immediately.	5 (4.0)	9 (9.1)	14 (6.3)
Total	125 (100.0)	99 (100.0)	224 (100.0)

Table 4. Importance of root tip by year of study

	1	2	3	4	5	6	Total	p
Yes	25 (64.1)	12 (35.3)	27 (61.4)	23 (67.6)	27 (79.4)	27 (69.2)	141 (62.9)	0.020*
No	-	3 (8.8)	4 (9.1)	3 (8.8)	1 (2.9)	1 (2.6)	12 (5.4)	
Undecided	14 (35.9)	19 (55.9)	13 (29.5)	8 (23.5)	6 (17.6)	11 (28.2)	71 (31.7)	
Total	39 (100.0)	34 (100.0)	44 (100.0)	34 (100.0)	34 (100.0)	39 (100.0)	224 (100.0)	

Table 5. Antibiotic preference by year of study

	1	2	3	4	5	6	Total	p
Yes	14 (35.9)	18 (52.9)	34 (77.3)	26 (76.5)	32 (94.1)	31 (79.5)	155 (69.2)	0.000*
No	-	1 (2.9)	-	1 (2.9)	-	1 (2.6)	3 (1.3)	
Undecided	25 (64.1)	15 (44.1)	10 (22.7)	7 (20.6)	2 (5.9)	7 (17.9)	66 (29.5)	
Total	39 (100.0)	34 (100.0)	44 (100.0)	34 (100.0)	34 (100.0)	39 (100.0)	224 (100.0)	

Table 6. Time factor by gender

	Female	Male	Total	p
Yes	107 (85.6)	67 (67.7)	174 (77.7)	0.002*
No	1 (0.8)	8 (8.1)	9 (4.0)	
Undecided	17 (13.6)	24 (24.2)	41 (18.3)	
Total	125 (100.0)	99 (100.0)	224 (100.0)	

Table 7. Time factor by year of study

	1	2	3	4	5	6	Total	p
30 minutes	15 (50.0)	14 (56.0)	14 (37.8)	20 (69.0)	6 (19.4)	16 (43.2)	85 (45.0)	0.001*
60 minutes	14 (46.7)	10 (40.0)	23 (62.2)	7 (24.1)	18 (58.1)	17 (45.9)	89 (47.1)	
120 minutes	1 (3.3)	1 (4.0)	-	2 (6.9)	7 (22.6)	4 (10.8)	15 (7.9)	
Total	30 (100.0)	25 (100.0)	37 (100.0)	29 (100.0)	31 (100.0)	37 (100.0)	189 (100.0)	

Table 8. Toothbrushing by year of study

	1	2	3	4	5	6	Total	p
Yes	22 (56.4)	16 (47.1)	20 (45.5)	14 (41.2)	28 (82.4)	20 (51.3)	120 (53.6)	0.009*
No	4 (10.3)	4 (11.8)	3 (6.8)	4 (11.8)	2 (5.9)	9 (23.1)	26 (11.6)	
Undecided	13 (33.3)	14 (41.2)	21 (47.7)	16 (47.1)	4 (11.8)	10 (25.6)	78 (34.8)	
Total	39 (100.0)	34 (100.0)	44 (100.0)	34 (100.0)	34 (100.0)	39 (100.0)	224 (100.0)	

Discussion

Dental avulsion is a prevalent injury in pre-school age children (26), and its prognosis highly depends on the rapid and appropriate treatment applied by non-dentists at the accident site prior to a professional dental treatment (3). The individuals mentioned above need to shorten the length of time the avulsed tooth is out of the mouth. Since the medical doctors are usually healthcare professionals who first encounter the injured patients and their guardians, it is deemed important they learn basic information about orofacial injuries. An essential and necessary part of undergraduate medical education includes emergency intervention (27). However, it is suggested that medical students generally do not have sufficient knowledge about dental injuries and treatment options (24, 28, 29). The priority of physicians in applications to the emergency department of medical faculties, concerning the head and neck region, is to control the patients' general health and then refer them to a dentist. Yet, patients may lose time in this interval, and the prognosis of the tooth and surrounding tissues might be delayed. For this reason, this study aimed to investigate the knowledge levels and attitudes of medical students regarding TDIs, especially avulsion injuries.

The results of our study revealed that 7.6% of the students had previously received training on dental injuries, and the sources of the training were dentists (47.1%), medical school (23.5%), and internet (17.6%). The number of students who received such training was relatively low, and males had significantly more

knowledge than females ($p=0.039$). In the study of Ivancic Jokic et al. (22), the participants reported the sources of training on dental injuries as specialists (19.8%), coaches (3.6%), friends (9%), literature (9%), lectures (7.2%), and television or radio (9%).

We found out that 54% of the students had not encountered avulsion before. Bozatlıoğlu and Patır Münevveroğlu (23) claimed that 8.7% of the senior medical students experienced an avulsion tooth case; it was 17.3% in our study. A study reported that the percentage of students who encountered avulsion tooth injury was 25% and that most of them argued only a dentist might perform the ideal treatment. In the same study, 58% of the participants referred the patient to a dentist, and only 5.5% considered the reimplantation of the tooth (25). Eden et al. (24) claimed that 21.7% of the participants preferred the reimplantation of the tooth, while 45.4% referred the patient to a dentist. Bozatlıoğlu and Patır Münevveroğlu (23) concluded that 72.8% of the senior medical students thought of reimplanting the avulsed tooth and referring the patient to a dentist. Reimplantation of an avulsed primary tooth is contraindicated due to the risk of damaging the underlying permanent tooth germ (30). In our study, 70.1% of the students avoided replanting an avulsed deciduous tooth, which points out that the students knew that the situation in question was not indicated. The female students responded to this question significantly more than the male students ($p=0.039$). However, although 70.5% of the participants knew that replantation of a permanent tooth was indicated, they preferred to refer the patient to a dentist immediately because they thought to have

insufficient knowledge about the case. Only 17.4% thought of replanting the avulsed permanent tooth.

Mediums, where the avulsed tooth should be preserved when its immediate reimplantation is not possible, are reported to be Hank's balanced salt solution (HBSS), milk, saline, or saliva (31). It is also strongly recommended that patients immediately consult a dentist (5, 32). The International Dental Traumatology Association (IADT) proposes milk as the most suitable and common storage medium for avulsed tooth, as it maintains the cells remaining alive on the root surface with the help of its neutral pH, physiological osmolality, growth factor, and nutrients required for cells (15). However, non-ideal storage conditions are dry wipes, water, and alcohol (33). Raoof et al. measured the knowledge levels of dentists and medical doctors about TDIs and concluded various storage conditions for an avulsed tooth in their study. While more than 50% of the participants came to the misconception that they could help preserve the viability of the periodontal ligament (PDL) by keeping the avulsed tooth in a handkerchief, 43% preferred milk, increasing PDL viability (34). In our study, 29.5% of the students preferred a handkerchief, and 7.6% favored milk as the medium to preserve an avulsed tooth. However, keeping the avulsed tooth in a handkerchief adversely affects its prognosis. Eden et al., (24) and Bozatlıoğlu and Patır Münevveroğlu (23) reported that 43.4% and 34.97% of the medical students, respectively, preferred saline physiology as the ideal solution for preserving an avulsed tooth.

According to the results, 45% of the students thought that the time required for the reimplantation of an avulsed permanent tooth should be 30 minutes. Time is the most crucial criterion in the prognosis of an avulsed tooth since it is likely that root resorption develops in the early period following reimplantation of avulsed tooth remaining outside for longer than 15 minutes (35). Holan and Shmueli claimed that 4% of the participants thought of replanting the avulsed permanent tooth, while 50% would not perform the treatment in any case (36). Regarding the time span, the rate of those who agreed "30 minutes" was the least among 5th-year students, while "120 minutes" was chosen most by them ($p=0.001$). This finding clearly shows that medical students engaging in an internship did not know that they need to shorten the time, which is one of the most critical factors in avulsion.

We discovered that year of study was significantly related to antibiotic prophylaxis application to the patient following reimplantation ($p=0.000$). While the first-year students disagreed with its application most, the rate of those favoring its application was the highest among the 5th-year students, which shows the medical students doing a clinical internship adopted the correct approach. Tetracycline comes to mind as the first choice in the first week of an avulsion, depending on the age and weight of the patient. Nevertheless, the use of tetracycline in young patients may cause discoloration in the permanent tooth (15).

In our study, 75% of the students stated that they would like to be educated about dental injuries. In the

literature, 67.1-100% of the participants shared similar answers (24, 25, 34). Although dentists have the primary responsibility for the treatment and follow-up of an avulsion, it is also essential for medical doctors to be knowledgeable on this subject. Practitioners often focus on wounds, bleeding, and bone injuries rather than avulsed tooth (25).

Conclusions

In line with the results, we found that the medical students had a low level of knowledge about TDIs, especially avulsion, and believe that this subject should be included in the curriculum of medical schools.

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Ethical Approval: Ethics committee approval was received for this study from Kahramanmaraş Sütçü İmam University in accordance the World Medical Association Declaration of Helsinki, with the approval number: 2019/13.

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