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RESEARCH ARTICLE

Knowledge and Awareness of School Teachers Regarding Emergency Management of Tooth Avulsion in the Kingdom of Saudi Arabia: A Cross-Sectional Study

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Abstract:

Aim:

This study aimed to assess the general knowledge and awareness of school teachers regarding the first aid emergency dental management of tooth avulsion in the kingdom of Saudi Arabia.

Materials and Methods:

A self-administered, anonymous, close-ended structured questionnaire was given to school teachers in Saudi Arabia. It included information regarding gender, knowledge, and awareness [three parts: basic demographic characteristics focusing on the gender (part one), questions regarding knowledge of school teachers toward emergency management of tooth avulsion (part two), and questions regarding awareness of school teachers toward emergency management of tooth avulsion (part three)].

Results:

A total of 615 school teachers (58% males and 42% females) completed the questionnaire. Approximately 54.3% of the school teachers preferred to immediately refer the child to the dentist if trauma affects permanent teeth ($p < 0.05$), and only 2.1% opined regarding reposition of the tooth in a normal position. Another 22.9% responded that they would scrub the tooth to clean the dirt and rinse with water, while 19.7% reported that they would keep the tooth in a wet handkerchief until they reach the dentist.

Conclusion:

The knowledge and awareness of schoolteachers regarding the management of avulsed teeth are insufficient; thus, education programs on traumatic dental injuries are essential.

Keywords: Dental trauma, Avulsion, Teachers, Children, Storage media, Dental management.

Article History

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1. INTRODUCTION

Traumatic dental injury in preschool and school children is most common, which is related to immature motor control, unguarded play, and hyperactivity [1, 2]. The luxation injury most commonly occurs in primary teeth due to soft, pliable young alveolar bone and affects the surrounding structures, such as soft tissue, between ages one to three years [3 - 5]. A previous study reported that 22% of children sustain injuries to permanent dentition and 30% to primary dentition [6]. It is estimated that over 50% of children are exposed to traumatic

dental injuries before leaving school [7]. The crown fracture more commonly occurs in permanent dentition, and an estimated 26–76% of injuries have been reported for the permanent dentition [8]. Luxation injuries are estimated to occur from 30 – 44% of all dental injuries [2]. An avulsion is a traumatic dental injury where a tooth dislodges entirely out of the socket. It is the most severe and complicated dental injury, seen to vary in range from 0.5 to 3.5% of all traumatic dental injuries, with the peak incidence between 7- to 11-years and the maxillary central incisors being the most affected [2, 5, 9]. Immediate replantation of the avulsed tooth is the best treatment of choice, with 85–97% success rates [10]. The management of dental avulsion depends on many factors, such as maturity of the tooth root end (close or open root apex) and

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health status of the periodontal dental ligament (based on the extra-oral time and type of storage media) [2, 9]. There are contraindications of replanting the avulsed tooth in some situations, such as severe carious tooth, severe periodontal disease, extremely uncooperative child, and medical conditions (e.g., cardiac patient and immunosuppressed patient) [9]. The possibility of replantation largely depends on critical extra-oral time [11].

The prevalence of traumatic dental injuries in Saudi Arabia was reported as 39.5% among school children aged 7-9 years [12]. Tooth fracture (22.7%) was the commonly reported dental trauma in this study, followed by tooth displacement due to trauma (8.7%) and complete tooth loss (8%) [12]. Another study from Saudi Arabia reported that 33% of the study subjects experienced dental trauma among school children aged 5-6 years [13]. The authors concluded that enamel fracture (71%) was the most frequent type of dental trauma, followed by tooth loss (13%) [13]. A recent study from Saudi Arabia has reported dental trauma in 49% of the participants, and the common reasons for dental trauma were falls (21.7%) and fights (22.8%) [14].

Dental trauma can occur in growing children since their permanent teeth erupt during this period. At least 50% of children might experience dentoalveolar trauma during their school time. Additionally, children tend to have an increased likelihood of dental trauma due to recreational activities and sporting events [1, 2]. Therefore, assessing school teachers' knowledge and awareness concerning dental injuries and treatment approaches may play a vital role in the management of dental trauma. Prior studies have shown a lack of school teachers' knowledge regarding dental trauma's emergency management [7, 15 - 18]. The parents and school teachers should be familiar with first aid management of dental trauma. Sufficient knowledge with good practice management is required to achieve an effective final result. In the Arabian region, no recent study has reported on the knowledge and awareness of dental trauma among school teachers. Hence, the present study aimed to assess general knowledge and awareness of school teachers regarding the first aid dental emergency management of avulsion tooth.

2. MATERIALS AND METHODS

Ethical approval was obtained from the Ethical Committee of the Deanship of Scientific Research, Majmaah University under MUREC-Apr.29/COM-2020/28-2. An electronic questionnaire was distributed among primary school teachers to assess their knowledge and awareness regarding emergency management of avulsion teeth in school children. The questionnaire was distributed into three different parts. The first part involved basic demographic characteristics, with a focus on gender. The second part included questions on the knowledge of school teachers toward emergency management of tooth avulsion. The third part of the questionnaire involved questions regarding awareness of school teachers toward emergency management of tooth avulsion. The data were collected in the Arabic language (the teachers' original language) through a self-administered electronic questionnaire

that has been converted into the Arabic language from English. For determining the validity of the questionnaire, all the parts of the questionnaire were reviewed by an expert in the field of pediatric dentistry in order to determine that the questionnaire was comprehensive enough to cover all the data required to address the study's objectives. Prior consent was obtained from the participants of the survey before they responded to this questionnaire. The questionnaire was distributed randomly to the school teachers in Saudi Arabia. The questionnaire was divided into sections of knowledge (Q2, 5, 6, 7, 9, and 10) and awareness (Q3, 4, 8, 11, 12, 13, 14, and 15) for the analysis. The responses of participants to questions of knowledge and awareness were compared based on gender.

2.1. Statistical Analysis

Responses were collected and tabulated in an excel sheet, which was converted into an SPSS data sheet. Descriptive statistical analysis was carried out using the SPSS software (version 17.0, Chicago, Illinois, USA), and a chi-square test was utilized for comparison at a 95% confidence interval with a p-value less than 0.05.

3. RESULTS

A total of 615 (58% males and 42% females) school teachers responded to the questionnaire. More than half of the school teachers (59.3%) reported supervising the children during sports activities ($p < 0.05$), and 5.7% witnessed dental trauma during their supervision (Table 1). Most of the participants (72.5%) were not aware of differentiating between primary and permanent teeth. The responses to knowledge questions and awareness questions are summarized in (Tables 2 and 3), respectively. The majority of participants did not know regarding the immediate management of avulsed primary tooth (44.4%), and only 10.2% had good knowledge. About 54.3% of the school teachers preferred to immediately refer the child to the dentist if trauma affects the permanent tooth ($p < 0.05$), and only 2.1% opined repositioning the tooth in a normal position. 47% of the school teachers responded that they would reimplant the tooth within 30 minutes, while 38% of the participants answered that they would reposition the tooth immediately. Another 22.9% of teachers responded that they would scrub the tooth to clean the dirt and rinse with water, and 19.7% of teachers reported that they would keep the tooth in a wet handkerchief until they reach the dentist (Fig. 1). The majority of the participants did not know how to grab the avulsed tooth (from tooth crown or root), *i.e.*, 48% ($p < 0.05$) (Table 2).

A significant difference was observed among school teachers regarding the knowledge of managing an avulsed tooth. The majority of school teachers did not have sufficient knowledge of dental trauma (86.3%). Approximately 77.9% have not received any prior advice on managing the avulsion of the tooth, while the other 22.1% received information from the internet ($p < 0.05$). Nearly 90% postulated the importance of the educational program and showed their interest in attending workshops and courses on how to deal with and manage dental trauma ($p < 0.05$).

Table 1. Overall responses of school teachers regarding emergency management of avulsed tooth.

	Question	Response	Percentage
Q1	Gender	Female	42.0%
		Male	58.0%
Q2	Can you differentiate between baby teeth and permanent teeth?	No	72.5%
		Yes	27.5%
Q3	Do you supervise the children during sport activities?	No	40.7%
		Yes	59.3%
Q4	Have you come across an accident where a tooth was avulsed?	No	94.3%
		Yes	5.7%
Q5	What is the immediate management of avulsion teeth if that baby tooth?	Don't know	44.4%
		Put back the tooth into original position	1.1%
		Refer the child immediately to the dentist	32.0%
		Throw-out.	10.2%
		Wash the child's mouth with tap water and take the tooth in a wet cloth	12.2%
Q6	What is the immediate management of avulsion teeth if that permanent tooth?	Don't know	32.0%
		Put back the tooth into original position	2.1%
		Refer the child immediately to the dentist	54.3%
		Throw-out.	1.8%
		Wash the child's mouth with tap water and take the tooth in a wet cloth	9.8%
Q7	How urgently do you think it is to seek a dentist help, if a permanent tooth has been avulsion?	Before next day	14.8%
		Immediate	38.0%
		Others	.2%
		Within 30 min	47.0%
Q8	What would you do if the avulsion tooth was covered with dirt?	Scrub the tooth to remove the dirt rinse with tap water	22.9%
		Wash with hydrogen peroxide	13.2%
		Wash with sterile saline	28.6%
		Wipe the tooth with tissue paper	17.4%
		Would do nothing	17.9%
Q9	How would you keep the tooth till you reach the dentist?	Don't know	.3%
		Others please state	.8%
		Put it in Any antiseptic solution	7.0%
		Put it in Child's mouth	7.8%
		Put it in Cold Milk	11.9%
		Put it in Cotton pad	11.1%
		Put it in HBSS	16.4%
		Put it in Ice Tap water	8.8%
		Put it in Sterile saline	16.3%
Put it in Wet handkerchief	19.7%		
Q10	How would you hold the tooth?	Anywhere (crown or root)	48.0%
		From the Crown	35.3%
		From the root	16.7%
Q11	Have you received advice on what to do when a permanent tooth was avulsion in an accident?	No	77.9%
		Yes	22.1%
Q12	If yes. The source of your information?	Dental clinic/ Dental hospital	5.7%
		Governmental program	.2%
		Others, Internet, etc,	15.4%
		Teachers training	1.3%
Q13	Are you satisfied with your knowledge on 'the management of dental Trauma'?	No	86.3%
		Yes	13.7%
Q14	Do you think it is important to have an educational program in 'management of dental trauma'?	No	11.1%
		Yes	88.9%

(Table 1) contd....

Q15	Would you like to attend an educational program on 'management of dental trauma'?	No	12.8%
		Yes	87.2%

Table 2. Gender-based comparison of responses related to knowledge among school teachers regarding emergency management of avulsed tooth.

	Response	Female	Male	P Value
K1	Q2: Can you differentiate between baby teeth and permanent teeth?			
	No	69%	75%	0.09
	Yes	31%	25%	
K2	Q5: What is the immediate management of avulsion teeth if that baby tooth?			
	Don't know	40%	47%	0.03
	Put back the tooth into original position	2%	1%	
	Refer the child immediately to the dentist	38%	28%	
	Throw-out.	10%	10%	
Wash the child's mouth with tap water and take the tooth in a wet cloth	10%	14%		
K3	Q6: What is the immediate management of avulsion teeth if that permanent tooth?			
	Don't know	34%	31%	0.00
	Put back the tooth into original position	4%	1%	
	Refer the child immediately to the dentist	55%	54%	
	Throw-out.	0%	3%	
Wash the child's mouth with tap water and take the tooth in a wet cloth	6%	13%		
K4	Q7: How urgently do you think it is to seek a dentist help, if a permanent tooth has been avulsion?			
	Before next day	17%	13%	0.66
	Immediately	33%	42%	
	Others	0%	0.3%	
Within 30 mins	49%	45%		
K5	Q9: How would you keep the tooth till you reach the dentist?			
	Don't know	1%	0%	0.00
	Others please state	0%	1%	
	Put it in Any antiseptic solution	11%	5%	
	Put it in Child's mouth	14%	4%	
	Put it in Cold Milk	8%	15%	
	Put it in Cotton pad	17%	7%	
	Put it in HBSS	9%	22%	
	Put it in Ice Tap water	11%	7%	
Put it in Sterile saline	15%	17%		
Put it in Wet handkerchief	16%	23%		
K6	Q10: How would you hold the tooth?			
	Anywhere (crown or root)	40%	54%	0.00
	From the Crown	33%	37%	
From the root	28%	9%		

Table 3. Gender-based comparison of responses related to awareness among school teachers regarding emergency management of avulsed tooth.

	Response	Female	Male	P Value
A1	Q3: Do you supervise the children during sport activities?			
	No	66%	22%	0
	Yes	34%	78%	
A2	Q4: Have you come across an accident where a tooth was avulsed?			
	No	95%	94%	0.81
	Yes	5%	6%	

(Table 3) contd....

Q8: What would you do if the avulsion tooth was covered with dirt?				
A4	Scrub the tooth to remove the dirt rinse with tap water	16%	28%	0
	Wash with hydrogen peroxide	16%	11%	
	Wash with sterile saline	27%	30%	
	Wipe the tooth with tissue paper	15%	19%	
	Would do nothing	25%	13%	
Q11: Have you received advice on what to do when a permanent tooth was avulsion in an accident?				
A5	No	78%	78%	0.852
	Yes	23%	22%	
Q13: Are you satisfied with your knowledge on 'the management of dental trauma'?				
A6	No	81%	90%	0.002
	Yes	19%	10%	
Q14: Do you think it is important to have an educational program in management of dental trauma?				
A7	No	18%	6%	0
	Yes	82%	94%	
Q15: Would you like to attend an educational program on 'management of dental trauma'?				
A8	No	21%	7%	0
	Yes	79%	93%	

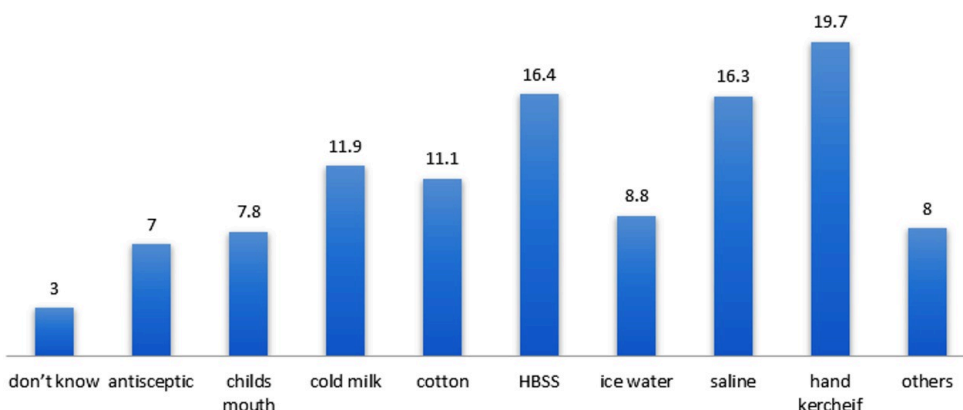


Fig. (1). Preference of school teachers regarding transport medium in emergency management of avulsed tooth.

4. DISCUSSION

Dental trauma is a sudden incident and requires prompt action with appropriate knowledge on first aid management. School teachers need to be informed regarding dental trauma and its management; however, most teachers have not received any relevant prior information regarding how to proceed with it [7, 19]. The main treatment objective of replanting an avulsed tooth is to maintain the patient's esthetics and function and reduce the psychological trauma of missing teeth. Another problem, in addition to the above, is unintentional root resorption, and its prevention is the prime concern for treating dentists [20]. Timely intervention with the use of appropriate transport media reduces the risk of root resorption. Only 2.1% of our respondents expressed that they would retain the avulsed tooth immediately to normal position. Similar results have been reported in the prior studies published from various countries [7, 21, 22].

Numerous storage media can be used, such as HBSS, cold milk, normal saliva, normal saline solution, and regular water, to preserve the avulsed tooth. Although regular water is most commonly accessible, it should be considered the last storage media as it affects the periodontal ligament and causes lysis of healthy cells on the periodontal ligament [23]. The majority of the teachers who participated in the present study were not aware of the exact storage media favorable for an avulsed tooth. In the present study, the most favored medium for storing an avulsed tooth was 'Put it in Wet handkerchief' (19.7%), followed by 'Put it in HBSS' (16.4%).

Shamarao *et al.* [24] reported that 9.3% of school teachers chose milk as a storage medium, comparable to the present study, where 11.9% chose cold milk. According to our study, 77.9% of the teachers have not received any prior advice or education on dental emergencies. This finding has been found to be consistent with previously published studies [15, 21, 25 - 27]. The dental emergency education program should be a part

of the annual educational course in the schools. It should include appropriate information on how to handle the child and the tooth during sports activities. Overall results showed that Saudi teachers lack knowledge and awareness regarding managing traumatic dental injuries.

Approximately 19.7% of the school teachers reported consulting a nearby dental hospital after dental trauma or immediately referring to a dentist [28]. In our study, only 32% of teachers picked the option of referring to dentists after primary tooth avulsion, while 54.3% were willing to refer after permanent tooth trauma. This difference might be due to the notion that baby teeth may eventually fall, and permanent teeth will occupy their position. On the other hand, among primary school teachers, most teachers did not receive any training on the emergency management of dental trauma (77.9%); thus, we recommend that medical care (first aid) and dental trauma management should be mandatory for all school teachers in Saudi Arabia.

In an Iranian study, 60% of schoolteachers reported responding to dental trauma in school themselves. About 70% reported that being educated in emergency management of dental trauma might improve traumatized teeth's prognosis. Only 7.5% of teachers responded retaining the avulsed tooth to normal position by themselves [29]. Surprisingly, only 2.1% of our respondents stated that they would re-implant the avulsed tooth. More than 94.7% of participants thought that their knowledge was insufficient and they were interested in learning more. In the present study, over 87.2% of the school teachers felt that they needed further education on avulsed teeth's emergency management.

Pithon *et al.* [30] studied knowledge levels in Brazilian schoolteachers and found that approximately half of the teachers surveyed (48.2%) had insufficient knowledge. Only 38.3% of school teachers had received training on emergency management of dental trauma, and only 17% correctly reported milk, the oral cavity, or filtered water as an adequate storage media for preserving the avulsed tooth while reaching to the dentist. Singh *et al.* [31] stressed the importance of intimation of the traumatic event to parents. The authors noticed that 43% of the school teachers preferred to contact the parents immediately to take the child to a dentist [31]. In our study, the majority of the participants (54.3%) chose to refer and consult with the dentist. The extra-oral dry time is crucial for replantation, and 30 min time is considered more significant [11]; in our study, most of the school teachers (47%) preferred to visit dental clinic within 30 mins, and 38% preferred immediate consultation. Even though there is a lack of knowledge regarding emergency management of avulsed tooth, the school teachers in the present study were aware of referring the child to the dentist as early as possible.

The majority of school teachers (87.2%) showed their willingness to attend education programs on emergency management of avulsed teeth. In the present study, we found insufficient knowledge among the school teachers regarding the management of avulsed teeth. The author opines that dental trauma in the schools may be minor due to the lack of knowledge on emergency management of avulsed tooth or traumatic dental injuries. However, it is essential to provide

sufficient knowledge to schoolteachers on storage media, handling the avulsed tooth, replacing the tooth, and especially, on the difference between primary and permanent teeth.

CONCLUSION

The knowledge and awareness among schoolteachers regarding the management of avulsed teeth are insufficient; therefore, education programs on traumatic dental injuries management are essential. About 86.3% of the participants were found unsatisfied with their knowledge on the emergency management of avulsed tooth.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study received the approval of the Institutional Review Board of Majmaah University under number MUREC-Apr.29/COM-2020/28-2.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures were followed in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

All participants in the study agreed to participate by responding to the study questionnaire.

STANDARDS FOR REPORTING

STROBE guidelines and methodologies and methodologies were followed in this study.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from [B.A], upon reasonable request.

FUNDING

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CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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