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Research Article

Validation of Questionnaire Regarding Dentists' Management of Avulsed Teeth and Precautions During COVID-19

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Abstract

Background: The COVID-19 pandemic caused major concern about the management of dental avulsion. The aim of this study was to validate a questionnaire assessing the management of avulsed teeth and precautions during COVID-19 among dental professionals, and additionally gather have preliminary results for future studies on a larger scale.

Methods: A cross-sectional study of 28 dental students was conducted as a pilot study to validate the questionnaire. Participants were invited through social media using convenience sampling. The questionnaire was composed of 30 questions according to the newest International Association for Dental Traumatology (IADT) guidelines for avulsed permanent teeth.

Results: The Cronbach's alpha for the knowledge questions was 0.739, and for dealing with avulsed teeth during COVID-19, 0.635. Among the participants, 53.57% knew that avulsed permanent teeth can be replanted, but only 10.71% knew that this is not applied on primary avulsed teeth. Between 10.71% to 39.29% knew the proper transporting media (normal saline, patient's mouth, cold milk, and Hanks' solution). When participants were asked about management of avulsed teeth during the COVID-19 pandemic, 35.71% said they asked patients to come to the clinic and gave the patient appropriate instructions. Also, 67.86% take extra precautions for COVID-19 patients.

Conclusion: The questionnaire used in this study was validated to measure levels of knowledge regarding management of avulsed teeth according to new IADT guidelines. The preliminary results of this study showed that dental students in Saudi Arabia have low levels of knowledge about the management of avulsed teeth. However, more studies with larger sample sizes are needed to have external validity of the results.

Keywords: *Implant; Dentistry; Biocompatibility; In Vitro; In Vivo; Implantology*

Introduction

Dental avulsion is the falling of a tooth out of its socket. It is considered a serious condition because several tissues could be traumatized [1]. A previous study reported that around 10% of the community had a history of dental trauma, and out of those, 1 - 16% were tooth avulsion cases [2]. A major risk factor for tooth avulsion is sports (60% of all cases), and schools are most often where a tooth avulsion occurs [3,4]. In children and teenagers, it is mainly the upper and lower incisors that are affected by dental avulsion [5], which results in many medical, social, and psychological effects, such as difficulties speaking, problems with social communication, and low self-confidence that may occur as a result of poor aesthetics from the loss of anterior teeth [5,6]. Out of all dental traumas, avulsions are prone to a poorer prognosis because of the unpredictable functional and aesthetic impairments following the trauma [7].

The gold standard of treatment according to the updated International Association of Dental Trauma (IADT) guidelines 2020 is immediate replantation in cases of tooth avulsion, but it is not always a feasible option [8]. Preserving the integrity of the periodontal ligament cells is essential for a favorable outcome [9]. The prognosis for avulsed tooth replantation is guided by the stage of root maturation (a closed apex has a better prognosis), storage media (the best media is Hanks' balanced solution), and extra-oral time (the critical time frame is 30–60 minutes) [7]. One of the major limitations of the previous studies assessing dentists' knowledge about the management of avulsed teeth [10–12] is that they are outdated because there are new guidelines. Also, they did not provide any information about changes that may have arisen due to the COVID-19 pandemic.

In fact, since the sudden impact of the pandemic, no studies have been done to report the awareness of dentists' management of avulsions with regard to precautions against COVID-19. Among dental conditions, avulsion is one of the cases that require urgent care [13]. Thus, the aim of this study was to validate a questionnaire assessing the management of avulsed teeth and precautions taken during COVID-19 by dental professionals. Another aim was to gather preliminary results for future studies on a larger scale.

Methods

A convenience sampling technique was used to recruit the participants (n = 28). Participation is optional and is through a Google link that was sent to dental groups via social media. This was disseminated through dental students from different universities in Saudi Arabia. Data collection was conducted from September through October 2020. Consent was obtained from participants before they answered the questionnaire, which took around 3 to 5 minutes to complete.

The self-reported questionnaire was constructed from two previous studies and modified for this study [14,15]. It consisted of 30 questions divided into four sections. The first section asked questions regarding sociodemographic status and familiarity with the newest International Association of Dental Traumatology IADT) guidelines for avulsed permanent teeth. The second section had seven multiple-choice questions aimed at measuring respondents' knowledge about the management of avulsed teeth in the preclinical phase. The third section included nine multiple-choice questions to test the dentists' knowledge about clinical management. Five multiple-choice questions were asked in the fourth section to assess the dentists' procedures in dealing with permanent avulsed central incisors during the COVID-19 pandemic. The questionnaire was face and content validated in terms of logical flow, organization, syntax, grammar, and understanding before administering it during the study.

The data were collected, tabulated, and analyzed using SPSS version 23 (IBM Corp., Armonk, NY, USA). Data were gathered and descriptive analyses were done using mean, standard deviation, frequency, and percentages. Cronbach's alpha measure was used to test the internal consistency of the knowledge sections and the section on management during COVID-19. Because a statistical significance level at 0.05 will be used, the chi-square and t-tests were used to compare participants' responses. All data were completely anonymized for the analyses. The study received ethical approval from the institutional review board (IRB) at Umm Al-Qura University.

Results

The information about demographic data is displayed in table 1, including age, gender, nationality, region, educational programs attended, and the number of avulsed teeth managed in the past. Table 2 and figure 1 show participants' answers to general questions on dealing with avulsed teeth. Table 3 and figure 2 show the answers to the clinical questions about dealing with avulsed teeth. Table 4 and figure 3 provide the participants' answers regarding dealing with avulsed teeth during the COVID-19 pandemic. The Cronbach's alpha for the questions measuring knowledge (combining general knowledge and clinical items) was 0.739 (Cronbach's alpha for general question knowledge was 0.866, and for clinical items, it was 0.559). Cronbach's alpha for the question regarding dealing with avulsed teeth during COVID-19 was 0.635.

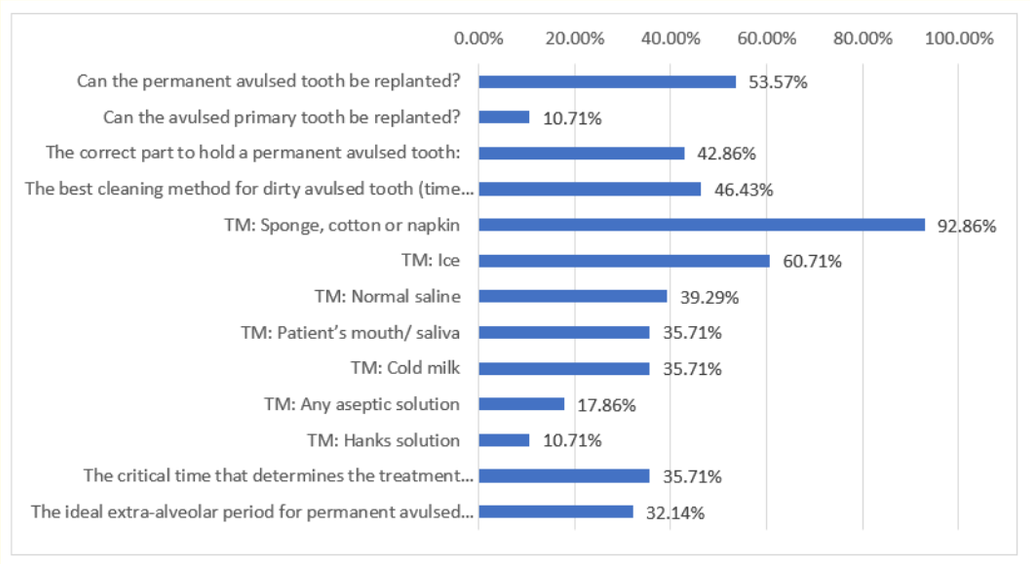

Figure 1: *Correct Answers to the Knowledge Questions Regarding the Proper Management of Avulsed Teeth. TM: Transportation Medium.*

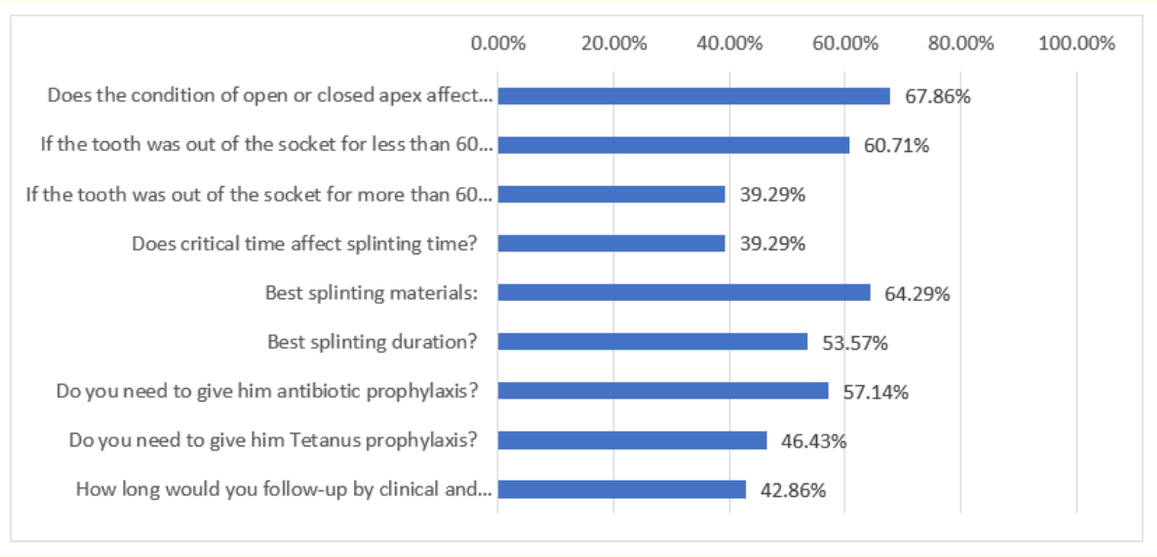

Figure 2: *Number of Correct Responses to Questions on Clinical Knowledge About Avulsed Tooth Management.*

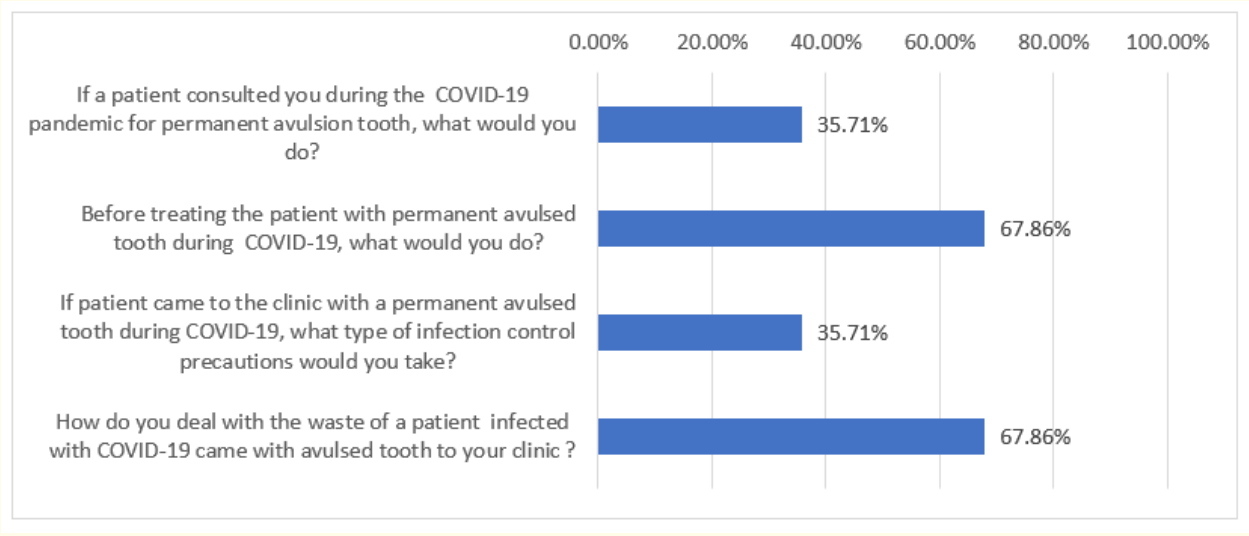

Figure 3: *Participants Correct Management of Avulsed Teeth During COVID-19 Pandemic.*

Variables		N	%	Mean	SD
Age				21.21	1.79
Gender	Male	4	14.29		
	Female	24	85.71		
Nationality	Saudi	26	92.86		
	Non-Saudi	2	7.14		
Region	Central	4	14.29		
	West	11	39.29		
	East	1	3.57		
	South	3	10.71		
	North	9	32.14		
Attended dental educational program on the management of tooth avulsion	Yes	15	53.57		
	No	13	46.43		
Up-to-date with the newest, 2020, International Association for Dental Traumatology (IADT) guidelines for avulsed permanent teeth	Yes	14	50.00		
	No	14	50.00		
Number of dental avulsion cases per year				17.61	35.07

Table 1: *Participants' demographic data (n = 28).*

Question	Answers	N	%
Can the permanent avulsed tooth be replanted?	Yes*	15	53.57
	No	2	7.14
	I do not know	11	39.29
Can the avulsed primary tooth be replanted?	Yes	16	57.14
	No *	3	10.71
	I do not know	9	32.14
The correct part used to hold an avulsed permanent tooth	Crown*	12	42.86
	Root	3	10.71
	Anywhere	4	14.29
	I do not know	9	32.14
The best cleaning method for a dirty avulsed tooth (time has not exceeded the critical time frame)	Saline or osmolality balanced media*	13	46.43
	Wet gauze	2	7.14
	Scrubbing with clean gauze and rinsing with water	1	3.57
	I do not know	12	42.86
Proper transporting medium:			
Sponge, cotton, or napkin	Yes	2	7.14
	No*	26	92.86
Ice	Yes	11	39.29
	No*	17	60.71
Normal saline	Yes*	11	39.29
	No	17	60.71
Patient's mouth/saliva	Yes*	10	35.71
	No	18	64.29
Cold milk	Yes*	10	35.71
	No	18	64.29
Any aseptic solution	Yes	5	17.86
	No*	23	82.14
Hanks' solution	Yes*	3	10.71
	No	25	89.29
The critical time that determines the treatment procedure in dental avulsion:	First 30–60 minutes*	10	35.71
	First 90 minutes	11	39.29
	First 90–120 minutes	6	21.43
	I do not know	1	3.57
The ideal extra-alveolar period for an avulsed permanent tooth:	Less than 30 minutes*	9	32.14
	First 30–60 minutes	6	21.43
	First 60–120 minutes	6	21.43
	I do not know	7	25.00

Table 2: *Participants' knowledge About Avulsed Teeth.*

Question	Answer	N	%
Does the condition of open or closed apex affect treatment procedures?	Yes*	19	67.86
	No	0	0.00
	I do not know	9	32.14
If the tooth was out of the socket for less than 60 minutes, what is the best procedure?	Should not touch the root surface and continue with the treatment*	17	60.71
	Should remove periodontal ligament from the root surface	4	14.29
	I do not know	7	25.00
If the tooth was out of the socket for more than 60 minutes, what is the best procedure?	Should not touch the root surface and continue with the treatment	8	28.57
	Should remove periodontal ligament from the root surface before continuing with the treatment*	11	39.29
	I do not know	9	32.14
Does critical time affect splinting time?	Yes	12	42.86
	No*	11	39.29
	I do not know	5	17.86
Best splinting materials:	Flexible splints*	18	64.29
	Rigid splints	3	10.71
	No need for splinting	7	25.00
	I do not know	0	0.00
Best splinting duration?	1 week	1	3.57
	2 weeks*	15	53.57
	4 weeks	3	10.71
	I do not know	9	32.14
Do you need to give an antibiotic prophylaxis?	Yes*	16	57.14
	No	4	14.29
	I do not know	8	28.57
Do you need to give a tetanus prophylaxis?	Yes*	13	46.43
	No	7	25.00
	I do not know	8	28.57
How long before you would follow-up for a clinical and radiographic examination?	1 year	10	35.71
	3 years	1	3.57
	5 years*	12	42.86
	I do not know	5	17.86

Table 3: *Participants' Clinical Knowledge about Avulsed Tooth Management.*

Question	Answer	N	%
If a patient consulted you during the COVID-19 pandemic for an avulsed permanent tooth, what would you do?	Give instructions for dealing with the avulsed tooth and tell them to stay home until the pandemic ends	7	25.00
	Ask them to come to the clinic right away and give them the appropriate instructions*	10	35.71
	Ask them to stay home and do nothing	11	39.29
	I do not know	0	0.00
Before treating a patient with an avulsed permanent tooth during the pandemic, what would you do?	Ask if they are or had exposure to a COVID-19 patient and, if so, take extra precautions*	19	67.86
	I would treat them immediately without asking because this is an emergency	5	17.86
	I do not know	4	14.29
If a patient came to the clinic with an avulsed permanent tooth during the pandemic, what type of infection control precautions would you take?	I would treat them like a regular patient	5	17.86
	I would defer the treatment until after the pandemic ends	9	32.14
	I would treat them, but with extra precautions*	10	35.71
	I do not know	4	14.29
How do you deal with the waste if a patient infected with COVID-19 came to your clinic with an avulsed tooth?	Dispose of it as regular waste in a common garbage bin	3	10.71
	Dispose of it as biohazard material in a yellow bag*	19	67.86
	I do not know	6	21.43

Table 4: *Participants' Management of Avulsed Teeth during the COVID-19 Pandemic.*

Discussion

The aim of this study was to validate a questionnaire assessing the management of avulsed teeth and the precautions taken during the COVID-19 pandemic among dental professionals. In addition, the study aimed to gather some preliminary results for future studies on a larger scale. The internal consistency of the knowledge questions was considered to be good, which was also the case for the COVID-19 questions. Also, the questionnaire was validated in terms of face validation and content validation, indicating that this questionnaire can be used for future studies for this assessment, using a larger sample size for data with external validity. This might be important due to the extra precautions and modifications that are needed to protect against COVID-19 in the dentistry arena [16].

The preliminary results show that these dental students had variability in their knowledge about the general management of avulsed teeth. This was also the case with regard to the emergency management of avulsed teeth during the COVID-19 pandemic.

One important point is that around half of the students reported that they had reviewed the new IADT guidelines. However, when assessing the level of knowledge about it, the results gave a different perspective. A previous study [15] reported that 96.5% of dentists agreed that it is possible to replant permanent avulsed teeth, which is higher than our study, where only 53.57% gave the same answer. In fact, our results showed that only 10.71% were aware that primary teeth cannot be reimplanted. This low level of knowledge might be due to our participants being students, whereas the previous study participants were primarily practicing dentists.

Most of our participants identified that sponge and cotton are not good mediums for storing an avulsed tooth. However, between 10.7% and 39.29% could identify that normal saline, the environment of the patient's mouth, cold milk, and Hanks' solution are good storage mediums, and that percentage is low. Conversely, a previous study [17] indicated that 68% of their respondents identified Hanks' sporulation as a good transporting medium. However, that study was conducted with dental practitioners, while, in contrast, our study was conducted with dental students. Also, the previous study showed that only 5% of participants used saline, 6% stored the tooth in the patient's mouth, and 21% used cold milk to save the tooth until they received dental care [17] in Al-kharj city, Saudi Arabia. Despite these percentages being low and thus similar to our study, the reason for this in their study might be because the transporting media had only one possible answer, whereas our study made each medium an item that could be selected. This again explains the merit of using a validated questionnaire and illustrates the importance of our study's development of a validated questionnaire. According to our study, around 64.29% of the dental clinicians use non-rigid flexible splinting materials after replantation of an avulsed tooth, this is completely the opposite of another study in Riyadh city, Saudi Arabia [18], which reported that only 11% of dentists use non-rigid splinting materials. Also, in one study [14], around 25% of dental clinicians reported they would continue following up with their patients clinically and radiographically for 3 years, while 42.86% of dental professionals would follow-up with patients for 5 years, which is the length of time recommended in the new guidelines [8]. In Duruk and Erel's (2020) study [15], around 65% of the participants claimed that there is a need to prescribe antibiotics in avulsion cases, which is slightly higher than reported by our results (57.14%). As shown above, some of our results are better than in prior studies, while some others were similar and still others were worse. These differences cannot be explained with our current data. However, it might indicate that dentists and dental students have different knowledge levels according to their current educational/employment status and city location. Due to the low levels of knowledge regarding avulsed permanent teeth, it is recommended to provide rigorous educational training by updating dental students with the new IADT guidelines via courses or workshops.

In terms of dealing with avulsed teeth during the COVID-19 pandemic, the results were not promising in terms of dealing with the situation correctly. Only 35.71% would ask the patient to come to the clinic. This might be due to the high level of anxiety about becoming infected with COVID-19 among dental professionals, as shown in previous studies [21]. There is a percentage who were not aware of what to do or were deferring treatment until the pandemic is over, which reflects that they need further information and training about the management of avulsed teeth during the pandemic. It also indicates that they are not aware that an avulsed tooth is an emergency that requires rapid dental intervention [13] and not a case that can be deferred. However, it seems most of the students were aware of how to manage biological wastes from a COVID-19 infected patient because it is infectious material. Nevertheless, this implication needs further studies to be conducted that include more dentists and dental students from across Saudi Arabia to have more generalizable results.

The unique point for this study is that it was conducted during the COVID-19 pandemic in order to recognize the awareness of dentists' management in this situation. The limitations of this study were the inability to interact with participants when collecting the data to evaluate their sources of knowledge due to pandemic precautions of social distancing.

Conclusion

The questionnaire used in this study was validated for measuring levels of knowledge regarding avulsed teeth according to the new 2020 IADT guidelines. The preliminary results of the present study revealed that dental students in Saudi Arabia have low levels of knowledge regarding the management of avulsed teeth, and they do not have enough knowledge to deal with dental avulsion during the COVID-19 pandemic. It is recommended to add more training to the educational curricula. However, more studies with larger sample sizes are needed to have external validity of the results.

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