Knowledge and Attitude of Oral Health Professionals in the Management of Avulsed Teeth

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Abstract
Objectives: The purpose of this study is to assess the knowledge and to compare the attitude and management of tooth avulsion between the general dentist and the specialist all with dental interns. **Materials and Methods:**16-point questionnaires have been developed to a similar study and have been validated by a group of specialist. The first part of the survey contained demographic data. The second part consisted of eight questions checking dentists' knowledge on the treatment of avulsed teeth. All in which took part in Saudi Arabia, Riyadh and covered 311 dentists. Data were analyzed with SPSS program version 21**Results:** 583 questionnaires have been distributed and a total of 311 were collected. Which consisted 53.34% of distributed surveys. Almost two-third (219) of the surveyed populations have never treated any patient with dental avulsion. Amongst those who had such experience, the majority treated at least one case (35.9%), there were also 22 (23.9%) dentist who treated more than 5 avulsed teeth. 25 of 311 dentist have never received education or training in the management of tooth avulsion. **Conclusion:** there is a need to familiarize oral health professions with the needed knowledge and management of avulsion through lectures and proper training.
Keywords: Avulsion; knowledge; management; oral professional; dental

Introduction

Traumatic dental injuries have become the most serious dental public health Problem since a remarkable decline in the prevalence and severity of dental caries in many countries.[(1)]
In recent years, there has been increasing concern about this oral health problem, because of both the high prevalence and cost involved in its treatment. Including long-time follow-ups [(2)(3)]

With reference to single tooth, the most serious trauma is tooth avulsion (knocking out), which implies total displacement of tooth out of its socket representing 16% of dental injuries. Where is the avulsion of permanent teeth is the most serious one. [(4).]

Avulsion usually affects upper and lower incisors in children, adolescences and young adults [(5)]Poor aesthetic and loss of function of front teeth may entail many medical, social and psychological effects, like speech impediment, difficulties in interpersonal relationships and low self-esteem.[(6)(7)(8)(9)]

The prognosis depends on the measures taken at the place of accident or the time immediately after the avulsion. [(10)(11)]

Lay people are not in agreement regarding the first place to be contacted in the event of avulsion injury. The majority suggests that a nearby dentist would be contacted and the minority feel that the patient would go to a general hospital directly [(12)]. Professional assistance may be generally obtained from general practitioner dentists, oral and maxillofacial surgeons, pediatric dentists, physicians (general practitioners or pediatric physicians) and general hospitals. Management of traumatic injuries, mainly avulsion, may be a challenge to the non- specialized dentist, as it occurs sporadically and when professionals are least prepared for them.

The purpose of this study is to evaluate and to assess the knowledge of the oral health professional and to compare the attitude and management of tooth avulsion between the general dentist and the specialist all with freshly graduated dental interns.

Materials and Methods

After obtaining the approval from the College of Dentistry Research Center a voluntary anonymous 16-point questionnaire have be developed and conducted to a similar study, then validated by a group of specialist by reviewing the questions of the survey and rating each question according to this scale. And found to be highly valid. (Table 1-2)

Table 1. Scale used in rating the questionnaire

Scale	Interpretation	Description
5	Very high valid	The questionnaire is valid and can provide unbiased data for the investigation, allowing 0-5% error
4	High valid	The questionnaire is valid and can provide unbiased data for the investigation, allowing 8-10% error
3	Valid	The questionnaire is valid and can provide unbiased data for the investigation, allowing 11-15% error
2	Less valid	The questionnaire is valid and can provide unbiased data for the investigation, allowing 16-20% error
1	Not valid at all	The questionnaire is valid and can provide unbiased data for the investigation, allowing 21-25% error

Table 2. Validators Questionnaire Assessment

Indicators	Rating 1	2	3	4	5
The indicator in the questionnaire consistently and accurately measures each variables of the investigation					
The questionnaire fits with the variables under investigation, thus measuring what it tends to measure					
The questionnaire has the capability to measure items of variables within a given time frame					
The questionnaire has the ability to distinguish the characteristics or the properties of differing attributes of the subjects under study					
The questionnaire has the ability to gather factual data, eliminating biases and subjectivity					
Quick and complete data can be generated by the questionnaire within the time frame allowed to obtain the data					
The questionnaire has no influence on the variables being measured					
The questionnaire is framed in a clear, simple, in order to avoid risk of error					
The questionnaire is capable of generating data that will be of value and practical use to the sectors concerned in the investigation.					

The first part of the survey contained demographic data: years of experience, gender, previous experience and education in the field of avulsion.

The second part consisted of eight questions checking dentists' knowledge on the treatment of avulsed teeth. On the basis of the answers to these questions, the level of dentists' knowledge will be evaluated by counting points for correct answers. The respondents could get 1 point for each correct answer to questions no. 1,2,4,5,6 and 8; 7 had four sub items. In question no. 3, respondents could score 4 points for indicating all suitable transport media, 1 point if the answer is correct but incomplete, and no points when they indicated any incorrect medium. The maximum number of points they could score will be 14.

Subjects have been randomly selected from different governmental hospitals and clinics covering all parts of Riyadh. Only the registered dentist and clinicians who are providing dental care at the time of distributing the questionnaire have been included in this survey.

Objective and potential benefit of the study have been explained to the participants. The questionnaire was personally distributed to the participants at their place of work then collected in a manner, which each hospital or clinics included in the sample have been visited once and all surveys gathered at the same day.

Results

583 questionnaires have been distributed and a total of 311 were collected. Which consisted 53.34% of distributed surveys. The majority of respondents (49.8 %) were dental interns followed by general practitioners (26%) and specialists (24.2%). Where is 78 (general practitioners and specialist) have an experience of more than 5 years.

Almost two-third (219) of the surveyed populations have never treated any patient with dental avulsion. Amongst those who had such experience, the majority treated at least one case (35.9%), there were also 22 (23.9%) dentist who treated more than 5 avulsed teeth. 25 of 311 dentist have never received education or training in the management of tooth avulsion. Most frequently, dentists assessed their knowledge of avulsion as satisfactory. (Table 3).

TABLE 3. Experience in dental avulsion treatment in the sample

Question	N (%)
Have you ever treated a patient with tooth avulsion?	
Yes	92 (29.6%)
No	219 (70.4%)
How many cases? N (92)	
0	219 (70.4%)
1	34 (10.9%)
2-3	27 (8.7%)
4-5	9 (2.9%)
More than 5	22 (7.1%)
Have you ever received advice or education on what to do in the event of an accident where a permanent tooth has been avulsed?	
Yes	286 (92%)
No	25 (8%)
How do you Asses your knowledge on the treatment of avulsed teeth?	
Good	132 (42.4%)
Satisfactory	160 (51.4%)
Unsatisfactory	19 (6.1%)

The answers to questions regarding the treatment of dental avulsion revealed the lack of this knowledge (Table 4). Majority of respondents 102 (32.8%)thought incorrectly that the method of choice in first aid for a patient with avulsed tooth is the replantation in dental surgery. More than half of the surveyed population chose incorrectly or did not know that after 60 min of extra-oral dry time, periodontal ligament cells are irretrievably damaged, and the prognosis of replantation is poor.

Only 9 respondents were able to choose all correct answers to the question regarding transport medium.

As many as 75 subjects (24.1%) indicated sterile gauze as a proper way to transport an avulsed tooth, whereas 12 subjects chose hydrogen peroxide or alcohol. More than half 190 (61.1%) of the answer to questions regarding the treatment of a contaminated tooth were correct. However, only 28.9% of dentists knew that the splinting time of an avulsed tooth should not be prolonged for more than 2–4 weeks. 244 (78.5%) subjects of the surveyed population did not know which type of splint to be used.

The percentage of correct answers to questions regarding endodontic treatment of avulsed tooth was also unsatisfactory. The surveyed dentists usually knew that a primary tooth should not be replanted.

TABLE 4. Knowledge on the treatment of avulsed teeth

Question	N (%)
The method of choice in the first aid management in a permanent avulsed tooth at the site of injury:	
Immediate replantation at the place of accident*	57 (18%)
Replantation in dental surgery	102 (32.8%)
Replantation in specialist department	82 (26.4%)
No answer	70 (22.5%)
Extra-oral dry time after which the prognosis of avulsed tooth becomes poor:	
30 min	43 (13.8%)
60 min*	152 (48.9%)
6h	10 (3.2%)
12 h	6 (1.9%)
No answer	100 (32.2%)
Recommended transport medium (you can choice multiple answers):	
Sterile gauze	75 (24.1%)
Tab water	23 (7.4%)
Hydrogen peroxide	12 (3.9%)
Milk*	204 (65.6%)
Saline*	79 (22.4%)
Alcohol	12 (3.9%)
Patient's saliva*	159 (51.1%)
Contact lens solution*	18 (5.78%)
Treatment of contaminated tooth (dental surgery conditions):	
Gently rinse with tab water	11 (3.5%)
Gently rinse with saline*	190 (61.1%)
Using disinfectant, (hydrogen peroxide, alcohol, sodium hypochlorite)	26 (8.4%)
Contaminated tooth cannot be replanted	16 (5.1%)
No answer	68 (21.9%)
Optimal splinting time (avulsion without alveolar bone fracture):	
Up to 2–4 weeks*	90 (28.9%)
Up to 6 weeks	41 (13.2%)
No answer	180 (57.9%)
Type of splint to be used (avulsion without alveolar bone fracture):	
Non rigid (flexible) splint*	35 (11.3%)
Rigid splint	32 (10.3%)
No answer	244 (78.5%)
The best time to initiate endodontic treatment of a tooth with a closed apex replanted before arriving at dental surgery is 7–10 days after replantation.	
True*	67 (21.5%)
False	14 (4.5%)
No answer	230 (74%)
The best time to initiate endodontic treatment of a tooth with a closed apex, when extra-oral dry time was longer than 60 min, is before replantation or 7–10 days after replantation.	
True*	80 (25.7%)
False	22 (7.1%)
No answer	209 (67.2%)
The best time to initiate endodontic treatment of a tooth with open apex is when clinical and radiographic evidence of pulp necrosis are observed.	
True*	56 (18%)
False	18 (5.8%)
No answer	237 (76.2%)
If the extra-oral dry time was longer than 60 min – before replantation, tooth should be immersed in 2% sodium fluoride for 20 min.	
True*	94 (30.2%)
False	36 (11.6%)
No answer	181 (58.2%)
Is the treatment of avulsed primary teeth the same as in case of permanent ones?	
Yes	23 (7.4%)
No*	244 (78.5%)
No answer	44 (14.1%)

* Mark the correct answer.

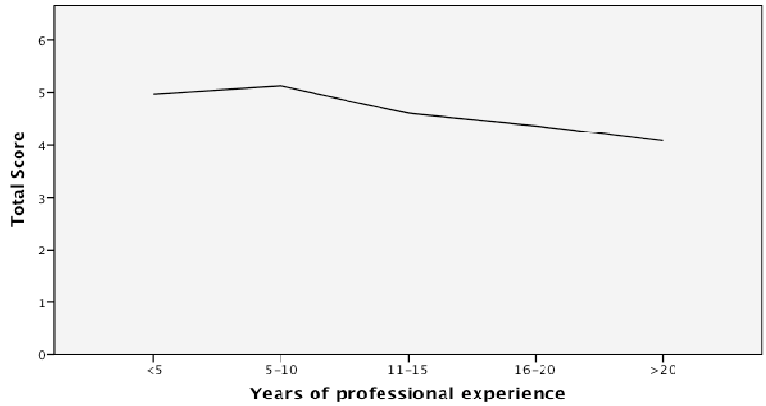
Discussion

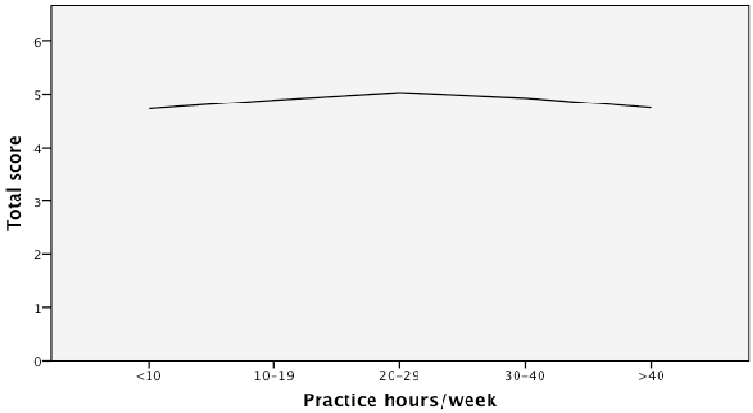
Knowledge of the appropriate treatment and emergency management of avulsed teeth can reduce stress and anxiety for both patients and the dental team. Therefore, it is important to establish baseline information about existing level of knowledge among the oral health provider's ether general dentist, specialist, or even dental interns in Riyadh city, which it was the aim of our study.

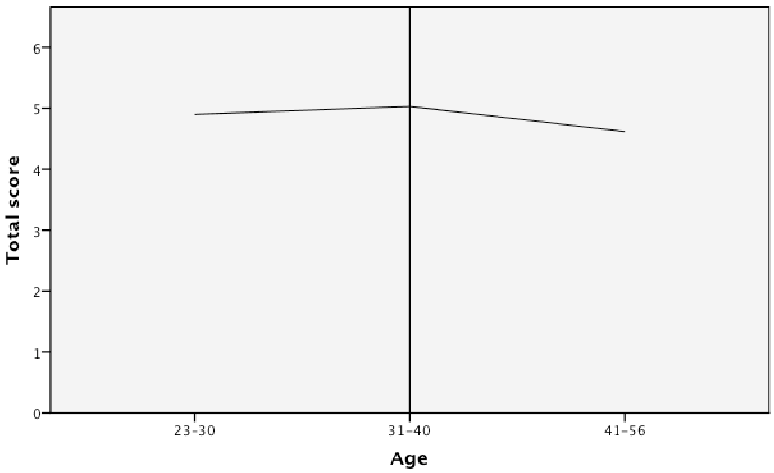
In general, our survey showed a low level of surveyed dentists' knowledge on the treatment of dental avulsion. An average result was below the half of points that could be scored – 4.90 to 14,witha minimum of 1 point and a maximum of 12 points.

Statistical analysis showed that participant who are freshly gradated and how received educations on the management of avulsion have higher score points. (Figure 5-6)

Participants who had 20-29 hours practice per week had better score. Joined with those who they're aged between 30-40. (Figure 7-8)







In this study, only in the field of comparing the treatment of primary tooth avulsion to the permanent ones was the level of the knowledge satisfactory. In addition to that the knowledge of the contaminated tooth cleaning.

In other parts of the survey, most dentists chose incorrect answers. It is concerning that they did not know that the best method of first aid for a patient with dental avulsion is immediate replantation at the place of accident.

Extra-oral dry time should be as short as possible, maximum 30–60 min, because damage of periodontal ligament cells begins very quickly. It is the most critical factor influencing future prognosis of a replanted tooth.[13-15]

In our study, we chose 60 min as the critical time because according to IADT guidelines, a different treatment should be provided if a tooth was in dry environment for more than 1 h.[10]

Hank's balanced salt solution is known as the best transport medium, we did not ask about HBSS as it is rarely available at the place of accident. Instead of HBSS, an avulsed tooth could be transported to dental surgery in easy available solutions like milk, saline, patient saliva or even contact lens solution.[10, 14,17,18] Milk can prevent damage of periodontal ligament cells up to 24–48 h.[17]

More than fifty present of surveyed individuals did not know the recommended splinting time for an avulsed tooth and minority of them suggested that splinting period should be six weeks, which is considered as a risk factor for replacement root resorption.[10, 19]It should be noted that in case of avulsion, prognosis is unclear and wrong treatment modalities may make it poor.

A splinting technique should allow physiologic movement of the tooth during healing. So, a flexible splint should be used. The result was quite unsatisfying as 78.5 % informed that they do not know which type of splint to be used and 10.3 % use rigid splint for avulsed.[20]

67.2 % of the surveyed dentist did not know that the ideal time to begin root canal treatment is 7–10 days post replantation. In which, Calcium hydroxide is recommended as an intra-canal medication for up to 1 month followed by root canal filling with an acceptable material. In addition to the lack of that knowledge only 25.7% knew if the tooth has been dry for more than 60 min before replantation The root canal treatment may be carried out extra-orally prior to replantation.

In teeth with open apexes, which have been replanted immediately or kept in appropriate storage media prior to replantation, pulp revascularization is possible. 76.2% did not know that root canal treatment should be avoided unless there is clinical or radiographic evidence of pulp necrosis.

More than half (58.2%) of the surveyed participants did not know that by immersion of the avulsed teeth in a fluoride solution might increase the survival rate of the tooth by increasing its resistance to resorption.[20-34]

A comparison of the level of knowledge of surveyed dentists with groups from other countries showed that the awareness of the principles of treating patients with traumatic dental injuries is varied. Zadiket al.[35] found a good knowledge of IADT guidelines amongst dentists employed by the Israeli army, but they had received detailed instructions on that subject a year before the research. According to Abu-Dawoudet al.[36], dentists working in Kuwait, especially those who had graduated there, had a high knowledge of emergency management of avulsed teeth. Studies conducted in Brazil in 2004 and 2006 differed in conclusions; however, an improvement of knowledge was observed during this period[37,38]. In an Australian survey, dentists' knowledge on traumatic dental injuries was estimated at a moderate level [39]. Conclusions arising from studies undertaken in the USA, Germany and China are that dental practitioners need to improve their knowledge on emergency treatment of avulsed teeth [16,40,41].

Conclusions

Our survey showed the lack of knowledge and attitude among the oral health professionals in the management of the avulsed teeth in the city of Riyadh, KSA. Therefore, it is necessary to familiarize oral health professions with the needed knowledge and management through lectures and proper training. It will benefit in reducing treatment failures and improving patient`s quality of life.

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