Knowledge of emergency management of avulsed teeth among young physicians and dentists

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Abu-Dawoud M, Al-Enezi B, Andersson L. Knowledge of emergency management of avulsed teeth among young physicians and dentists.

Abstract – This study was designed to investigate the knowledge and attitude of newly graduated physicians and dentists regarding emergency management of avulsed teeth. Data were collected using a self-administered questionnaire. Thirty physicians and 30 dentists who graduated during the period 2000–2004 were surveyed. They all served in either hospitals or dental centres with emergency settings. All the participants that were asked were willing to participate. The majority of the physicians (83.3%) surveyed had not received information on what to do if a tooth is knocked-out and 96.6% did not have any dental health education course during their study. In contrast, nearly all the dentists (93.3%) had received information on what to do if a tooth is knocked-out. Regarding knowledge level, eight of the physicians (26.6%) demonstrated low knowledge while the remaining 22 (73.3%) had some knowledge; none of the physicians showed a high knowledge level. In sharp contrast, 22 dentists (78.5%) had high knowledge, six (21.4%) showed some knowledge and none demonstrated low knowledge. We conclude that emergency dental treatment is sometimes required to be provided by a physician before any dental contact. Unfortunately, the findings from this survey clearly suggest that very few physicians would provide appropriate emergency treatment. All medical staff personnel need to receive simple instructions about management of dental trauma. Most dentists had high knowledge regarding this issue; nevertheless, a few dentists, not graduated in Kuwait, were found to have limited knowledge, which needs to be improved.

Key words: replantation; avulsion; tooth; knowledge; education; first aid

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Traumatic tooth avulsion (i.e. exarticulation, knocked-out tooth) is the total displacement of the tooth out of its socket because of traumatic injury (1–6). Avulsion of permanent teeth accounts for approximately 0.5–16% of dental trauma (3, 7). The peak age for avulsion of permanent incisors is between 7 and 9 years (1, 3, 8, 9). Avulsed permanent teeth can be saved if replanted immediately or stored in a physiologic solution, such as saline, milk or even saliva until professional help is obtained (1, 2, 5, 6, 10, 11). However, if such proper first aid procedures are not provided, the tooth will be lost. The immediate and appropriate management of traumatically avulsed teeth provided within the first 15 min after avulsion is critical for the long-term success of the treatment (1, 2, 5, 6, 10, 11). Primary teeth should not be replanted because of the potential risk of damaging the permanent successors (1, 2, 5, 6).

Relative to other dental injuries, avulsion represents a challenge in terms of the proper emergency management provided at the site of the accident. The principal challenge is to keep the cell layer around the tooth surface vital. During avulsion, the periodontal ligament (PDL) cells surrounding the root surface are injured (1, 2, 4, 5, 10, 12). The prognosis of avulsion injuries is largely dependent on the condition of the PDL cells at the time of replantation and is inversely related to the period of dry storage (1, 2, 4, 5, 10, 12).

Maxillary central incisors are the teeth most commonly prone to avulsion (1, 9, 13). Therefore, functional and aesthetic consequences associated with the loss of an anterior tooth should be considered. Losing an anterior tooth at this age may have severe psychological consequences. Immediate replantation of an avulsed tooth is needed to restore aesthetics and function for the patient. If the tooth is lost, there are long-term economic consequences as more expensive and extensive treatment modalities will be needed to restore such impairments.

Most dental injuries, including avulsion, occur because of sport-related injuries in the school or playground, physical violence, road traffic accidents, falls and other injuries. Initial emergency management, therefore, may involve such individuals as the school nurse, parents, relatives, teachers and general medical practitioners in the emergency units before any professional dental help can be obtained. The immediate and appropriate management of traumatically avulsed teeth is critical for the long-term success of the treatment. Many avulsed teeth are lost because of lack of knowledge about the proper first aid procedures that need to be provided. Consequently, dental health education in this field can be very effective in reducing the negative consequences of such injuries (14).

Some published surveys (15–22) have investigated the lay knowledge and awareness of the public regarding this situation. We found only one study in the literature, however, about the level of knowledge among medical personnel (13). Dentist should be well educated in this field, but we found no study documenting the level of awareness and attitude of dentists.

The aim of this study was to investigate the knowledge and attitude of newly graduated physicians and dentists in relation to this problem in that these are two important groups involved in the emergency phase of the management of avulsion injuries.

Material and methods

The present study is a cross-sectional observation study. The data were collected by distributing standardized questionnaire forms (Appendix) to the target groups. Totally, 30 physicians and 30 dentists who graduated between 2000 and 2004 were surveyed. They all served in either hospitals or dental centres with emergency settings. The project was ethically approved by Faculty of Dentistry (FOD) and permission was given by the Ministry of Public Health (MOPH) to survey the participants.

The mean age of the dentists at the time of the study was 26 years (range 22–29 years) and 26.5 years (range 24–29 years) for the physicians. The gender distribution was similar for both groups, with 42 (70%) male and 18 (30%) female participants. Table 1 shows the countries of graduation of the 30 physicians and 30 dentists. The majority (73.3%) of the physicians had graduated from Kuwait while half of the dentists had graduated from the USA.

All questions were close-ended (multiple-choice questions), except for the questions regarding personal data. The survey was voluntary and strict confidentiality was assured as no names or phone numbers were required.

The questionnaires were given to the participants under the supervision of the authors. Furthermore, the authors were always present at the time the questionnaires were completed and the questionnaires were collected immediately after the participants answered the questions.

The questionnaire, containing 20 questions, was divided into three parts. The first part consisted of seven questions on personal information. It included information about (age, gender, medical or dental graduate, year of graduation, country of graduation, if first aid training included dental trauma and if the medical training involved any dental educational programmes). Parts II and III were composed of 13 questions based on an imaginary case of traumatic avulsion.

Table 1. Country of graduation of participating physicians and dentists

Country	Physicians	Dentists
Bahrain	4	0
Egypt	0	4
India	0	3
Ireland	3	0
Jordan	0	2
Kuwait	22	0
Philippines	0	1
Romania	0	1
Russia	0	1
Syria	0	2
UK	1	1
USA	0	15
Total	30	30

The following fields of knowledge were assessed:

- Importance of immediate management of an avulsed permanent tooth on the long-term success of treatment
- Importance of not replanting primary teeth because of the potential risk of damaging the permanent successors
- Critical extra-alveolar time of an avulsed tooth
- Optimal storage methods and media
- Proper cleaning technique of a grossly contaminated avulsed tooth before replantation
- Proper handling of an avulsed tooth
- First place to contact in seeking professional help

The results were analysed and knowledge was assessed by a standardized method with scoring of the participants' knowledge level. Five questions from part II (questions 1–5) and three questions from part III (questions 1, 2 and 4) were used to assess the level of knowledge.

A score of eight points represents full knowledge while a score of zero indicates no knowledge. Between these two scores a scale of high knowledge (6–8 points), some knowledge (3–5 points) and low knowledge (0–2) was formulated.

Descriptive statistics were used to analyse and present the data. The Mann–Whitney *U*-test was performed to determine differences in knowledge level between the two groups (i.e. between the dentists and physicians). Statistically significant differences were assumed when $P < 0.05$. The chi-square test was also used to analyse the data.

Results

All of the participants who were initially approached gave their consent to participate in the study. Almost all (93.3%) of the physicians but less than one-third (28.6%) of the dentists reported that the 'first aid' course they had taken did not cover management of dental trauma.

The majority of the physicians (83.3%) reported that they did not receive any information on what to do if a tooth is knocked-out; in addition, 96.6% of the physicians did not have any dental health education course during their study. In contrast, nearly all the dentists (93.3%) had received information on what to do if a tooth is knocked-out. The difference in information level between the two groups was statistically significant ($P < 0.05$).

Regarding knowledge level, eight of the physicians (26.6%) had low knowledge, 22 (73.3%) had some knowledge and not one showed high knowledge. For the dentist group, 22 (78.5%) had high knowledge, six (21.4%) had some knowledge and none had low knowledge (Fig. 1). The difference in knowledge level between the groups was significant.

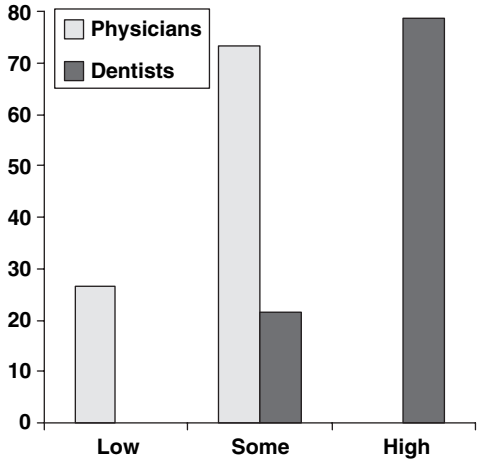

Fig. 1. Knowledge level of physicians and dentists. For definition of low, some and high knowledge (see Material and methods).

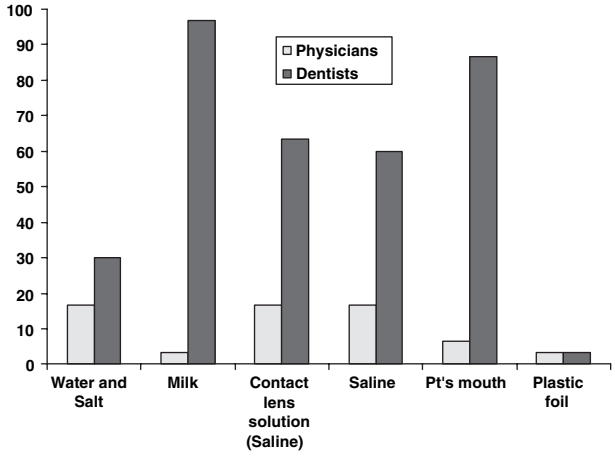

Fig. 2. Correct answers for suitable storage methods and medias by physicians and dentists.

Nine physicians (30.0%) and 20 dentists (66.7%) had knowledge about the available dental emergency units and their office hours in Kuwait. Seven physicians (23.3%) and 14 dentists (46.7%) reported that they or someone they know has been at a site of an accident where somebody had dental trauma. Regarding the type of dental trauma, fractured teeth were the most commonly reported injury by both groups. Eleven of 60 (18.3%) participants had experienced at least one case of avulsion. Dental trauma caused by sport injuries and falls were more commonly seen by dentists. Knowledge of proper storage methods and media was significantly higher in the dentist group (Figs 2 and 3).

Discussion

This study provided baseline information about the existing level of knowledge of dental avulsion in newly graduated physicians and dentists. In general,

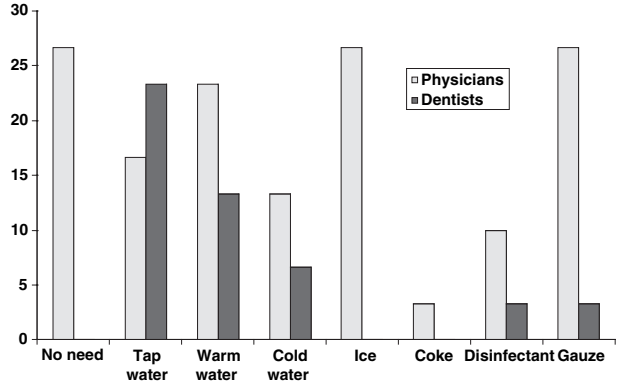

Fig. 3. Incorrect answers on questions about the storage methods and media by physicians and dentists.

only the dentists showed high knowledge about dental avulsion. In contrast, the results of the survey reflected the fact that the physicians had received no advice or had low awareness about the emergency management of avulsed teeth and the possibility of saving them through simple replantation. Physicians who work in hospitals with emergency settings should receive simple instructions about dental first aid.

In this survey we preferred to directly supervise the questionnaire process. In the survey reported by Holan & Shmueli (13) the questionnaire forms were mailed to the participants. By using this latter method, we feel there is a risk that the participants' responses may be compromised.

It is possible that all 13 questions could have been included in one section rather than dividing the questionnaire into two sections. However, because the responses to earlier questions may influence the later responses, we decided to separate the questions into two parts, making sure that they were given separately to the participants.

Only 6.7% of the physicians recalled that the first aid course covered dental trauma. Almost all (96.7%) of the physicians had no dental health education course during their study. The first aid course given by the authorities in Kuwait is a 4-day course designed to increase the knowledge level so that the physician is able to manage all types of emergency, (e.g. burns, fractures and poisoning). In such a comprehensive course it is surprising that dental trauma was not included. Some dental injuries have a favourable prognosis although this will heavily depend on the actions taken during the emergency phase.

In the light of such results an important implication from this study would include the need for an educational campaign to broaden the knowledge of medical personnel about emergency management of dental trauma. This can be done, for instance, by incorporating a dental trauma management lecture or seminar into the curriculum of the Health Science Centre for training medical students in Kuwait. Moreover, leaflets, stickers and posters about basic first aid treatment can be provided not only to lay people but also to professional care providers.

Another surprising finding was that only 33% of the physicians and 66% of the dentist had information about the location and office hours of dental emergency services. Such information should be available at all emergency settings. Recently, FOD has distributed guidelines for management of dental trauma in which the location of emergency clinics and their office hours are included (23).

Although the physicians and dentists in this study were quite young, 25% of the physicians and 50% of the dentists had already gained some experience about dental trauma and 20% of the participants had already gained experience about avulsed teeth. These findings show that professionals in emergency settings are in fact exposed to patients with tooth avulsions.

Knowledge of correct measures regarding storage media was found to vary considerably. Although the dentists were aware of physiologic media such as saline, milk and saliva, such knowledge was rare in the physicians. To treat or provide correct professional advice knowledge about storage media must be increased. Professional medical personnel can cause serious injury to PDL cells by providing poor advice. For instance, 25% of the physicians thought that there was no need to store an avulsed tooth. In the physician group 25% thought a tooth could be stored dry in gauze or tissue paper, but such a storage media would rapidly destroy the PDL cells (1, 2, 4, 5, 10, 12).

Despite years of research showing that cell membranes will be destroyed if stored in water, an alarming number of dentists thought that a tooth could be stored in such a medium. Many physicians believed that a tooth should be stored on ice. This may be recommended for body parts (such as a cut finger) but when trying to save a cell layer, a more sensitive storage medium is required. When ice melts during transport to the dentist, it becomes water, which, because of a difference in osmolality, will destroy the walls of the cell membrane (1, 2, 4, 5, 10, 12).

Undergraduate teaching of physicians is carried out in Kuwait since more than 20 years back. The majority of the physicians interviewed had graduated in Kuwait. There is a need for including an educational course about dental emergency management in the medical undergraduate curriculum in Kuwait. In recent years a FOD has started. This new faculty can contribute to teaching in basic dentistry e.g. management of avulsed teeth in the

undergraduate curriculum in Faculty of Medicine. Such discussions have just started.

At the time of the study no dentist had graduated from the FOD in Kuwait. For this reason only dentists graduated abroad took part in the study. The quality of teaching emergency dental treatment may vary between different countries. This may explain why even some dentists have an insufficient knowledge level of emergency management. The graduating students from the new FOD have been taught modern principles of tooth avulsion and how to act in a situation of emergency. When these dentists will come out in the society they will certainly contribute to a rise in knowledge level in the society of how to act in case of an emergency with an avulsed tooth.

There is a need for courses in Dental Traumatology in the society to increase the knowledge level among the professionals. Guidelines have recently been distributed to all dentists and we feel that this will contribute to a higher standard of care. In accordance, reaching out to the medical students at the undergraduate level by a course in dentistry in the undergraduate curriculum is presently discussed and in such a course the emergency management of avulsed teeth is an important topic to be covered. Furthermore courses for staff at emergency clinics are planned. In addition posters and information brochures will be distributed to emergency clinics in the society.

Conclusion

A physician is sometimes required to provide emergency dental treatment before professional dental contact. Unfortunately, the findings from this survey suggest that few physicians could provide appropriate emergency treatment. All members of a medical staff need to receive simple instruction about management of dental trauma. Most dentists had high knowledge regarding this issue; nevertheless, a few dentists were found to possess limited knowledge of acute dental trauma.

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Appendix

Case no. □□□
Date (day/month/year) □□□□□□
Dental trauma management awareness
Management of avulsed teeth
Survey of new medical and dental graduates, Kuwait.
Please answer parts I, II & III of the questionnaire.

Part I: Personal information:

1. Date of birth (day/month/year) □□□□□□

2. Gender: □ Male □ Female

3. Are you a: □ New medical graduate □ New dental graduate

4. Year of graduation □□□□

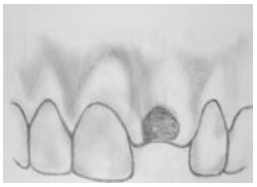
5. Country of graduation ——————

6. Did you have any 'First Aid' course covering 'Management of Dental Trauma' during your study or training?
□ Yes
□ No

7. Have you ever received information on what to do if a tooth is knocked-out?
□ Yes
□ No

8. If you are a medical graduate, have you had any dental health educational course during your study?
□ Yes
□ No

Part II: You were at the site of an accident where a 14-year-old boy knocked-out* one of his upper front teeth.
*The tooth is totally displaced out of the socket



1. What do you think is the most appropriate action?
□ Stop the bleeding
□ Stop the bleeding and search for the tooth
□ Search for the tooth and seek help
□ Search for the tooth and put it back into the socket of the injured person's mouth
□ No need to search for the tooth as it is already knocked-out

2. How urgent do you think it is to seek professional help?
□ Immediately
□ Within 30 min
□ Within a few hours
□ Before 24 h has elapsed
□ No need to seek professional help

3. Would you care if the tooth that has been knocked-out were a primary tooth?
   ☐ Yes
   ☐ No

4. Can you differentiate if the tooth is primary or permanent?
   ☐ Yes
   ☐ No

5. Which would be the first place you would contact to seek treatment?
   ☐ No need to seek treatment
   ☐ General medical practitioner
   ☐ Dentist
   ☐ School health programme

6. Do you know the dental emergency units and their office hours in Kuwait?
   ☐ Yes
   ☐ No

7. Have you or someone you know been at the site of an accident where somebody had a dental trauma?
   ☐ Yes → go to questions 8 and 9
   ☐ No 8. If yes, what type of dental trauma? (choose all possible alternatives)
   ☐ Knocked-out tooth
   ☐ Fractured tooth
   ☐ Dislocated tooth
   ☐ Others, please state.....

9. What was the cause of the dental trauma? (choose all possible alternatives)
   ☐ Road traffic accident
   ☐ Sport-related injury
   ☐ Fall
   ☐ Violence (fight, child abuse…)
   ☐ Others, please state .....

   Case no. ☐☐☐
   Date (day/month/year) ☐☐☐☐☐☐

Part III:

1. You found the knocked-out tooth and it is dirty:
   ☐ Wipe the tooth with a tissue paper
   ☐ Clean the tooth with a tooth brush
   ☐ Rinse the tooth gently under running tap water for a few seconds without scrubbing it.
   ☐ No need to clean the tooth because it is useless
   ☐ Others, please state .....

2. How would you hold the tooth?
   ☐ From the crown
   ☐ From the root
   ☐ Any where (crown or root)

3. Which of the following storage media are suitable to store a knocked-out tooth? (choose all possible alternatives)
   ☐ No need to store the tooth
   ☐ Tap water
   ☐ Warm water
   ☐ Cold water

- ☐ Water with a pinch of salt
- ☐ Ice
- ☐ Coke
- ☐ Milk
- ☐ Contact lens solution (saline)
- ☐ Disinfectant solution
- ☐ Physiologic saline solution
- ☐ Patient's mouth
- ☐ Wrap it with tissue paper or gauze
- ☐ Wrap it with plastic foil

4. If you were at a site where someone knocked-out a tooth, you would
   - ☐ Not take action because you lack knowledge and training
   - ☐ Not take action because of the medico-legal consequences
   - ☐ Be confident and replant the tooth
   - ☐ Not be confident but you would replant the tooth anyway