International Dental Education

Should Medical Students Be Educated About Dental Trauma Emergency Management? A Study of Physicians and Dentists in Kerman Province, Iran


Abstract: Since physicians sometimes need to attend a case of dental trauma, it is necessary that they possess sufficient knowledge of management of traumatic dental emergencies. This study was conducted to assess the knowledge of dental trauma among dentists and physicians. A three-part questionnaire, including demographic data, knowledge, and self-assessment, was administered to 104 dentists and 151 physicians in Kerman Province, Iran. Data obtained from 255 completed questionnaires were statistically analyzed using t-test, Mann-Whitney U test, chi-square, and Pearson correlation coefficient. Among the physicians, only fourteen (9.3 percent) had received education regarding dental trauma. In contrast, seventy-seven dentists (74 percent) had received information on what to do if a tooth is traumatized. Regarding knowledge level, only 10.6 percent of the physicians had high knowledge, while 66.3 percent of the dentists demonstrated high knowledge. The differences of knowledge level between the two groups were statistically significant (p=0.0001). More than half of the dentists (58.3 percent) and nearly all the physicians (98.7 percent) were dissatisfied with their level of knowledge and suggested that further education on the topic should be offered.

Keywords: clinical education, interdisciplinary education, interprofessional education, medical students, dental trauma, Iran

Submitted for publication 2/22/12; accepted 6/19/12

Among all facial injuries, traumatic dental injury (TDI) is the most common as demonstrated by population studies that found a prevalence for TDI ranging from 3.9 percent to 58.6 percent. Previous studies have also found that TDI has various biological, emotional, and psychosocial consequences. Simple emergency treatment of a traumatized tooth, such as the replantation of an avulsed permanent tooth, can ensure the best possible prognosis and reduce complications from injury. Unfortunately, previous studies have found that such primary care was not provided in up to 50 percent of cases that required first aid dental treatment. Moreover, 59 percent of patients received inadequate treatment. In a study by Traebert et al., only 28 percent of patients with dental trauma had received any interventions. Delays in first aid may be detrimental to the prognosis of a traumatized tooth. It is also important to consider the economic and psychosocial implications of delayed or inappropriate treatment. An Australian study that investigated the time lapse in emergency care for children with dento-alveolar trauma in a tertiary referral hospital reported that there was, on average, a 9.6-hour delay between incident and treatment.

After a traumatic dental injury, some patients are first referred to emergency rooms where physicians are potentially on the front line to provide emergency diagnosis and treatment for such patients. A study by O’Neil et al. found that 7.3 percent of emergency patients in the United States had sustained injuries to the structures of the oral cavity upon arriv-
al at the hospital. In Brazil, the occurrence of tooth injuries in patients treated in the hospital environment was found to be 6.5 percent. The development of knowledge among front-line staff in conjunction with the efficient training of practitioners would lead to improved management and more effective results for victims of dental trauma. International reports indicate that there is a gross lack of knowledge among people in various health care areas, including physicians and dentists, on management of traumatic dental emergencies. The importance of providing some dental knowledge to members of the medical profession has been widely acknowledged. However, with some exceptions, the inclusion of dental subject matter in medical student curricula has been limited or neglected. A basic knowledge of dentistry by medical practitioners in addition to a basic knowledge of medicine by dentists can improve communication between the professions.

Literature searches performed using Scopus, PubMed, Google Scholar, and Open Access Journals, focusing on articles through December 2011, provided no evidence for the knowledge level of dentists and physicians in emergency management of dental trauma in Iran. The aim of this study, therefore, was to evaluate the knowledge of physicians and dentists concerning first aid treatment of dental trauma in Kerman Province, the largest province of Iran.

**Methods**

This research represents a cross-sectional study of dentists’ and physicians’ knowledge in Kerman in 2010 regarding the treatment of dental traumas in emergency situations. The survey was approved by the Research Ethics Committee at Kerman University of Medical Sciences (code: K/87/152). The instrument for data gathering in this study was a questionnaire created by the researchers based on similar studies. The questionnaire included demographic information (age, gender, etc.), questions about knowledge (nine questions), and self-assessment questions (two questions). To estimate the content validity index, ten endodontists and pediatric dentists commented on each question. The content validity index of each question was 0.8 to 1, which confirmed the validity of the questionnaire.

A pilot study on twenty dentists and physicians was conducted. The participants acquired 60 percent of total score. In this regard, the sample size for $\alpha=0.05$ and $d=0.06$ was calculated as 262.

To determine the reliability of the questionnaire, a test-retest method was used. After two weeks, the subjects completed the questionnaire again, resulting in a Pearson correlation coefficient of 0.83. The internal consistency reliability with Cronbach’s alpha was greater than 0.60.

The Kerman Medical Council provided a list of dentist and physician members to the researchers. The list included only 125 dentists, of which we had access to 107 dentists. In addition, 155 physicians were randomly selected from the list to complete our sample size. All participants were given an explanation regarding the objective and potential benefit of the study and, after ensuring the confidentiality of information provided, the questionnaires were personally distributed to the participants at their place of work. All participants agreed to take part in the survey. The forms were completed and collected in one visit.

We used measures of central tendency and dispersion for data description as well as t-test, Mann-Whitney U test, and chi-square, in addition to Pearson correlation coefficients by means of SPSS 11.5 (SPSS, IBM, Chicago, IL, USA) for data analysis. A value of $p\leq0.05$ was considered to be significant. Each question had one correct answer that earned a score of 1, while the wrong answer earned a score of 0. From the nine questions, eight questions were created to rank the level of knowledge. Question 9 was removed due to its extensive content and many answer choices. Instead, this question was analyzed on its own. A score of 8 represented full knowledge, while a score of 0 indicated no knowledge. A score of 0 to 3 was identified as low knowledge, a score of 4 to 6 was identified as some knowledge, and a score of 7 or 8 was indicated as high knowledge.

**Results**

A total of 255 completed questionnaires were collected, representing a response rate of 97.3 percent. Seven questionnaires were excluded because of missing data. There were 104 (40.8 percent of total) dentist respondents and 151 (59.2 percent of total) physician respondents. The demographic characteristics are shown in Table 1.

The mean knowledge score for dentists regarding management of dental trauma was 6.79 (SD=1.19) and for physicians was 4.64 (SD=1.46) out of a total possible score of 8. Data indicated a high degree of knowledge for 66.3 percent of den-
dentists gave more correct answers compared to physicians. Differences between the study groups were significant except for egg white, contact lens solutions, normal saline, alcohol, and cell culture medium (p<0.05).

Of all physicians surveyed, only 20 percent reported that they would replant an avulsed tooth immediately at the scene of an accident compared to 91.3 percent of dentists. This difference was significant (p=0.0001). It is also worth noting that 58.3 percent of dentists and 98.7 percent of physicians were dissatisfied with their level of knowledge. Most of the participants felt that further education is needed on the topic.

### Discussion

Our study demonstrates that, despite the fact that 75 percent of the physicians surveyed had dealt with traumatic dental injuries, their knowledge level on the subject was significantly less than that of dentists. According to Flores et al., the prognosis of a traumatized tooth depends on the quality of the measures taken by the practitioner and the time elapsed between the accident and treatment. More than 66 percent of the dentists we surveyed had high knowledge about diagnosis and management of dental trauma. In sharp contrast, only 10.6 percent of the physicians fell into this category. This finding is consistent with the results of studies conducted in Kuwait, Pakistan, and Israel.16,17,22,24

| Table 1. Demographics and training experiences of study population |
|-----------------------------|-----------------------------|
|                             | Dentists   | Physicians |
| Gender                      | Number (%) | Number (%) |
| Female                      | 35 (33.7%) | 105 (30.5%) |
| Male                        | 69 (66.3%) | 46 (69.5%)  |
| Age                         |             |             |
| ≤35                         | 50 (48.1%) | 50 (33.1%)  |
| 36-45                       | 43 (41.3%) | 81 (53.6%)  |
| >45                         | 11 (10.6%) | 20 (13.2%)  |
| Received first aid training |             |             |
| Yes                         | 77 (74.0%) | 14 (9.3%)   |
| No                          | 27 (26.0%) | 137 (90.7%) |
| Had dental trauma experience|             |             |
| Yes                         | 94 (90.4%) | 113 (75.0%) |
| No                          | 10 (9.6%)  | 38 (25.0%)  |

**Figure 1. Knowledge level of physicians and dentists in study**

*Note: The differences are significant (p=0.0001).*
### Table 2. Knowledge questions on survey

**Case I:** A 9-year-old student fell down while walking, and as her face hit the pavement, she broke off the maxillary central tooth at the horizontal middle line of the crown. Otherwise, she is healthy, unhurt, and conscious.

**Q1.** The broken tooth is likely to be:
- a) Deciduous tooth
- b) Permanent tooth
- c) Do not know

**Q2.** Your immediate management of the case is:
- a) Refer the patient to a dentist without advising her to keep the tooth fragment.
- b) Advise the patient to save the tooth pieces or fragments and refer her to a dentist.
- c) Suggest the patient to have the tooth extracted.

**Case II:** A 12-year-old boy was punched in the face and had a tooth knocked out. There is some blood in his mouth. Otherwise, he is healthy, unhurt, and conscious.

**Q3.** The immediate emergency action you would take is:
- a) Stop the bleeding by applying gentle pressure with a cloth over the injury and advise the patient to rest.
- b) Stop the bleeding and then search for the tooth.
- c) Look for the tooth and put it back in its socket.
- d) Place the tooth in a handkerchief and refer the child to a dentist.
- f) Because of the hopeless prognosis, there is no need to replant the tooth.

**Q4.** Would you investigate if the child had a tetanus vaccine?
- a) Yes
- b) No

**Q5.** How urgent do you think it is to replant an avulsed tooth?
- a) Immediately
- b) Within a few hours
- c) Within the same day
- d) This is not a crucial factor

**Q6.** Would you care if a primary tooth is knocked out?
- a) Yes
- b) No

**Q7.** If the tooth has fallen on the dirty ground, what would you do?
- a) Rub away the dirt by a paper tissue and put it back into its socket.
- b) Clean the tooth with a toothbrush under tap water and put it back into its socket.
- c) Rinse the tooth gently under tap water and put it back into its socket.
- d) Discard the tooth.

**Q8.** How would you hold the tooth?
- a) By the crown
- b) By the root
- c) Not important (crown or root)

**Q9.** Which storage medium is appropriate for storing an avulsed tooth?
- a) Tap water
- b) Cold water
- c) Hot water
- d) Salt water
- e) Coconut water
- f) Ice
- g) Milk
- h) Disinfectant solution
- i) Patient saliva
- j) Egg white
- k) Coke
- l) Normal saline
- m) Alcohol
- n) Contact lens solution
- o) Plastic foils
- p) Cell culture media
- q) Wrap in paper tissue

**Note:** Correct answers are in italics.
in this scenario will lead to delay in replantation and would jeopardize the prognosis of the traumatized
tooth. Conversely, replantation of avulsed primary
teeth is contraindicated because of the risk of injury
to the underlying permanent tooth germ.

Although most of the participants were knowledgeable in this
regard, a significantly lower proportion of physicians
made a more correct response. When the avulsed tooth had come in contact
with soil, the majority of those surveyed said they
would rinse the tooth under tap water without rub-
ing it and put it back into its socket. Unfortunately,
about 10 percent of the physicians said they
would not make any effort to replant or preserve a tooth in
this situation. An attempt should be made to provide
training regarding this vital point.

Whenever immediate replantation is not pos-
sible, the avulsed teeth should be stored in a cell-
compatible medium. Some media that are proposed
to preserve avulsed teeth are milk, sterile saline,
saliva, cell-culture media, chicken egg white, contact
lens solution, salt water, coconut water, propolis,
and plastic foil.

There was a considerable
discrepancy regarding answers to the question
about appropriate storage media. Physicians were
significantly less knowledgeable about the types of
media than dentists. This finding is consistent with
previous studies in which physicians showed grossly
inadequate knowledge in this area. This finding reinforces
the need for an effective approach to increase the
knowledge base of physicians on traumatic dental
emergency management.

A rather negative finding in our study was
that about 40 percent of the physicians surveyed did
not know that a fractured incisor in a nine-year-old
student represents a permanent tooth. Knowledge
in this area was noticeably lacking and may lead to
neglect in timely and proper management of a per-
manent tooth, which affects long-term prognosis. It is
important for a practitioner to know that a fractured
fragment of tooth can be reattached. Approximately
37 percent of physicians and 22 percent of dentists
in our study responded that they would not attempt
to search for pieces of the fractured tooth. In the
study conducted by Subhashraj, 56 percent of med-
cal practitioners knew that a doctor could reattach a
tooth fragment.

Unfortunately, only 20 percent of the physi-
cians in our study reported that they would imme-
diately replant an avulsed tooth. About half of the
physician population was concerned with stopping
the bleeding. This may be the result of the basic
emergency life support training provided during their
medical education, which provides instruction and
practice in dealing with life-threatening bleeding in
trauma patients. Similar results were observed in
another study. However, controlling the bleeding
in this scenario will lead to delay in replantation and
would jeopardize the prognosis of the traumatized
tooth. Conversely, replantation of avulsed primary
teeth is contraindicated because of the risk of injury
to the underlying permanent tooth germ. Although
most of the participants were knowledgeable in this
regard, a significantly lower proportion of physicians
made a more correct response.

When the avulsed tooth had come in contact
with soil, the majority of those surveyed said they
would rinse the tooth under tap water without rub-
ing it and put it back into its socket. Unfortunately,
about 10 percent of the physicians said they
would not make any effort to replant or preserve a tooth in
this situation. An attempt should be made to provide
training regarding this vital point.

Whenever immediate replantation is not pos-
sible, the avulsed teeth should be stored in a cell-
compatible medium. Some media that are proposed
to preserve avulsed teeth are milk, sterile saline,
saliva, cell-culture media, chicken egg white, contact
lens solution, salt water, coconut water, propolis,
and plastic foil. There was a considerable
discrepancy regarding answers to the question
about appropriate storage media. Physicians were
significantly less knowledgeable about the types of
media than dentists. This finding is consistent with
previous studies in which physicians showed grossly
inadequate knowledge in this area. Professional
medical personnel can cause serious injury to PDL
cells by providing poor advice to trauma patients.
For example, more than half of the physicians sur-
veyed thought a tooth could be stored dry in a paper
tissue. Another surprising finding was that only 43
percent of our participants in the physician group

---

Table 3. Results of eight knowledge questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Dentists</th>
<th>Physicians</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
<td>Correct</td>
</tr>
<tr>
<td>Question 1</td>
<td>97.1%</td>
<td>2.9%</td>
<td>60.3%</td>
</tr>
<tr>
<td>Question 2</td>
<td>77.9%</td>
<td>22.1%</td>
<td>62.9%</td>
</tr>
<tr>
<td>Question 3</td>
<td>63.5%</td>
<td>36.5%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Question 4</td>
<td>88.5%</td>
<td>11.5%</td>
<td>83.4%</td>
</tr>
<tr>
<td>Question 5</td>
<td>74%</td>
<td>26%</td>
<td>31.1%</td>
</tr>
<tr>
<td>Question 6</td>
<td>87.1%</td>
<td>12.9%</td>
<td>61.3%</td>
</tr>
<tr>
<td>Question 7</td>
<td>92.3%</td>
<td>7.7%</td>
<td>70.9%</td>
</tr>
<tr>
<td>Question 8</td>
<td>98.1%</td>
<td>1.9%</td>
<td>73.5%</td>
</tr>
</tbody>
</table>

p-value determined by chi-square test

Note: All differences were statistically significant except for question 4 (p=0.26). See Table 2 for questions.
Figure 2. Correct answers to question about storage media by physicians and dentists

<table>
<thead>
<tr>
<th>Media</th>
<th>Dentists</th>
<th>Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt water</td>
<td>26</td>
<td>45.7</td>
</tr>
<tr>
<td>Milk</td>
<td>96.2</td>
<td>43.7</td>
</tr>
<tr>
<td>Contact lens solution</td>
<td>42.3</td>
<td>36.4</td>
</tr>
<tr>
<td>Saline</td>
<td>83.7</td>
<td>82.8</td>
</tr>
<tr>
<td>Coconut water</td>
<td>30.8</td>
<td>19.9</td>
</tr>
<tr>
<td>Egg white</td>
<td>26.9</td>
<td>22.5</td>
</tr>
<tr>
<td>Cell culture media</td>
<td>31.7</td>
<td>23.8</td>
</tr>
<tr>
<td>Plastic foil</td>
<td>89.4</td>
<td>71.5</td>
</tr>
<tr>
<td>Patient saliva</td>
<td>92.3</td>
<td>60.9</td>
</tr>
</tbody>
</table>

Figure 3. Incorrect answers to question about storage media by physicians and dentists

<table>
<thead>
<tr>
<th>Media</th>
<th>Dentists</th>
<th>Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tap water</td>
<td>53.8</td>
<td>51</td>
</tr>
<tr>
<td>Cold water</td>
<td>14.4</td>
<td>29.1</td>
</tr>
<tr>
<td>Hot water</td>
<td>14.4</td>
<td>27.8</td>
</tr>
<tr>
<td>Disinfectant</td>
<td>10.6</td>
<td>20.5</td>
</tr>
<tr>
<td>Ice</td>
<td>6.7</td>
<td>36.4</td>
</tr>
<tr>
<td>Coke</td>
<td>3.8</td>
<td>1.3</td>
</tr>
<tr>
<td>Alcohol</td>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>Paper tissue</td>
<td></td>
<td>15.4</td>
</tr>
</tbody>
</table>

Dentists: 53.8, 14.4, 14.4, 10.6, 6.7, 3.8, 1, 15.4
Physicians: 51, 29.1, 27.8, 20.5, 36.4, 1.3, 2.6, 51.7
chose milk as a proper storage medium even though milk has an osmolality within physiological limits. This improves the vitality of PDL cells during the extra-alveolar period.

We were surprised to find that about 99 percent of the physicians in our study were not satisfied with their knowledge of dental traumas and were interested in receiving more information on dental injuries. It may be indicative of a keen interest among them regarding the topic.

Some potential limitations of our study should be mentioned. The first concerns the use of closed-ended questions that do not allow the researchers to include all possible responses. Another limitation lies in the cross-sectional design of the study in which the participants are unlikely representative of their groups as they were recruited from only a single city.

In spite of these limitations, our study supports the findings of other authors in that the knowledge of physicians concerning emergency management of dental traumatic injuries is inadequate. Data indicate that this important topic is neglected in the education of physicians as primary caregivers. Special emphasis must be given to practitioners regarding the treatment of an emergency involving a traumatized tooth. An effective approach may be incorporating an educational course about dental trauma emergency management in the medical curriculum. Medical students at the predoctoral level could engage in interdisciplinary seminars and case discussions within dental departments. Moreover, providing leaflets, stickers, and posters about basic emergency treatment to professional care providers can broaden their knowledge on the topic. Distribution of informational brochures to emergency rooms may help the practitioners to deal with such traumatic events. Continuing education courses that are voluntary or mandatory are another possible way to accomplish this goal.

Well-informed practitioners who are able to handle emergency procedures in traumatic situations can help achieve a higher standard of care. Educational programs are essential for dentists as well in order to provide them with the latest information in dental traumatology and ensure effective treatment for patients with tooth injuries.

**Conclusion**

The members of a medical staff must be able to provide simple emergency care following dental trauma. Unfortunately, the data from this survey indicate that few physicians possess high knowledge on immediate management of traumatized teeth. This important epidemiologic finding should serve as a warning. It highlights the urgent need to develop strategies to improve physicians’ knowledge and ensure adequate treatment for patients with tooth injuries.

**Acknowledgments**

The authors wish to thank the Research Committee of Kerman University of Medical Sciences for financial support; Joanna Cory Aceto, who undertook the burden of proofreading the article; and the physicians and dentists for their participation and kind cooperation in our study.

**REFERENCES**