

Dental trauma education intervention as a positive influence among undergraduate students

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ABSTRACT

Objective: To investigate the effect of dental trauma educational intervention among undergraduate students of a Federal University in Brazil. **Materials and Methods:** Students ($n = 125$) enrolled in the dentistry ($n = 70$), nursing ($n = 33$), and speech therapy ($n = 22$) courses were invited to attend a dental trauma lecture and also to answer a questionnaire about their confidence in managing crown fracture and tooth avulsion, before (T0) and immediately after (T1) the lecture. McNemar's test ($P < 0.05$) with logistic regression compared the answers between the courses. **Results:** Female gender (78.4%) aged from 18 to 22 years (73.6%) predominated among all the participants. Dentistry students scored higher correct answers (54.3%) in T0 when compared to nursing (12%) and speech therapy (9%) students, concerning the storage medium for tooth fragment transportation. Likewise, few dentistry students (22.9%) and no nursing and speech therapy students knew about the ideal storage medium for an avulsed tooth when immediate replantation was unviable. After educational intervention, a significant improvement was found between T0 and T1 ($P < 0.001$) for all courses, mainly regarding tooth avulsion with almost 100% of correct answers. Furthermore, logistic regression demonstrated that dentistry students had three times more knowledge absorption than nursing and speech therapy ones. **Conclusions:** The educational intervention demonstrated a significant positive impact regarding the knowledge of dental trauma emergency management among health students. Accordingly, it is essential to spread this information among health professionals to save teeth, especially in cases of avulsion.

Key words: Crown fracture, dental trauma, lecture, questionnaire, tooth avulsion, undergraduate students

INTRODUCTION

During the last decade, dental trauma has been reported to occur in an expressive part of the population around the world (4.5%–17.5%), even interfering in their quality of life.^[1-3] Among the types of dental trauma that can affect the population throughout their daily practice, especially during sports activities at schools and universities, the most common and severe

types consist of tooth fractures (34.5%–62.2%) and tooth avulsion (9%–11.7%), respectively.^[4,5] In these circumstances, it is well known that higher success prognosis rate has been closely related to the correct management of the traumatized tooth in the local of the incident, immediately after the dental trauma.^[6] However, most of the population in direct contact

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with these accidents cannot accurately perform the correct emergency conduct for these cases, including health professionals.^[7,8]

Taking this into consideration, it is essential that different communities, including educational and health professionals, should be prepared and well informed to render the appropriate conduct front a dental trauma situation. Nevertheless, studies have shown the lack of information and knowhow in dental trauma emergency care of teachers, athletes, rescue staff, paramedics, educators, sportive coaches, physicians, nurses, and dental professionals.^[9,10] These findings characterize an alarming situation that might lead to irreversible damages to the affected tooth that did not receive the appropriate treatment in the local of the accident.^[7-10] In addition, health professionals might be frequently requested to help in accidents involving tooth injury, so they might know the emergency procedures to save traumatized teeth preventing posttraumatic complications. Thinking in this way, it is important to start teaching dental trauma emergency protocols to undergraduate health students so that they can be prepared to act when this situation happens.^[11,12]

It is also worth to mention that unlike dental caries and periodontal disease, which may be directly prevented, dental trauma incidents may not be predicted. Therefore, educational programs aiming to develop the population knowledge regarding the correct conduct in cases of dental trauma emergency may be the initial pathways to prevent its complications.^[13-15] In Brazil, several studies in different parts of the country (e.g., Minas Gerais, Paraíba, Pernambuco, Santa Catarina) have demonstrated high occurrence of traumatic dental injuries among children; however, no study in the State of Sergipe has focused its attention to the knowledge of some future health professionals, mainly considering the high prevalence (40.5%) of dental trauma in Sergipe.^[16-19] Hence, this study investigated the effect of educational intervention among undergraduate students, from three health courses, of a Federal University in Brazil, including lecture presentation and question-and-answer sessions, to promote awareness regarding emergency measures concerning tooth avulsion and tooth crown fractures.

MATERIALS AND METHODS

The present study was approved by the research ethics committee at a Federal University in Brazil.

Educational intervention lecture regarding dental trauma emergency management was carried out in a Federal University in Brazil to a total of 125 undergraduate students of three health courses: dentistry ($n = 70$), nursing ($n = 33$), and speech therapy ($n = 22$). All the participants signed written consent form and all of them maintained their right to withdraw from the study at any time. Besides the lecture, the assessment was performed using a dual-part questionnaire: The first part contained the participants' demographic information and the second part was related to the awareness, knowledge, and attitude toward dental trauma emergency protocol for tooth crown fractures and tooth avulsion. In this second part, particular focus was presented on storage medium transportation for crown fractures fragments and tooth avulsion [Table 1]. Briefly, the questionnaire application was divided in three phases: pretest (T0), intervention, and posttest (T1). The pretest and posttest were carried out through the application of the mentioned questionnaire which was taken immediately before and after the lecture. This informative lecture was presented in Portuguese language during 40 min by one of the authors, regarding general concepts of dental trauma and how to deal in an emergency situation of crown fracture and avulsion injuries. A computer, a projector, and a screen were used to perform the lecture. The presentation was finished with a question-and-answer discussion and an audience to discuss the remaining doubts of the participants. The results were tabulated and a McNemar's test with logistic regression was used to compare the responses between the graduation courses before and after the intervention, with the significance level set at 5% ($P < 0.05$).

RESULTS

The demographic data indicated that most of the participants (56%, $n = 70$) were dental school students (nursing, $n = 33$, 26.4%; speech therapy, $n = 22$, 17.6%) aging from 18 to 22 years (74%) and belonged to the female gender (78.4%). Table 2 demonstrates the information related to the answers obtained before and after the intervention lecture (Part II of the questionnaire). Regarding the storage selection to transport tooth crown fragment, 78% of the students recognized, before the intervention lecture (T0), the importance of carrying it to a dentist; however, only 35.2% would transport the fragment correctly, and 36.8% believed that dry storage selection was the most appropriated transportation

Table 1: Questionnaire containing personal information and knowledge of dental trauma**Questionnaire about the knowledge of dental trauma**

Graduation course

1. Dentistry
2. Nursing
3. Speech therapy

Age

1. 18-22 years
2. 23-30 years
3. >30 years

Gender

1. Male
2. Female

If you break off a part of your tooth, and find the dental fragment, what would you do?

1. Take the fragment to the dentist
2. Do not take the fragment to the dentist
3. Another

How should a "broken" fragment be transported?

1. Wrapped in a napkin
2. Water
3. Inside a dry container
4. Milk
5. Another

If a friend suffers a blow and his/her tooth completely fall out, what would you do?

1. I would look for the tooth, wash it with soap and take to the dentist
2. I would look for the tooth, replant it and take to the dentist
3. I would not look for the tooth and immediately take to the dentist
4. I would look for the tooth, wrap it in a napkin and take to the dentist

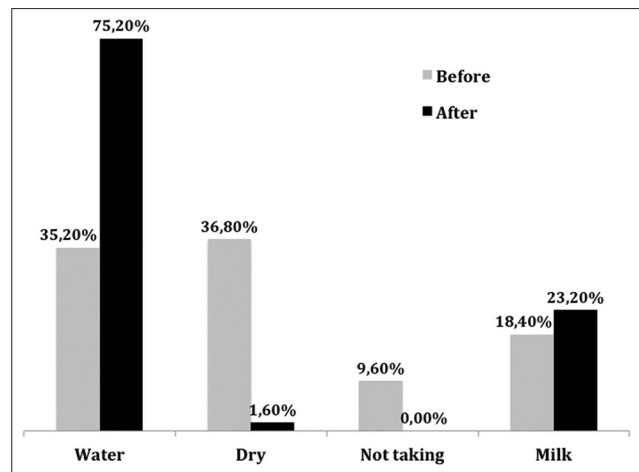
Considering the anterior situation, if you find the tooth covered by dirt, what would you do?

1. I would gently wash the tooth with toothbrush
2. I would wash the tooth in tap water
3. I would replant the tooth without pretreatment
4. I would wash the tooth with soap

Considering the anterior situation, if you did not replant the teeth, how would you transport it to the dentist?

1. Ice
2. Water
3. Paper
4. Milk
5. In the mouth of the children
6. Saline solution
7. Alcohol

form in this case [Table 2 and Figure 1]. Pondering each course separately, dentistry students showed higher percentage (54.3%) of correct answers before the lecture (T0) when compared to nursing (12%) and speech therapy students (9%), concerning storage medium for tooth fragment transportation [Table 3]. After educational lecture, a significant improvement of knowledge was observed from baseline (T0) to postlecture evaluation (T1) ($P < 0.001$) with almost all the participants understating the importance of carrying the fractured tooth to dentist (97.6%) in water (75.2%) [Table 3 and Figure 1].

**Figure 1:** Crown fracture fragment transportation answers before (T0) and after (T1) lecture

Regarding tooth avulsion, it was observed that before the lecture, the participants showed unsatisfactory awareness (24%) concerning the correct conduct in cases of tooth avulsion, which should be replanted in the moment of the trauma [Table 2]. However, the big majority (84%) recognized that a dirty avulsed tooth should be carefully washed and managed before the replantation [Table 2]. Proceeding on this track, before the lecture, only 13% of all the participants affirmed that they would store an avulsed tooth in milk; however, after the lecture, almost all the students (98%) were able to identify the correct storage media to transport avulsed teeth [Figure 2]. Describing apart each course, it was possible to see that before the lecture, few dentistry (22.9%) and no nursing and speech therapy students knew about the ideal storage medium (milk) for avulsed tooth transportation when immediate replantation was unviable. After educational intervention, a significant improvement was found between the baseline (T0) and postlecture evaluation (T1) ($P < 0.001$), for all the evaluated courses, with almost 100% of correct answers [Table 3].

Furthermore, logistic regression after the lecture demonstrated that dentistry students presented 3.28 times more capability of knowledge absorption when compared to nursing and speech therapy ones. In addition, nursing and speech therapy students showed 63% and 71% less knowledge about fracture first-aid knowledge than dentistry students, respectively.

DISCUSSION

Dental trauma represents an accidental episode usually associated with undesirable effects (e.g., crown

Table 2: Distribution of the correct and incorrect answers regarding dental trauma emergency knowledge before and after the dental trauma lecture (n=125)

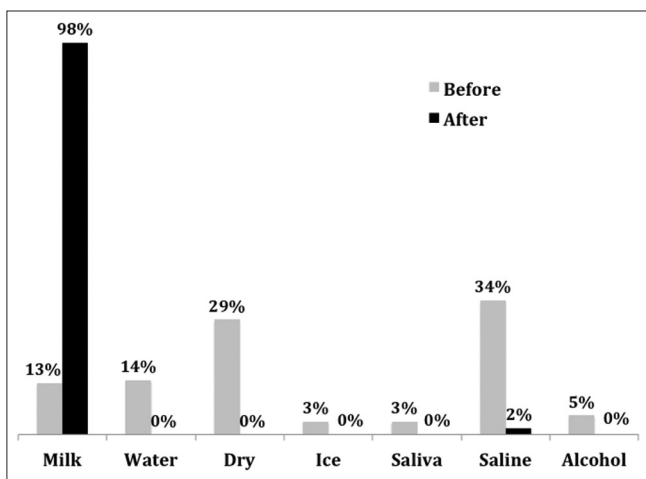
Questions	T0 (%)		T1 (%)	
	Correct	Incorrect	Correct	Incorrect
Carry fractured crown fragment to dentist	100 (78)	25 (22)	124 (97.6)	124 (97.6)
Storage medium for fractured fragment	44 (35.2)	56 (64.8)	73 (75.2)	73 (75.2)
Immediate replantation of avulsed tooth	26 (20.4)	74 (79.6)	115 (90.5)	115 (90.5)
Management of messy avulsed tooth	107 (84)	18 (16)	127 (100)	127 (100)
Storage medium for avulsed tooth	16 (13)	109 (87)	127 (100)	127 (100)

T0: Before, T1: After

Table 3: Descriptive analysis of the answers according to the courses before and after the dental trauma lecture

Knowledge	Dentistry (n=70)			Nursing (n=33)			Speech therapy (n=22)		
	T0, n (%)	T1, n (%)	P*	T0, n (%)	T1, n (%)	P*	T0, n (%)	T1, n (%)	P*
Crown fracture	38 (54.3)	49 (70.0)	0.0009	4 (12.1)	22 (66.7)	<0.001	2 (9.1)	22 (100.0)	<0.001
Avulsion	16 (22.9)	70 (100.0)	<0.001	0 (0.0)	31 (93.9)	<0.001	0 (0.0)	22 (100.0)	<0.001

*McNemar's test. T0: Before, T1: After

**Figure 2:** Tooth avulsion storage medium answers before (T0) and after (T1) the lecture

discoloration, pulp necrosis, root resorptions, and partial or complete loss of the injured teeth).^[7,20] Some of these consequences, especially the root resorption, may lead to an undesirable condition, the tooth lost. Thus, situations like this could be largely prevented by spreading information to the populace regarding the ideal management front an emergency dental trauma situation, specially tooth avulsion and fractures. Furthermore, health professionals should be aware of emergence dental trauma conduct since they might be demanded when it happens.^[7,13-15]

In this scenario, preventive lectures, mainly to those communities directly connected to the most susceptible group suffering dental trauma (children), seem to be a pathway to decrease the possible damages caused by dental injuries. Facing this reality, the present study applied questionnaires before and after a dental

trauma emergency lecture to compare the preliminary and afterword knowledge of the participants regarding the correct conduct to be followed in dental trauma situations to 125 undergraduate students from health courses of Lagarto, a city in the state of Sergipe, Brazil. In general, before the lecture, the participants showed lack of knowledge regarding dental trauma first-aid management, where <50% of the undergraduate health students were able to specify the correct protocol to transport fractured crown fragment and avulsed tooth.

Concerning the transportation of a crown fractured fragment, 46 subjects (36.8%) affirmed that the best way to carry the fragment would be under dry conditions, demonstrating lack of knowledge regarding this topic. It is important to mention that dehydration conditions may interfere in the prospect tooth adaptation and restoration. As a matter of fact, the dental trauma management guidelines, published by the International Association for Dental Traumatology (IADT) and the American Academy of Pediatric Dentistry (AAPD), advocates that the fractured fragment reattachment to the tooth is considered the first option to achieve better esthetic and functional reestablishment for the traumatized patient.^[6]

Seeking this ideal treatment, it was observed, after the lecture, an expressive increase in the selection of the correct protocol (take the fragment hydrated to the dentist) by the students, attaining a correct rate of almost 100%. Previous studies have demonstrated opposite results about the knowledge on crown fracture transportation with greater (48.6% and 64.86%) confidence on managing fractured tooth with Hong

Kong and London students, respectively.^[11,13] Besides the good hydration properties provided to the fragment by water or saline solution, the literature recently demonstrated an alternative, the egg white, which may also be suitable as a transportation medium for coronary fragments, contributing positively to the future adhesion of restorative material during dental attachment.^[21]

The design of this study also focused on the knowledge of tooth avulsion management, and unfortunately, this aspect still remains unknown among most of the participants since only 20.4% recognized the importance of replantation of an avulsed tooth before the lecture. This finding corroborates with a previous study, which showed that only 3% of sports and medical university students have been instructed about replantation.^[22] Moreover, when replantation is impracticable, IADT and AAPD recommend to store the avulsed tooth in milk;^[23] however, most of the students (33.60%) believed that the saline solution could be the ideal storage medium for tooth transportation before the lecture. These results suggest the lack of knowledge concerning saline solution detrimental effects on periodontal ligament cells, which does not afford good osmolality features for their survival, a mandatory factor for better prognosis of the replantation, preventing ankylosis and root resorption.^[24] This assumption was similar to international scenario that has examined dentistry undergraduate students from all over the world, encountering that only 26.9%, 22.3%, and 20% of Saudi Arabian, Hong Kong, and Japanese undergraduate students, respectively, have known the proper method to transport an avulsed tooth.^[12,13,25] Although the baseline scores (T0) were low, after the lecture (T1), the correct conduct increased to 90.5%, demonstrating positive feedback from the students after the intervention lecture.

To our knowledge, scarce investigations have evaluated the acquaintance of dental trauma management among undergraduate students from general health courses, so the present study decided to include nursing and speech therapy students, which constantly works with urgency situations and oral cavity conditions, respectively.^[7,22] Based on the results presented in this study, it became clear the critical necessity to disseminate knowledge regarding dental trauma first-aid management in the university community. Forthcoming, students awareness regarding dental trauma should not be limited only to lectures but must also be spread throughout the

technology apps and educational methods based on problem-based learning, to effectively prevent dental trauma complications.

CONCLUSIONS

Within the limitations of this study, it is reasonable to conclude that most of the undergraduate students did not present previous awareness about first-aid management of crown fracture and tooth avulsion. However, the dental trauma educational intervention disclosed a positive impact in the knowledge acquisition regarding the emergency conducts mainly in cases of tooth avulsion. Hence, educational programs should be developed for college students in the health area to encourage them to correctly conduct an emergency dental trauma episode.

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Conflicts of interest

There are no conflicts of interest.

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