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Evaluation of the knowledge of elementary education teachers on tooth avulsion and replantation

Simone Scandiuzzi,[1] Lívia Gonçalves Coelho Sampaio,[1] Monaliza Barreto Moreira,[1] Regiane Cristina do Amaral,[1] Rodrigo Dutra Murrer[1]

[1]Department of Endodontics, Doutor Leão Sampaio University, Juazeiro do Norte, CE, Brazil

• Conflicts of interest: none declared.

Abstract

Objective: this study is a quantitative cross-sectional survey with elementary school teachers from municipal schools of Juazeiro do Norte – CE. **Material and Methods:** a questionnaire was applied in order to verify the knowledge of these professionals about the procedures to be performed in relation to avulsion and tooth replantation. **Results**: this study was carried out with 97 teachers. Most of these educators answered that the dentist is the first professional to be referred to in case of dental trauma, but only 46.4% considered that the avulsed tooth should have immediate care. Of the respondents, 75.3% would not replant the tooth or were not sure that they would do it. Regarding the handling of an avulsed tooth, only 24.7% would rinse the tooth abundantly in running water, 41.2% of the teachers would store it in a dry environment, wrapping it in a piece of paper; none would put in the student's mouth, and 58.7% would store in a liquid. In relation to the humid transport medium, 23.7% would carry it in saline, 24.7% in tap water, 6% in milk, and 4.1% in alcohol. **Conclusion:** a few teachers were able and declared to be trained on the correct conducts in the face of a dental trauma situation, and many presented low level of knowledge about the procedures to be followed in these cases. Therefore, it is necessary to make greater efforts in the dissemination of information by health professionals, in order to broaden knowledge about the subject.

Keywords: Tooth avulsion; Knowledge; Tooth replantation.

Introduction

The prevalence of dental traumas has been substantially increasing in recent years, affecting children and adolescents due to the increase in sports practicing, falls, bicycle and automobile accidents, and violence.[1-5] Traumatic dental injuries are special situations that require immediate treatment and a long-period follow-up, as they can generate serious physical and psychological consequences to patients, causing emotional stress to family members, in addition to high rehabilitation costs.[1,6]

In the presence of dental trauma, oral structures suffer damage on the impact, which may cause changes in pulpal and periodontal tissues, requiring a proper emergency care and treatment. Treatment may only be the diagnosis of pulpal and periodontal status, requiring from a palliative conduct to more complex treatments, to sustain the dental element in its formal functions.[4] The most common traumatic dental injuries are coronary fractures involving enamel and enamel/dentine. However, some injuries can be more severe, such as avulsion and tooth intrusion, which require immediate emergency care since they can generate irreversible damage to pulpal and periapical tissues, even leading to tooth loss.[8,9]

The ideal treatment for avulsed teeth is the immediate replantation by the own injured person or by anyone at the scene of the accident; if this is not possible, the conservation of the tooth in an appropriate storage medium is recommended. [7-9]

Extra-alveolar time directly influences the prognosis, since the greater the length of stay out of the alveolus, the worse the chances of healing.[10,11] Thus, the pulpal tissue necrosis and the cells of the periodontal ligament increase the reabsorption processes, being this the main cause of loss of replanted teeth.[12] The occurrence of necrosis on pulpal, periodontal ligament cells, and cement tissues increases the possibility of root reabsorption, being this the main cause of loss of replanted teeth.[12] That is why the emergency treatment is crucial in trying to keep the tooth, where a successful replantation precedes the immediate action of the injured person of those at the scene of the accident. They depend on an immediate response of the injured person in performing the own replantation, or of the people at the scene of the accident. Also, in the cases where the immediate replantation is not possible, the handling of the traumatized teeth is of equal importance to keep the periodontal ligament fibers viable.

Knowledge on the ready care of traumatic injuries guarantee agility and correct management of the traumatized teeth, being important to disclose these information to people who deal daily with children and adolescents, as well as for lay people. The literature reviews a deficiency in the knowledge of teachers and health professionals about dealing with traumatic lesions in deciduous and permanent dentition.[3,5,13-16] Thus, this study aims to verify the knowledge of elementary school teachers of public schools in Juazeiro do Norte - CE, concerning the steps to be taken after a dental trauma, and to develop an educational-preventive action on dental trauma for children and teachers, hoping to raise awareness in the face of this growing public health problem.

Material and Methods

The study was submitted to the Research Ethics Committee of Centro Universitário Doutor Leão Sampaio, obtaining the approval No. 1.759.0788, and the volunteers who wished to participate in the study signed an ICF (Informed Consent Form).

A study by convenience samples was performed, from October 2016 to February 2017, with the elementary school teachers of public schools in the municipality of Juazeiro do Norte - CE.

Ninety-six teachers (older than 18) participated in the study, without gender distinction, and responded a questionnaire with objective questions on the main theme of dental trauma.

The assessment tool was the application of a questionnaire to the teachers, with objective (simple and multiple choice) questions, divided into two parts. Part I, containing questions about age, gender, educational level, and first aid knowledge. Part II, containing basic questions about the importance of emergency care for dental trauma, experience with dental avulsion and what they would do in such a case, and two questions simulating clinical cases of coronary fracture and permanent teeth avulsion. Data analysis was through descriptive means (percentage).

Results

Of the 96 participant teachers, 75% did not receive information on dental trauma, most were women aged from 30 to 49 years old, and had 6 – 20 years of professional experience (Table 1).

Table 1. Frequency distribution by gender, age, and educational level of elementary school teachers of Juazeiro do Norte (CE)

VARIABLES	GENDER		TOTAL	%
	F	M		
Age				
Below 20 years old	**0**	**1**	**1**	**1.0**
20 to 29 years old	**15**	**6**	**21**	**21.6**
30 to 39 years old	**18**	**11**	**29**	**29.8**
40 to 49 years old	**28**	**6**	**34**	**35.2**
Over 50 years old	**8**	**4**	**12**	**12.4**
Overall total	**69 (71%)**	**28 (29%)**	**97**	**100**
Professional experience				
Less than 01 year	**3**	**0**	**3**	**3.1**
From 01 to 05 years	**23**	**17**	**40**	**41.2**
From 06 to 20 years	**33**	**8**	**41**	**43.3**
From 21 to 30 years	**7**	**3**	**10**	**10.3**
Over 30 years old	**3**	**0**	**3**	**3.1**
Had info on the topic "dental alveolus trauma"?				
Received instructions on dental trauma	**17**	**7**	**24**	**25**
Did not receive	**52**	**21**	**73**	**75**

Most teachers answered that the dentist is the first professional to which the injured should be referred in case of dental trauma. Only 46.4% considered that the avulsed tooth should be immediately taken care of; 75.3% would not replant the tooth or were not sure if they would do it, even though 52.6% knew the meaning of tooth replantation; and 51.5% claimed to know the difference between a milk and a permanent tooth (Table 2).

Table 2. Frequency distribution of the emergency actions of elementary school teachers of Juazeiro do Norte - CE on situations of dental avulsion and replantation

VARIABLES	TOTAL	%
If one of your students showed up with a tooth in hand after suffering an accident, what would be the first place to contact for treatment?		
Doctor	6	6.2
Dentist	47	48.5
Pediatric Dentist	16	16.5
Hospital	28	28.9
Dental Clinic of a Higher Education Institution	0	0
When do you consider to be ideal searching for service if a permanent tooth is avulsed (fell from the mouth)?		
Immediately	45	46.4
Within 30 minutes	16	16.5
Within a few hours	23	23.7
Until the next day	11	11.3
What is dental replantation?		
It is a tooth transplant	15	15.5
It is putting another tooth in the mouth	17	17.5
It is replacing a tooth by another	14	14.4
It is the replacement of the same tooth in the mouth	51	52.6
Would you replant the avulsed tooth in the place from where it fell?		
Yes	24	24.7
No	40	41.2
Not sure	33	34.1
Do you know how to differentiate a deciduous (milk) tooth from a permanent tooth?		
Yes	50	51.5
No	28	28.9
Not sure	19	19.6

Regarding avulsed tooth managing, only 24.7% would rinse the tooth abundantly in running water, 17.5% would throw it in the garbage, and 23.7% would not know what to do. Concerning the avulsed tooth storage, 41.2% of the teachers would storage it in a dry environment, involving it on a piece of paper; none would put it in the student's mouth, and 58.7% would store it in a liquid. As for the humid transportation medium, 23.7% would carry it in saline, 24.7% on running water, 6% on milk, and 4.1% on alcohol (Table 3).

Table 3. Frequency distribution of the emergency conducts of elementary school teachers on packaging the avulsed tooth and clinical situations

VARIABLES	TOTAL	%
Suppose you decided to put it back, but as it fell to the floor the tooth is covered in dirt; what would you do?		
I would brush it gently with a toothbrush	16	16.5
I would wash the tooth with soap and detergent	14	14.4
I would rinse the tooth abundantly in running water	24	24.7
I would replace it in its socket without doing anything	3	3.1
I would throw it in the appropriate trash can, to avoid contamination	17	17.5
I would not know what to do	23	23.7
If you think you could not put the tooth back in place, how would you transport it?		
In a container with water	24	24.7
Wrapped in a paper napkin	40	41.2
In a container with milk	6	6.2
In a container with alcohol	4	4.1
In a container with physiological solution (saline)	23	23.7
In the student's mouth (saliva).	0	0.0
Clinical case No. 1: A 9-year-old child fell and hit its face during the recess and broke the upper front tooth, with no injuries or consciousness loss. What would be the most appropriate conduct in this case?		
Calming the child down, taking it back to class, and contacting the parents	15	15.5
Contacting the parents and advising them to seek a dentist immediately	60	61.9
Searching for the pieces of the broken tooth and placing them in a container with water, contacting the parents, and referring to the dentist	14	14.4
Contacting the parents after class and explaining what happened	8	8.2
Clinical Case No. 2: during the school hours, a 12-year-old girl fell down the stairs and injured her mouth. Her mouth bleeds and it looks like she lost a upper front tooth.		
Searching for the tooth, washing it, and giving it to her to take home.	18	18.6
Searching for the tooth and putting it back on place, calling the parents and advising to seek a dentist immediately	8	8.2
Trying to stop the bleeding, contacting the parents, and sending the girl home.	21	21.6
Searching for the tooth and putting it in a container with liquid, contacting the parents, and sending the girl to the dentist immediately.	21	21.6
Searching for the tooth and wrapping it in a paper or towel, contacting the parents, and sending the girl to the dentist immediately.	29	29.9

Table 3 presents the questions in which two dental trauma situations were hypothetically simulated to assess the conduct and knowledge of the teachers. In Case 1, it was verified the best course of action to be taken by teachers regarding the following case: a 9-year-old child fell and hit its face during recess, breaking the upper front tooth, with no injuries or loss of consciousness. About 60% answered that they would firstly contact the parents and advise them to seek a dentist; of these, only 14.4% would search for the broken pieces of tooth, placing it in a container with water, and then contacting the parents and referring to the dentist.

In case 2, it was assessed the best course of action to be taken by the teachers in the following case: a 12-year-old girl fell down the stairs and hurt the mouth, and there was

bleeding and dental avulsion. Only 8.2% would put the tooth back on its place, call the parents and advise them to seek a dentist immediately, indicating urgent replantation. About 20% would store the tooth in humid medium, 29.9% in dry medium, and send the child to the dentist immediately.

Discussion

Currently, there is vast literature on knowledge and managing limitations regarding traumatized teeth by health professionals and lay people,[3,5,14-16] showing disturbing data that were confirmed by this study.

The results confirmed the little knowledge on dental trauma in the formation of elementary school teachers, revealing that 75% of the interviewees did not have enough information to perform the proper management, similarly to prior studies.[8,16]

Only 46.4% of them considered that the avulsed teeth must have immediate care, 75.3% would not replant the teeth or were not sure if they would do it - even though 52.6% knew the meaning of tooth replantation. This is troubling, since the school is considered a key place that possibly favors dental trauma, due to the involvement of children in physical and social activities.[17] These results indicate the need for including this theme in first aid orientations on dental trauma during the pedagogic formation of the teachers.

In the last decades, literature has showed that treatment for avulsed teeth consists in replanting the tooth immediately, trying to reintegrate it in its original anatomic position, thus keeping its integrity and function.[18] However, the success rate is low, ranging from 5% to 50%, as the teeth are rarely immediately replanted at the scene of the accident.[1,7] In our study, there was a low index of dental replantation, similarly to other studies in the literature.[8,14] Late replantation can be performed, leading – due to the severe damage in the periodontal ligament cell fibers – to a greater risk of complications such as substitution reabsorptions and ankylosis.[10]

The extra-alveolar period affects directly the periodontal ligament cells variability, which may compromise the treatment prognosis since they are essential for the cicatrization conditions.[7] Consequently, the greater the extra-alveolar period, the greater the risk of necrosis and root reabsorption, possibly even leading to dental loss.[10] Periodontal ligament fibers remain viable in human beings, if the tooth is kept in a storage medium for up to 60 minutes, or 15 minutes in a dry medium.[18] About 50% of the interviewed teachers reported that the ideal time to search for treatment was immediately after trauma.

When not possible to perform the replantation, the tooth must be kept in a liquid medium in which its pH, osmolarity, and metabolism are physiologically sustained, and transported to the dentist, who should replant it as soon as possible.[7]

The main transportation means are: a) Tap water: it causes a rapid cell lysis; b) Saliva: it maintains the periodontal ligament (PDL) vitality for up to 20 minutes c) Isotonic saline solution: properties superior than those of tap water and saliva, considering a 20-minute period after avulsion; d) Milk: it has proteins, enzymes, osmolarity, and pH that contribute to sustain the PDL vitality for up to 6 hours, being considered one of the best transporting/storing medium; e) Hank's and Viaspan balanced saline solution: it extends the PDL vitality and enables the non-absorption of the avulsed tooth for up to a 24-hour extra-alveolar period.[19,20] Concerning humid transporting medium, 58.7% of the teachers would store it in a liquid – being 23.7% in saline, 24.7% in running water, 6% in milk, and 4.1% in alcohol. Milk preserves the periodontal ligament viability for up to a 6-hour extra-alveolar period, and when compared to saliva, it is superior due to the smaller amount of bacteria.[20] Other storing media such as ice, plastic bags, and sterilizing solutions (chloramine, alcohol, cetavlon) proved to be inefficient.[3]

Only 24.7% of the interviewees would rinse the tooth thoroughly under running water. According to the literature, before replanting the avulsed tooth it must be irrigated with saline solution, due to the ability of bacteria to adhere to the periodontal ligament, which may result in inflammatory reabsorption.[13] About 20% of the interviewees would toss the tooth in the garbage, and 23.7% would not know what to do. Concerning avulsed tooth storage, 41.2% of the teachers would keep it in a dry environment, involving it on a piece of paper. This is the worst procedure to be taken since it facilitates the dehydration of dental tissues and, consequently, the periodontal ligament cells death and replantation failure. These results corroborate with other studies.[3,14]

In the hypothetical situation of a clinical case of coronary fracture, most educators replied that they would firstly contact the parents and advise them to seek a dentist; of these, only 14.4% answered they would search for the broken pieces of tooth, placing it in a container with water, for then contacting the parent and refer the child to the dentist.

In the hypothetical clinical case of dental avulsion, only 8.2% would replace the tooth and 21.6% would store it in a humid medium. Similar results were observed in studies on dental avulsion, demonstrating once again the lack of knowledge on dental trauma managing.[3,14]

Schools are a promising place for the development of educational programs regarding oral health and dental trauma prevention since a number of children and adolescents attend it daily, in addition to parents, teachers, and the entire community involved. There are opportunities, throughout school life, of developing basic health knowledge to increase self-esteem, improve social behaviors, and develop new life

skills. A billion children are in schools all over the world, in addition to teachers, students' parents, and involved community. Programs concerning health promotion and prevention might strengthen, Moreover, these programs can humanize the school environment and implement practices and policies that offer multiple opportunities for health.[21]

This study developed a social-educational action on oral health, in partnership with the extension project: "Dental Trauma: Prevention and Treatment", which sought through educational lectures, posters and leaflets to direct important information on dental trauma; the responsiveness of both children and teachers was considered satisfactory.

Conclusion

Within the study limitations, it was found that few teachers were able and declared to be trained on the correct conduct in the face of a dental trauma situation, and many presented a low level of knowledge on procedures to be followed in such cases. Therefore, it is necessary to extend the knowledge on health promotion and maintenance, and on dental trauma prevention. One of the strategies to change the current scenario of lack of knowledge is the overall first aid training and the educational campaigns about dental trauma in schools and in the community. In addition to a formal and continuing education to improve teachers' knowledge and emergency conducts on children dental trauma, another way to achieve a proper awareness is the distribution of educational posters and leaflets in schools.

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Mini Curriculum and Author's Contribution

1. Simone Scandiuzzi - DDS and MSc. Contribution: bibliographical research, experimental procedures, manuscript writing, manuscript review, paper submission.
2. Lívia Gonçalves Coelho Sampaio - DDS. Contribution: bibliographical research, experimental procedures.
3. Monaliza Barreto Moreira - DDS. Contribution: bibliographical research, experimental procedures.
4. Regiane Cristina do Amaral - DDS and PhD. Contribution: bibliographical research, statistical analysis, manuscript review.
5. Rodrigo Dutra Murrer - DDS and PhD. Contribution: manuscript writing, manuscript review, paper submission.

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Corresponding Author

Simone Scandiuzzi

E-mail: simonescan@gmail.com