Knowledge of physical education teachers about emergency management of tooth avulsion

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ABSTRACT

A great number of traumatic dental injuries occur at school, during sports-related activities. However, physical education teachers are often not prepared to provide emergency management of dental trauma in general and of tooth avulsion in particular. The aim of this study was to assess the knowledge of emergency management of tooth avulsion among physical education teachers at public and private schools of a city in southern Brazil. A questionnaire covering personal and professional information and eight multiple-choice questions to assess knowledge of emergency management of tooth avulsion was sent to 217 physical education teachers. Of a total of 217 questionnaires distributed, 102 returned. Only 23.5% of the teachers had received prior information on dental trauma. When asked about the first action to be taken if faced with an avulsed tooth, only 12.7% informed they would attempt to replant the tooth. Fifty two teachers (51%) were not aware of the optimum extraoral time. Significant differences were found between teachers who had and who had not received prior information with regard to adequate transport medium and adequate time for replantation (chi-square, $p = 0.03$ and $p = 0.02$, respectively). There is a general lack of knowledge of emergency management of avulsed teeth among physical education teachers, pointing to an urgent need to implement regular, continuing education so as to increase the level of knowledge and improve prognosis of this important traumatic dental injury.

Keywords: Dental trauma, avulsion, knowledge, quality of life.

Conhecimento dos professores de educação física sobre o atendimento de emergência da avulsão dentária

RESUMO

Grande parte dos traumatismos dentários ocorre no ambiente escolar durante a prática de esportes. Porém, os professores de educação física não estão preparados para fornecer o tratamento de emergência adequado, que é essencial para o prognóstico do dente avulsionado. O objetivo deste estudo foi investigar o conhecimento dos professores de educação física das escolas estaduais, municipais e particulares na cidade de Santa Maria-RS-Brasil sobre o atendimento de emergência da avulsão dentária. Um questionário avaliando o conhecimento dos professores de educação física foi

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distribuído a 217 professores. Um total de 102 (47%) questionários retornaram e foram analisados. Os resultados mostraram que apenas 23,5% dos professores já tinham recebido informações sobre traumatismo dentário. Quando questionados sobre os primeiros cuidados com o dente avulsionado, somente 12,7% tentariam reimplantar. Cinqüenta e dois professores (51%) não souberam por quanto tempo o dente pode permanecer fora do alvéolo sem causar danos às células do ligamento periodontal. O teste Qui-quadrado indicou uma diferença significante entre os professores que receberam ou não informação quanto ao tempo hábil para o reimplante (p=0,02). Fica evidente que há um inadequado conhecimento sobre o tratamento de urgência de dentes avulsionados. O estudo aponta para a necessidade de educação continuada para aumentar o conhecimento sobre o manejo de urgência de dentes avulsionados.

Palavras-chave: Trauma dental, avulsão, conhecimento, qualidade de vida.

INTRODUCTION

Dental trauma is a serious oral health problem and may cause both functional and esthetic problems, with possible impacts on the patient's quality of life (1,2). Most epidemiological studies show that a great number of traumatic dental injuries in school-aged children occur either at home or at school, especially during physical education classes (3-5).

Correct emergency management of dental trauma is essential for a good long-term prognosis, especially in cases of tooth avulsion (6,7). Nevertheless, several studies, conducted in different countries, have reported a low level of knowledge of academic and physical education teachers with regard to the management of tooth avulsion (8,9).

The objective of the present study was to assess the level of knowledge of physical education teachers working at public and private schools in a city in southern Brazil regarding the emergency management of tooth avulsion.

MATERIAL AND METHODS

The study protocol was approved by the Research Ethics Committee at Universidade Federal de Santa Maria, Brazil.

The present study was aimed at physical education teachers working at both public and private schools in the municipality of Santa Maria, a city with approximately 300,000 inhabitants located in the state of Rio Grande do Sul, southern Brazil. All participants received an envelope containing both a questionnaire and an informed consent form. All participants included in the study signed the consent form.

The survey was distributed to 217 physical education teachers. It comprised two parts: a first part with questions on professional and personal background, and a second part with eight multiple-choice questions assessing the teachers' knowledge of emergency management of tooth avulsion (Table 1).

TABLE 1. Questionnaire used to assess knowledge of emergency management of tooth avulsion

School name:_____

Working with grade(s):_____

Education level: (1) complete high school (2) incomplete college degree
(3) complete college degree (4) graduate degree

Sex: ( ) M ( ) F

Age: .....

Time working as a physical education teacher: .....

1- Have you ever received information on dental trauma?

( ) yes ( ) no

If yes, please inform the source of such information:

( ) lectures with dentists

( ) leaflets

( ) conversation with your dentist

( ) first-aid training

( ) other sources

Consider the following imaginary scenario: During a physical education class at the school's outdoor facilities, a child suddenly falls and hits their mouth into the ground, knocking out the permanent upper central incisor (the tooth falls out of the child's mouth). With this in mind, please answer the following questions by checking the correct option in each case.

1 – What would be your first action?

( ) try to locate the tooth

( ) take the child to the dentist, not bothering about the lost tooth

( ) try to stop the bleeding with pressure (e.g. using a clean cloth)

( ) call the child's parents or guardians

( ) locate the tooth and attempt to replant it

2 – If you have informed that you would NOT try to replant the tooth, how would you transport it?

( ) in a recipient with water

( ) wrapped in a paper napkin

( ) in a recipient with milk

( ) in a recipient with saline solution (physiologic saline)

( ) in saliva

3 – If you have informed that you would try to replant the tooth, what aspects would you take into consideration during the procedure?

( ) would replant the tooth in any way or direction

( ) would take care so as to touch only the crown, not the root

( ) would try to align the avulsed tooth with neighboring teeth

( ) would try to align the avulsed tooth with neighboring teeth, holding the tooth by its crown, not touching the root, and would immediately seek professional help

( ) do not know

4 – What type of professional help would you seek first?

( ) hospital

( ) drugstore

( ) dental clinic

( ) physician

( ) do not know

5 – In your opinion, how long can a tooth stay out of the mouth without any consequences or damage?

( ) up to 30 minutes

( ) up to 1 hour

( ) up to 2 hours

( ) time is not an important factor

( ) do not know

6 – Do you think that the use of a mouth guard could help prevent this type of trauma?

( ) yes

( ) no

The schools were visited in person and the questionnaires were handed to the principals or people in charge of each school at the time of the visit. Principals who agreed to participate were informed of the study objectives, were asked to distribute the forms to all physical education teachers working at the school, and received instructions on how the questionnaires should be filled in. One week later, questionnaires were collected. Questionnaires were returned in a sealed and anonymous envelope.

Answers were revised and entered into spreadsheets. Results were analyzed using the Statistical Package for the Social Sciences (SPSS), version 18.0. The association between different questions and having or not received prior information on dental trauma was analyzed using the chi-square test. Significance was set at $p < 0.05$.

RESULTS

Of a total of 217 questionnaires distributed, 102 returned, at a response rate of 47%. Mean age was 45.76 years (range: 33 to 59 years). Mean length working as a teacher was 19.61 years.

Of the 102 respondents, only 24 (23.5%) reported to have received prior information on dental trauma. The sources of such information are described in Table 2.

TABLE 2. Sources of information on dental trauma.

	No.	Percentage	Valid percentage*	Cumulative percentage
Lectures with dentists	7	6.9	29.2	29.2
Leaflets	2	2.0	8.3	37.5
Conversation with dentist	3	2.9	12.5	50.0
First-aid training	6	5.9	25.0	75.0
Other	6	5.9	25.0	100.0
No answer available	78	76.5	-	-
Total	102	100.0	-	-

* Percentage considering only valid answers (n = 24).

In order to determine the level of knowledge of physical education teachers regarding emergency management of tooth avulsion, one question inquired the teachers about the first action they would take if faced with a case of tooth avulsion. Most teachers informed that they would try to locate the avulsed tooth (56.9%); of the remainder, 15.7% would try to stop the bleeding with pressure, e.g. using a cloth, 12.7% would try to replant the tooth, 7.8% would call the child's parents or guardians, and 6.9% would take the child to the dentist, not bothering about the avulsed tooth.

Table 3 shows the teachers' knowledge about the best transport medium for an avulsed tooth whenever immediate replantation is not possible.

TABLE 3. Teachers' knowledge of the most adequate transport medium for an avulsed tooth.

	No.	Percentage	Valid percentage*	Cumulative percentage
Water	33	32.4	32.7	32.7
Napkin	28	27.5	27.7	60.4
Milk	11	10.8	10.9	71.3
Saline solution	12	11.8	11.9	83.2
Saliva	17	16.7	16.8	100.0
No answer available	1	1.0	-	-
Total	102	100.0	-	-

* Percentage considering only valid answers (n = 101).

Of the teachers who informed that they would try to replant the tooth, 46.5% were not aware of the correct procedures that should be performed during replantation, and 53.5% agreed with all the procedures suggested in the questionnaire.

Table 4 shows the type of professional help that physical education teachers would seek as a first option if faced with a case of tooth avulsion.

TABLE 4. Type of health care assistance sought by teachers if faced with an avulsed tooth.

	No.	Percentage	Valid percentage*	Cumulative percentage
Hospital	16	15.7	15.8	15.8
Dental clinic	81	79.4	80.2	96.0
Physician	1	1.0	1.0	97.0
Other	3	2.9	3.0	100.0
No answer available	1	1.0	-	-
Total	102	100.0	-	-

* Percentage considering only valid answers (n = 101).

When asked about optimum extraoral time, 51% of the teachers (52) did not know the answer, 23.5% (24) informed 30 minutes to be an adequate amount of time, 13.7% (14) 1 hour, 7.8% (8) up to 2 hours, and 3.9% (4) believed that time was not an important issue in the management of avulsed teeth.

The use of mouth guards as a tool to prevent dental trauma was considered valid by 70.3% of the respondents; the remainder did not believe that such an initiative could have any impact on the prevention of sports-related trauma.

The chi-square test was used to assess associations between having received prior information on dental trauma and the different approaches described ($p < 0.05$). No statistically significant differences were observed between these two groups in terms of the first action if faced with an avulsed tooth ($p = 0.70$). Conversely, a statistically

significant difference was found in relation to the medium selected to transport the avulsed tooth (p = 0.03): most teachers who had received prior information on dental trauma would transport the avulsed tooth immersed in saliva and water, compared with water or a napkin among teachers without prior information (Table 5).

TABLE 5. Association between having received prior information on dental trauma and optimum extraoral time and transport medium.

	With prior information (n = 24)	Without prior information (n = 78)
Optimum extraoral time, n (%)		
Up to 30 minutes	10 (41.7)	14 (17.9)
Up to 1 hour	3 (12.5)	11 (14.1)
Up to 2 hours	3 (12.5)	5 (6.4)
Time is not an important factor	2 (8.3)	2 (2.6)
Do not know	6 (25.0)	46 (59.0)
Transport medium, n (%)		
Water	5 (20.8)	28 (36.4)
Napkin	4 (16.7)	24 (31.2)
Milk	2 (8.3)	9 (11.7)
Saline solution	5 (20.8)	7 (9.1)
Saliva	8 (33.3)	9 (11.7)

Also, there were no significant differences between teachers with or without prior information on dental trauma with regard to the correct procedures to be performed during replantation (p = 0.20), the type of health care assistance sought (p = 0.64), and the use of mouth guards to prevent tooth avulsion (p = 0.44).

No significant association was observed either between the answers provided and the respondent's age, time working as a teacher, or educational level (p > 0.05).

Finally, Table 5 shows a statistically significant difference between teachers with and without information with regard to the optimum extraoral time (p = 0.02).

DISCUSSION

The present study used a questionnaire to survey the level knowledge of physical education teachers regarding the emergency management of avulsed teeth in the city of Santa Maria, state of Rio Grande do Sul, southern Brazil. No study had so far been conducted in the region with the same objective. Our results revealed a low level of knowledge among the professionals assessed, which is in line with other studies conducted at different Brazilian states (10-12).

The first aspect worthy of note in our study was our low response rate, of only 47%. One possible explanation for such a low participation is related to the way the

survey was distributed: questionnaires were not distributed directly to the teachers; rather, they were handed to the schools' principals, who in turn were asked to pass the forms on to the teachers. Previous studies using questionnaires directly applied to different groups of professionals have reported higher response rates (10,13). In contrast, previous studies with a methodology similar to ours have obtained poor response rates (14,15). Interestingly, among the schools who refused to participate in our study, one common reason for the principals' decision was related to the absence of feedback by investigators conducting similar studies in the past.

Previous studies have indicated that educational initiatives aimed at teachers can positively influence their knowledge and attitudes regarding emergency management of dental trauma, consequently leading to a more favorable prognosis (15). This finding underscores the urgent need to increase the knowledge of teachers about the recommended protocol for emergency management of traumatic dental injuries. In our study, only 23.5% of the teachers declared to have received prior information on dental trauma. However, there was no statistically significant difference in the number of correct answers given between teachers with and without prior information on dental trauma, which may be explained by the type of information covered and the teaching method employed in their training, or to the lack of regular, continuing education among these professionals. In fact, several authors have reported that providing teachers with information on dental trauma once only is not enough to promote adequate management of traumatic dental injuries (9,16).

The prognosis of a traumatized tooth is highly dependent on an adequate emergency management. In cases of avulsed teeth, immediate replantation greatly increases the chances of a successful treatment outcome. In our study, the majority of teachers assessed (51%) were not aware of the optimum extraoral time, i.e. the length of time an avulsed tooth can stay out of the patient's mouth without serious consequences or damage to the avulsed tooth. This finding is relevant once it widely known, among dental professionals, that the longer the time elapsed between avulsion and replantation, the higher the risk of replacement resorption and inflammatory root resorption (6).

When immediate replantation is not possible, the tooth should be stored in an adequate transport medium so as to avoid damage to the periodontal ligament cells (6). Our study showed that the majority of teachers (32.7%) would transport the tooth immersed in water. However, according to the specialized literature, tap water is the least desirable transport medium for an avulsed tooth, and should only be used when no other option is available, once it is a hypotonic medium and therefore can cause rapid cell lysis (17,18). Also, when comparing teachers who had and who had not received prior information on dental trauma, our results showed that the first group tended to chose more adequate media, albeit not ideal, when compared with the group without prior information. Nevertheless, even in the group with prior information, only a minority of teachers chose milk as the avulsed tooth transport medium (8.3%), the best among the options presented in the questionnaire.

Milk is considered to be a practical transport medium, easily available and relatively free of bacteria. In addition, its osmolality is not excessively harmful to the periodontal ligament cells (18). However, in our study, only 10.9% of the respondents would choose milk as the storage medium to transport the avulsed tooth. Blomlöf et al. compared milk and saliva as storage media and observed better results with the former (17). Although saliva is among the recommended storage mediums for the transportation of avulsed teeth, it is the last option referred (19). Saliva is also a hypotonic medium, and the additional presence of microorganisms may contribute to cell death.

Still regarding avulsed tooth transportation, perhaps the most disturbing finding of our study was the fact that a large number of teachers (27.7%) would choose a napkin to transport the tooth, as also reported before by Chan et al. (9). These results reveal an important lack of knowledge, with high impacts in terms of long-term prognosis of avulsed teeth, once the choice of an adequate transport medium is essential to prevent damage to periodontal ligament cells and thus increase the chances of a successful treatment.

Another important aspect in the management of avulsed teeth is tooth manipulation. The avulsed tooth should be handled by the crown, not touching the root, avoiding contact with and possible damage to periodontal ligament cells (6). Our survey showed that 46.5% of the physical education teachers did not know how to correctly handle an avulsed tooth. In the study of Frugeri & Costa (20), of all the professionals who answered the authors' survey, an average of 23% were not aware of the correct way to handle the tooth.

When asked about the type of professional help they would seek when faced with a case of tooth avulsion, a high rate of respondents informed that they would first seek help at a dental clinic (80.2%), and only 15.8% would take the patient to a hospital. This is a positive finding of our study, and it shows that the dental professional is considered by this group of teachers to have a better knowledge of the correct actions to be taken in a case of tooth avulsion when compared with other health care professionals.

The permanent loss of an avulsed tooth has both functional and psychological consequences. In 2009, Berger et al. conducted an investigation to assess the effect of severe dental trauma on the quality of life of both the affected children and their parents (21). The authors observed an immediate decrease in the family's quality of life. The authors' also found that one year after the traumatic event, children were still affected, primarily in terms of their social and emotional well-being.

In sum, our results confirm a general lack of knowledge of the emergency management of avulsed teeth among physical education teachers and add to the existing body of literature by providing information of such knowledge in southern Brazil. Considering the fact that these professionals are frequently exposed to traumatic dental injuries, our findings suggest an urgent need to implement a continuing education system as a tool to increase the chances of a good prognosis in this type of injury.

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