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ORIGINAL ARTICLE

Knowledge of Physical Education Students about Tooth Avulsion Before and After Receiving an Informative Leaflet

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ABSTRACT

Objective: To evaluate the knowledge of Physical Education students about tooth avulsion (TA) in both dentitions before and after receiving an informative leaflet (IL). **Material and Methods:** The questionnaire contained information about TA in dentition and its management and was applied to the Physical Education students before and after reading an IL. **Results:** A total of 118 students, 96.61%, attended a first aid course, and 17.80% received information about TA. Most students (88.98%) never had an experience with TA, and 90.68% considered its management important. The other questions, before and after reading the IL, respectively, were: would not perform deciduous tooth replantation (42%; 88%); knew how to handle the avulsed permanent tooth (APT) (38%; 92%); knew how to clean the APT (50%; 99%); knew that permanent tooth replantation (PTR) must be immediate (15%; 95%); knew the ideal time to seek for the dentist right after TA without performing PTR (6%; 83%); knew how to store APT (31%; 97%). **Conclusion:** The knowledge of Physical Education students in this research revealed a limited understanding of dental tooth avulsion. After receiving an informative leaflet, the students showed a significant improvement in knowledge about traumatic avulsion management, including tooth replantation and proper actions.

Keywords: Tooth Injuries; Tooth Avulsion; Tooth, Deciduous; Dentition, Permanent.

Introduction

Traumatic dental injury (TDI) is one of the fifth most prevalent diseases [1] and affects more than one billion living people worldwide [2]. Considering public health, TDI is still a problem because it may lead to life-long treatment and presents high costs [2,3].

Tooth avulsion (TA), considered a severe type of TDI, may occur at schools, the gym, the pool, and practicing sports in both dentitions [4-7]. According to the International Association of Dental Traumatology (IADT), an avulsed permanent tooth has to be immediately replanted or properly stored to minimize the risk of inflammatory external root resorption, dental ankylosis, and tooth loss [4,8-10]. On the other hand, tooth replantation in primary dentition is not recommended due to the complexity of the treatment, which involves replantation, splint placement and removal, and endodontic treatment [5]. Besides that, the permanent tooth germ may be damaged, leading to disorders in its development and eruption process [11-13].

However, many avulsed teeth are inappropriately managed [6], and TDI is rising in the young population due to sports practice [14]. Most of the studies that were carried out to evaluate the knowledge of Physical Education students about TA were performed on permanent teeth [15-19], and only one included deciduous teeth [19]. The students' knowledge was probably considered low due to not receiving information about dental trauma during their course [18].

In this scenario, it is essential to evaluate if the knowledge of Physical Education students concerning the emergency procedures in the case of TA in both dentitions may improve after receiving the information during the graduation course. Therefore, to the best of our knowledge, this is the first study that evaluated the knowledge of Physical Education students about TA in deciduous and permanent teeth before and after receiving an informative leaflet.

Material and Methods

Ethical Aspects and Study Sample

This study was approved by the Research Ethics Committee of the Hermínio Ometto University Center, UNIARARAS, Brazil (#85883218.0.0000.5385). The sample of this observational study was composed of last year's students of the Physical Education course of Hermínio Ometto University Center, Brazil, in 2018 and 2019.

All last year's course students were invited to participate in this study. Only the participants who signed the Free and Informed Consent Form were included in the study.

Survey of Knowledge Assessment about Dental Trauma Before and After the Informative Leaflet

The evaluation of students' knowledge regarding TA of deciduous and permanent teeth was carried out through a structured questionnaire containing 23 multiple-choice questions during the class periods of the Physical Education course. The correct answers to the questionnaire were defined based on the information presented in the International Association of Dental Traumatology guidelines [4,5]. The questionnaire was applied in two phases on the same day: before and after reading the informative leaflet. The authors created both materials, the questionnaire and the leaflet. The leaflet information was based on the IADT guidelines [4,5].

In the first phase, students answered the questionnaire only with their previous knowledge about TA. Afterward, they received an informative leaflet with all the information previously addressed in the questions. All necessary information on prevention and first aid procedures after TA has been included in this leaflet. The leaflet presents information on the epidemiology and etiology of TA and how to proceed in both dentitions.

In the second phase, students were invited to answer the same questionnaire after reading the informative leaflet. The students could not consult colleagues, the researcher, or the informative leaflet during the questionnaire application.

Statistical Analysis

The sample size was based on the Emerich et al. [17]. The program used for data analysis was GraphPad Prism (GraphPad Software, La Jolla, CA, USA). The data were transformed into decimal logarithms for normalization. The conditions of homogeneity of variances and normality of the groups before and after the questionnaires were performed by the Shapiro-Wilk normality test. Even with the logarithmic transformation, the normality cannot be proved. In this case, Wilcoxon's signed rank test was used. The level of significance adopted was 0.05.

Results

A total of 118 students participated in the study, which included 68 males (57.63%) and 50 females (42.38%) (Table 1). The mean age of the investigated population was 20 (+17-35) years old. Only 6.78% of the participants were parents. Most students (96.61%) had already attended a first aid course. However, only some students (17.80%) had received some information on TA in this course. Most students (88.98%) never had a TA experience, and 90.68% considered it urgent and vital to know how to manage a TA.

Table 1. Descriptive characteristics and the previous trauma experience of the students.

Variables	%
Gender	
Male	57.63
Female	42.38
Age (min-max)	20 (17-35)
Have children	6.78
Attended a first aid course	96.61
Not received information about DA+ in the course	86.44
Received information about DA+ before participating in this research	17.80
Not witnessed some DA+	88.98
Finds urgent management of DA* important	90.68

+DA: dental avulsion.

In Table 2, before the informative leaflet (BL), the definition of TA was correct only for 45.76% of the students; after the informative leaflet (AL), the percentage was statistically higher (95.76%; p<0.0001). After TA, 42% of the students BL think the deciduous tooth replant is impossible, and AL 88% agree that deciduous replant is not recommended (p<0.0001). It is advised to manipulate the avulsed permanent tooth by the crown; in the BL group, only 38% marked this option, and for the AL group, this recommendation was statistically higher (92%; p<0.0001). The avulsed permanent tooth should be cleaned with running water; only 50% of students BL pointed out this option, and this percentage was higher statistically for the students AL (99%; p<0.0001). Only 15% of the students BL chose that after TA, the best time for its replantation is immediately after the trauma occurrence, and this percentage was significantly higher than AL (95%; p<0.0001). After the TA, most of the students answered that the best option is to go to the dental office to attend, and this was the only question that even BL (75%) and AL (78%) didn't have a statistical difference to take the child after the TA happened. Only 6% of the students BL answered that the time to bring the patient to the dentist to perform the replantation is up to 60 minutes, and this percentage is higher up to 83% AL (p<0.0001). Thirty-one percent of BL students

choose the correct storage to maintain the avulsed permanent tooth, which is the milk or saline solution, and this percentage is higher for the AL group at 97% (p<0.0001). Other answers related to the questions above are described in the supplementary material.

Table 2. Percentage of correct answers about dental trauma before and after the informative leaflet.

Question	Answers	Before %	After %	p-value*
Definition of dental avulsion	Complete dental avulsion	45.76	95.76	<0.0001
Is it possible to reimplant the deciduous tooth?	No	42.0	88.0	<0.0001
Manipulation of avulsed permanent tooth	Crown	38.0	92.0	<0.0001
Cleaning the avulsed permanent tooth	The tooth should be cleaned with running water	50.0	99.0	<0.0001
After dental avulsion, what time is better for reimplanting the permanent tooth?	Immediately	15.0	95.0	<0.0001
After the dental trauma, where is the best place to take the child for treatment?	Dental practice	75.0	78.0	>0.05
In the case of reimplantation, until which time is better to be in the dentist?	Until 60 minutes	6.0	83.0	<0.0001
Correct storage of avulsed permanent tooth	In the milk or saline solution	31.0	97.0	<0.0001

Discussion

The prevention of TDI is less expensive and time-consuming and should involve interdisciplinary actions, including school health programs [20]. According to Andreasen et al. [21], TA can be considered an emergency. For this reason, it is crucial that dentists, caregivers, and teachers, especially physical education teachers or coaches, know how to identify this type of dental trauma. In the present study, the definition of TA for the BL group was correct only for 45.76%, and for AL, this percentage was statistically higher, which shows us that the informative leaflet should be considered as a form to spread this knowledge. Almost all the participants in this study claimed to have never had any experience with dental trauma; on the other hand, in the study by de Oliveira et al. [19], 34.7% of the participants already had personal experiences with the subject. Such data can be explained by the fact that most participants in this study were not parents (93.22%) or possibly did not have direct contact with children.

Regarding replantation in deciduous teeth, 42% of BL students think that deciduous teeth replantation is not possible, and 88% of AL students agree that it is not recommended. However, in the study by de Oliveira et al. [19], 87.9% of the participants knew that deciduous teeth should not be replanted, a percentage twice as high as our study's.

Still, regarding the replantation of deciduous teeth, it is known that it is not recommended due to the possibility of damage to the permanent tooth germ [4,5,11-13]. The increase of knowledge soon after receiving the information through reading the leaflet shows the importance of providing the information during graduation, as only some students could indicate why replantation of deciduous teeth is not indicated.

According to the IADT guidelines [4], dental replantation is the most indicated treatment for permanent TA. However, some factors, such as the time elapsed between trauma and replantation, correct handling, and how the tooth is stored, correlate with the case's prognosis and the replantation's success [15]. The avulsed permanent tooth has to be manipulated by the crown, BL only 38% marked this option, and AL this recommendation is statistically higher. Our findings do not corroborate with the study of Arikan and Sönmez [22], where more than half of the participants initially knew the correct management of the permanent avulsed

tooth. Therefore, after receiving the information from the leaflet, the knowledge of the participants of both studies also increased.

Correct cleaning of avulsed permanent teeth is performed with running water, and only 50% of BL students pointed out this option, and this percentage was statistically higher for AL students (99% - p<0.0001). However, in the study by de Oliveira et al. [19], it was evidenced that a smaller percentage of participants (26.1%) would clean the tooth with running water. The knowledge of this information is fundamental to the prognosis of the case.

Regarding the storage media of the avulsed tooth, it is recommended by the IADT [4] that it should be stored in a media that prolongs the vitality of the periodontal ligament cells, such as milk or saline. In the present study, 31% of BL choose the correct storage media to keep the permanent tooth avulsed, either in milk or saline solution, and this percentage rises to 97% until AL (p<0.0001). In the study carried out by de Oliveira et al. [19], only 26.6% and 7.5% of the participants considered storing the tooth in saline or milk, respectively, and in the study by Arikan and Sönmez [22], before receiving the information, only 10% of the participants identified the correct tooth storage, increasing to 86.6% after reading the leaflet.

According to the IADT guideline [4], replantation should be performed immediately after TA for all the mentioned reasons. In the present study, BL, only 15% of the students chose that the best time to replant the permanent tooth is immediately. This percentage was significantly higher AL (95% - p<0.0001), corroborating the study by Arikan and Sönmez [22], who also found that the knowledge about this issue was initially low (26.2%) and increased (47.1%) after reading the leaflet.

However, when, for some reason, the immediate replantation cannot be performed, it is acceptable to perform it for up to 60 minutes, provided that the tooth is handled correctly and stored [15]. In the present study, only 6% of BL students think this, and this percentage is higher up to 83% AL (p<0.0001).

The place to be sought in cases of immediate replantation should be the dental office for the dentist's evaluation and performance of tooth splinting and endodontic treatment. The dental office was the only question that even BL (75%) and AL (78%) had no statistical difference in taking the child after the dental trauma occurrence. The results obtained in this study were satisfactory and showed that the participants knew the importance of the dentist's evaluation of these cases, even without the information.

Several studies found in the literature [15,16,19,22] show that the knowledge of physical education students about the emergency management of dental trauma is low, especially in cases of TA. According to Jorge et al. [16], most Physical Education students do not know how to proceed correctly in the face of a TA, and de Oliveira et al. [19] emphasize the importance of carrying out more campaigns to provide information on dental trauma. Due to the higher possibility of these professionals witnessing a TA, they must know how to correctly perform emergency procedures in deciduous and permanent dentitions, emphasizing the importance of multidisciplinary learning.

Conclusion

The knowledge of Physical Education students in this research revealed a limited understanding of dental tooth avulsion. After receiving an informative leaflet, the students showed a significant improvement in knowledge about tooth avulsion management, including tooth replantation and proper actions. The findings emphasize the importance of widespread education to enhance preparedness and responses to tooth avulsion incidents, potentially minimizing long-term consequences.

Authors' Contributions

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All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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