

# PERCEPTION OF ELEMENTARY SCHOOL TEACHERS ON DENTAL TRAUMATISM: AN ANALYSIS IN THE AMAZON REGION

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## ABSTRACT

Traumatic dental injuries (TDI) are highly prevalent lesions in the school environment and its consequences can negatively affect psychological well-being. The aim of this cross-sectional study was to evaluate the perception and management of TDI cases by public elementary school teachers in the city of Belém, in Amazon region. Data were collected, focusing on previous experiences in first aid on TDI, and its effect on their knowledge and attitudes towards dental avulsion in permanent teeth. Our results show the low level of information on management and the need for teaching training in their work environment.

**Abstract:** Dental trauma; Dental avulsion; elementary school teachers.

### PERCEÇÃO DOS PROFESSORES DE ESCOLAS FUNDAMENTAIS SOBRE TRAUMATISMO DENTAL: UMA ANÁLISE NA REGIÃO AMAZÔNICA

#### RESUMO

Lesões traumáticas dentárias (LTD) são muito prevalentes no ambiente escolar e as consequências destas podem afetar negativamente o bem-estar físico e emocional das crianças. O objetivo desse estudo transversal foi avaliar a percepção e o manejo das LTD por professores do ensino fundamental de escolas públicas da cidade de Belém, localizada na região amazônica. Os dados foram coletados com foco em experiências prévias em primeiros socorros de LTD e os efeitos deste sobre conhecimento e atitudes em relação à avulsão de dentes permanentes. Nossos resultados mostram baixo nível de informações sobre condutas e necessidade de capacitação de professores no ambiente de trabalho.

**Palavras-chave:** Trauma dentário; Avulsão dental; Professores do ensino fundamental.

### PERCEPCIÓN DE PROFESORES DE PRIMARIA SOBRE EL TRAUMATISMO DENTARIO: UN ANÁLISIS EN LA REGIÓN AMAZÓNICA

#### RESUMEN

Las lesiones dentales traumáticas (LDT) son muy prevalentes en el ámbito escolar y las consecuencias de estas pueden afectar negativamente el bienestar físico y emocional. Este estudio transversal tuvo como objetivo evaluar la percepción y el manejo de la LDT por parte de profesores de enseñanza básica de escuelas públicas de la ciudad de Belém, ubicada en la Amazonía. Los datos se recopilaron con un enfoque en las experiencias previas de primeros auxilios de LDT y los efectos de esto en el conocimiento y las actitudes hacia la avulsión de dientes permanentes. Nuestros resultados muestran un bajo nivel de información sobre los comportamientos y la necesidad de formación del profesorado en el ámbito laboral.

**Palabras-clave:** Trauma dental; Avulsión dental; Maestros de primaria.

## 1. INTRODUCTION

Traumatic dental injuries (TDI) are common pathology affecting the oral cavity, considered a public health concern (Borges et al. 2017). The maxillary central incisors being the most affected tooth (Dascalu et al. 2016). The traumatic injuries can cause several physiological problems for the supporting structures of the teeth, dental pulp, dentin and enamel, as well as mucosal damage and psychological damage, due to the child's embarrassment, especially when smiling, negatively affecting their quality of life (Viegas et al. 2014, Antunes et al. 2016).

TDI occur more frequently at home, followed by the school environment. Specifically, at school, TDI can occur both within the classroom or during recreation time (Raof et al. 2012, Mehrabkhani et al. 2015). Several factors facilitate the occurrence of trauma, such as marked overjet, previous open bite or even physical conditions (Abanto et al. 2012, Kramer et al. 2015). Usually, a teacher is the first to assist the traumatized student, but most of them unknown the appropriate immediate care, which can prevent the success of the treatment after the accident, since poor conservation of the tooth and the improper cleaning of the trauma site may impair the prognosis of the case (Arikan & Sonmez 2012, Awad et al. 2017).

Many studies have been conducted in different countries to assess teacher's knowledge and attitudes about what should be done in a situation of dental trauma in children occurring in school

(Viegas et al. 2014, Antunes et al. 2016, Awad et al. 2017). However, there are few studies that investigate the influence of first aid training on teachers' perceptions, behaviors and attitudes about the mentioned issue (Mehrabkhani et al. 2015, Razeghi et al. 2019). And this become even more evident with regard to studies with teachers from public elementary schools in the northern of Brazil, which are located in the Amazon region. This extensive region has cities with characteristics and structures quite different from each other, which highlights the need for studies in Dentistry in this area that is still little explored.

Thus, the aim of the present study was to evaluate the perception of dental traumatism by elementary school teachers in public institutions located in the city of Belém do Pará, in the Amazon region, focusing on their previous experiences in first aid related to TDI and its effect on their knowledge and attitudes towards dental avulsion of permanent teeth.

## 2. MATERIALS

### 2.1. ETHICAL ASPECTS

This study was approved by the Ethics and Research Committee with Human Beings of the Health Sciences Institute of the Federal University of Pará (CONEP 855.156-2014). The voluntary nature of the study was emphasized and strict confidentiality was assured.

## 2.2. RESEARCH SUBJECTS AND SAMPLE SIZE CALCULATION

The present study included a sample of 120 teachers from public elementary schools that are located in Belém do Pará, a city located in northern Brazil, Amazon region (Figure 1). This number of participants was calculated from a total of 275 teachers who worked from the 1st to 5th year of Elementary School in the year 2019, according to data provided by the Municipal and State Education Secretary, from the formula for normal distribution, with 95% confidence level, 5% margin of error, with 80% test power, considering

a possible dropout rate of 20%. These teachers were chosen because they worked with children between the ages of 6 and 10, a stage that the highest prevalence of traumatic dental injuries is reported. Based on this calculation, it was planned to recruit a sample with a total size of 144 teachers, however only 120 of them wanted to answer the proposed questionnaire. Even with the smaller number of responding teachers, it was still possible to carry out the planned statistical analysis. All 120 teachers investigated were effectives in the public service and were randomly selected from all schools listed.

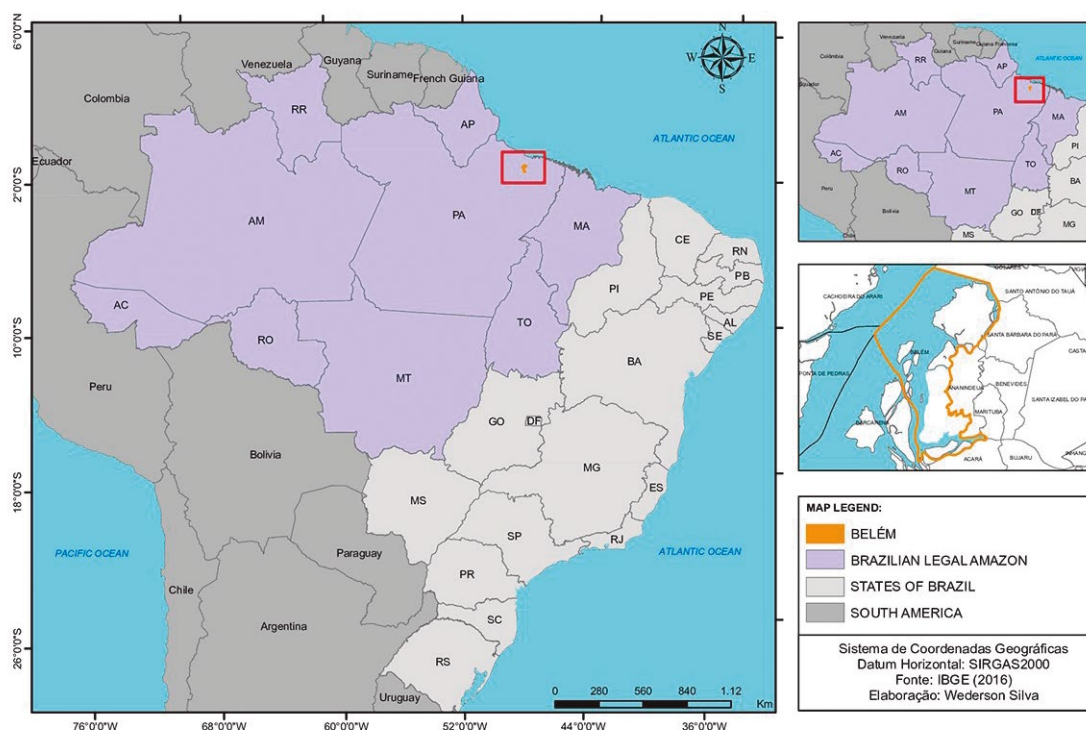


Figure 1 - Representation of Belém county, inside the Brazilian Legal Amazon.

The schools, in which the questionnaires were applied to the teachers, were drawn from a list provided by the Municipal and State Education Department, regardless of neighborhood or location.

### 2.3. INSTRUMENTS AND DATA COLLECTION

The questionnaire used in present study is based on the one previously used by Miranda (Miranda et al. 2018) which was composed of 19 open questions. These questions were divided into three evaluation topics: four questions were related to general aspects concerning individual characteristics (sex, age, working time as a teacher and school subject types). Twelve questions comprised the items about knowledge and attitudes related to dental avulsion in permanent teeth (such as tooth replacement after avulsion and the ideal time; behavior in a situation of dental avulsion bleeding in schoolchildren; tooth treatment before replacement in alveolus; tooth conditioning in case of avulsion; tooth packing solution and student's medication after avulsion). Finally, three questions were related to training in first aid related or not to TDI (if prior to answering the questionnaire, they had already received some type of training during their professional education or even after working in schools, on the following topics: first aid, specifically about dental trauma and, if they had any experience in a situation of dental trauma). The application of questionnaires was carried out in the school environment, in the interval between

teaching activities, under the presence of the researchers. This took place throughout the scholar year, precisely to maintain the randomization of the investigated schools and teachers.

### 2.4. STATISTICAL ANALYSIS

Data were analyzed using the statistical analysis package SPSS (SPSS Inc., Chicago, USA). The influence of the teacher's ability to assist the student in case of trauma and the existence of previous training were the two dependent variables chosen to be assessed with other independent variables presented in questionnaire: individual characteristics; previous training of dental trauma; behavior in a situation of dental avulsion bleeding in schoolchildren; tooth replacement time after avulsion; tooth replacement after avulsion; tooth treatment before replacement in the alveolus; tooth conditioning in case of avulsion; tooth packing solution; students medication after avulsion and dental trauma experience in school environment.

The association analysis between variables was performed by means of the chi-square test, with level  $\alpha = 0.05$ , considering in dichotomous questions the scores 0 or 1 for the negative or positive answers, respectively.

## 3. RESULTS

The established sample size was reached in its entirety, in which 120 elementary school teachers were included in the study, guaranteeing a power of 80% to the applied test. Female teachers

constituted of 66,6% the total sample (Table 1). 50% of teachers were between 40 and 49 years old. 41,6% of the evaluated had up to 10 years as a teacher.

Among all those evaluated, most of teachers (88,33%) revealed that they did not have ability to assist a student with dental trauma. In relation to the individual characteristics of the teachers, 71,4% of the respondents who declared that they were able to assist students after dental trauma were 40 years or older, which is an age group higher when compared to the group of teachers who declared that they did not feel prepared to attend schoolchildren in the same condition (p= 0.026).

In the evaluation of knowledge and attitudes, most of teachers, who declared they were not able to assist students in dental trauma situations,

had not received previous training in relation to this type of trauma (98,1%, p <0.001; Table 1). The attitude towards tooth replacement in the alveolus after avulsion was more frequent in the group of elementary teachers who declared themselves capable of attending students (35,7%, p<0.001; Table 1). The attitude of medicating students after dental avulsion was also more present in the same group of teachers (92,9%, p<0.001; Table 1). There were no significant differences (p>0.05) in the answers of evaluated teachers regarding behavior in a situation of dental avulsion, tooth replacement time after avulsion, tooth treatment before replacement in alveolus, tooth packing solution and dental trauma experience in school environment.

Table 1 - Difference (Chi-square test) between the ability of a teacher to assist a student with dental trauma and the individuals' characteristics, knowledge, attitude and experiences in relation to dental trauma that occurs in the school environment of public elementary schools in Belém, Brazil, 2019.

	Ability to assist a student with dental trauma				p-valor*
	Yes n=14 (11,67%)		No n = 106 (88,33%)		
	n	%	n	%	
<b>Individual Characteristics</b>					
<b>Gender</b>					
Female	10	71,4%	70	66,0 %	NS
Male	4	28,6%	36	34,0%	
<i>Age group:</i>					
20 to 29 years	3	21,4%	6	5,7%	0.026
30 to 39 years	1	7,1%	28	26,4%	
40 to 49 years	5	35,7%	55	51,9%	
50 years or more	5	35,7%	17	16,0%	
<i>Working time as a teacher</i>					

Up to 10 years	5	35,7%	45	42,5%	NS
11 to 20 years	3	21,4%	37	34,9%	
More than 20 years	6	42,9%	24	22,6%	
<b>Knowledge and attitudes related to dental trauma</b>					
<b>Previous training of dental trauma</b>					
Yes	5	35,7%	2	1,9%	<0.001
No	9	64,3%	104	98,1%	
<b>Behavior in a situation of dental avulsion bleeding in schoolchildren</b>					
Stop bleeding and carry to the dentist	10	71,4%	81	76,4%	NS
Stop bleeding, condition teeth and carry to the dentist	4	28,6%	25	23,6%	
<b>Tooth replacement time after avulsion</b>					
Until 1 h	12	85,7%	69	65,1%	NS
2 to 10 h	1	7,1%	8	7,5%	
11 to 24 h	1	7,1%	29	27,4%	
<b>Tooth replacement after avulsion</b>					
Yes	5	35,7%	1	0,9%	<0.001
No	9	64,3%	105	99,1%	
<b>Tooth treatment before replacement in alveolus</b>					
Cleaning	6	42,9%	41	38,7%	NS
Other treatments	3	21,4%	16	15,1%	
No treatment	0	0,0%	1	0,9%	
No answer	5	35,7%	48	45,3%	
<b>Tooth conditioning in case of avulsion</b>					
Empty container / paper	7	50,0%	60	56,6%	NS
Container with liquid	3	21,4%	14	13,2%	
Others	4	28,6%	32	30,2%	
<b>Tooth packing solution</b>					
Water	5	35,7%	41	38,7%	NS
Saline solution	3	21,4%	32	30,2%	
Antiseptic	2	14,3%	22	20,8%	
Others	3	21,4%	9	8,5%	
None	1	7,1%	2	1,9%	
<b>Students medication after avulsion</b>					
Yes to medication	13	92,9%	8	7,5%	<0.001
No to medication	1	7,1%	98	92,5%	
<b>Dental trauma experience in school environment</b>					
Yes	4	28,6%	20	18,9%	NS
No	10	71,4%	86	81,1%	

It was verified that only 5,83% received prior training related to dental trauma, it. In this group, both the procedure to recover the tooth (85,7%,  $p < 0.001$ ; Table 2) as the administration of medication after avulsion (71.4%,  $p < 0.001$ ) was significant. There was also a significant difference of opinion in relation to a tooth packing solution: in the group that had already received training, 42,9% declared a preference for packaging in saline

solution ( $p < 0.023$ ; Table 2), whereas in the group that never received such training, the substance of choice was water (39,8%,  $p < 0.023$ ; Table 2). There were no significant differences ( $p > 0.05$ ) in the answers of elementary teachers about behavior in a situation of dental avulsion, tooth replacement time after avulsion, tooth treatment before replacement and tooth conditioning after avulsion.

Table 2 - Difference (Chi-square test) between previous training of elementary teachers on dental trauma and knowledge and attitude towards dental trauma, in the school environment of public schools in Belém, Brazil, 2019.

	Previous training of dental trauma				p-value*
	Yes n=7 (5,83%)		No n = 113 (94,17%)		
	n	%	n	%	
<b>Knowledge and attitudes related to dental trauma</b>					
<b>Behavior in a situation of dental avulsion bleeding in schoolchildren</b>					
Stop bleeding and carry to the dentist	5	71,4%	86	76,1%	NS
Stop bleeding, condition teeth and carry to the dentist	2	28,6%	27	23,9%	
<b>Tooth replacement time after avulsion</b>					
Until 1 h	5	71,4%	76	67,3%	NS
2 to 10 horas	0	0,0%	9	8,0%	
11 to 24 horas	2	28,6%	28	24,8%	
<b>Tooth replacement after avulsion</b>					
Yes	6	85,7%	0	0,0%	<0.001
No	1	14,3%	113	100,0%	
<b>Tooth treatment before replacement in alveolus</b>					



Cleaning	2	28,6%	45	39,8%	NS
Other treatments	1	14,3%	18	15,9%	
No treatment	0	0,0%	1	0,9%	
No answer	4	57,1%	49	43,4%	
<b>Tooth conditioning in case of avulsion</b>					
Empty container / paper	5	71,4%	62	54,9%	NS
Container with liquid	1	14,3%	16	14,2%	
Others	1	14,3%	35	31,0%	
<b>Tooth packing solution</b>					
Water	1	14,3%	45	39,8%	0.023
Saline solution	3	42,9%	32	28,3%	
Antiseptic	0	0,0%	24	21,2%	
Others	3	42,9%	9	8,0%	
None	0	0,0%	3	2,7%	
<b>Students medication after avulsion</b>					
Yes to medication	5	71,4%	16	14,2%	<0.001
No to medication	2	28,6%	97	85,8%	

#### 4. DISCUSSION

Trauma dental injuries (TDI) are quite common among children. Besides affecting hard and soft dental tissues as well as supporting structures, they can lead aesthetical defects, induce masticatory, occlusal and/or phonetical dysfunctions, affect the development of permanent teeth and even promote psychological disturbances (Nagarajappa et al. 2020). In the present study, school environment and teachers, who work in the first grades of elementary school, were chosen because schools are one of the places where TDI occurs more frequently and teachers can play an important role in improving the prognosis of traumatized through

immediate management or on time referral to healthcare providers (Tzimpoulas et al. 2020). Also, it is relevant to highlight the scarcity of data regarding the perception of teachers who work in the Amazon region, especially in elementary public schools. This emphasizes the need to conduct an exploratory study on the topic. For this reason, we even opted for simplified statistics, without multivariate analysis.

The results indicate that evaluated elementary school teachers had a low level of knowledge about dental trauma in school environment. Of the 120 teachers, only 11,67% declared to be able to assist a student with dental trauma. Among these teachers,

only 35,7% received prior training ( $p < 0.001$ ). Most of them were over 40 years old. Similar result had already been reported by Awad (Awad et al. 2017) who suggests that one possible explanation would be that younger teachers were more likely to admit their lack of ability to handle to TDI.

In the studied sample, only 5,83% received first aid training about TDI, which is considered very low when compared to other previous studies (Pithon et al. 2014, Nirwan et al. 2016). Previous training on TDI can be a key factor that influenced the behavior of teachers, include giving them more confidence to be able to support students in case of dental trauma, because although only a small proportion of the evaluated teachers received TDI first aid training, there was a significant difference in some of their responses regarding the attitude to be taken in such situations, when compared to teachers who did not receive any type of training. For example, trained teachers more often said that they would re-insert the tooth into the alveolus (85,7%;  $p < 0.001$ ) and they were in favor of administering some sort of medication to the student after avulsion (71,4%;  $p < 0.001$ ). However, other studies previously (Mehrabkhani et al. 2015) carried out did not find this association and suggest that elementary teachers should receive dental emergency training continuously throughout their working life.

This may explain why even though teachers had done dental first aid training, some of them didn't know how to answer to important questions,

such as the best treatment for the avulsed tooth before replacement in the alveolus (57,1%) and stated that the tooth should be placed in an empty container or a container filled with paper (71,4%). Our results may suggest that although previous training provided teachers with greater confidence in the conduct of dealing with dental trauma, the training still left particularly important shortcomings regarding all the procedures and conduct to be performed in this emergency situation.

These findings are consistent with the previous study conducted in Saudi Arabia (Alsadhan et al. 2018), that showed a very low level teachers' knowledge concerning the management of traumatic dental injuries in schools. In a similar way, many of the teachers surveyed did not know the bonding of the remaining tooth fragment after the trauma or the reimplantation the avulsed permanent tooth in its position. Including, over three-quarters of the teachers did not choose the suitable storage for an avulsed tooth. These findings reinforce the need for training of teachers about TDI.

It is essential that primary school teachers have knowledge that although dental avulsion is one of the most severe form of TDI, leading to the loss of pulp vitality from the lack of blood supply, future problems can be avoided with good preservation of the dental element and rapid reimplantation, along with correct medication using antibiotics increases the favorable prognosis

of the case (Andreasen et al. 2010). According to a meta-analysis (Fagundes et al. 2018) the most suitable medium for this storage is the Hank's balanced salt solution (HBSS), that was considered the gold standard.

Our findings reinforce that the sample of teachers evaluated needs to be more informed in TDI and how the emergency procedures adopted can influence dental prognosis. Considering local possibilities, it is suggested that one of the best ways to promote updated knowledge to these teachers is through continuing education programs. Cagetti (Cagetti et al. 2019) recommended dental trauma training courses in a school environment should use videos, brochures and/or manuals, as well as posters and leaflets explaining risks of dental trauma in children should be put on walls. Furthermore, they point out that this training should be not only for teachers, but also for school employers and students.

There are already studies that have compared different educational interventions on knowledge of primary school teachers on management of TDI. A recent study (Razeghi et al. 2019) evaluated educational leaflet and oral presentation and both were effective in increasing knowledge and self-reported practice of teachers during short-term follow-up. But, in long term evaluation, educational leaflet was better with respect to knowledge than teacher's self-reported practice. Another study (Nashine et al. 2018) investigated the effect of pre and post educational intervention

on the knowledge and attitude of school teachers regarding dental trauma. For that, the authors used two different methods of teaching, audio and audiovisual. As a result, they found statistically significant increase in knowledge of teachers and no detect significant differences between the two types of intervention.

It is worth mentioning that the observational design of the study did not allow investigating the knowledge of teachers after receiving instruction. This would be interesting approach to assess the effectiveness of professional training methods. In addition, the cross-sectional design of the study makes it impossible to determine a cause and effect relationship between the variables analyzed. Another important limitation concerns the use the non-validated questionnaire. The importance of validating the data collection instrument is recognized. However, adaptations were made to a previous study questionnaire to meet the demands of this investigation.

Therefore, despite the limitations, this study makes evident the need that elementary teachers have appropriate TDI training in order to have knowledge and to instruct their students about basis dental care as a way to prevent traumatic dental injuries.

## 5. CONCLUSION

In the present study, it was observed that teachers from public elementary schools in the city of Belém had low knowledge about the

management of dental traumatism injury. Most of them were not able to assist students in dental first-aid emergency. Continuing education programs can improve the knowledge level of these teachers regarding dental trauma, in order to emphasize the importance of each emergency conduct to be adopted and to clarify the consequences of adopting inappropriate attitudes, since the prognosis of certain injuries depends on early and proper management.

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## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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