Prevalence of dental trauma in children and adolescents assisted at NEPTI at FOUFBA

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ABSTRACT

The inseparability between teaching, research and extension is desirable for the provision of quality dental education. This study determined the profile of patients assisted at the Extension/Research Unit in Dental Trauma at the Dental School of UFBA. The study was conducted on 86 patients of both genders, aged 0 to 14 years, presenting dentoalveolar lesions. Two individuals had already been previously treated and returned with a new trauma, adding up to 88 episodes of trauma. Data were collected from March 2016 to January 2018 and the variables evaluated were age and gender of the patient, affected teeth, type, etiology, classification and place where the trauma occurred. Among the 86 patients, 58.1% were boys and 41.9% girls, with age ranging from 1 to 14 years with mean of 5.5 (± 3.7) years. In most cases one tooth was affected, and the upper central incisors were the most affected. In primary teeth, subluxation was the most frequent trauma in supporting tissues and coronal fracture with pulp exposure in dental tissues. In permanent teeth, avulsion was the most frequent in supporting tissues and enamel and dentin fractures in dental tissues. It was possible to characterize the profile of patients treated with dental injuries in the project, enabling the dentists to know the risk population of the region, the main causes and the most frequent traumas.

Descriptors: Community-Institutional Relations. Education, Higher. Epidemiology. Tooth Injuries.

1 INTRODUCTION

Chapter IV of the LDB ("Law on Guidelines and Bases of Education")[1], addressing Higher Education in Brazil, establishes in article 43, item VII, as a purpose of higher education in the country, "to promote

the extension, open to participation of the population, aiming at the diffusion of achievements and benefits resulting from the cultural creation and scientific and technological research generated in the institution". Law 13,005 of June 25th, 2014 approved the National Education Plan (PNE)[2], with duration of 10 years, establishing 20 goals to be achieved within this period. The PNE goal 12 addresses the higher education, in which strategy 12.7 mentions "ensuring at least 10% (ten percent) of the total credits required for graduation in university extension programs and projects, directing its action, as priority, to areas of great social relevance". The glossary of External Evaluation Instruments of the Ministry of Education (MEC)[3] defines extension as the "interdisciplinary educational process that promotes interaction between higher education institution (IES) and other sectors of society, applying scientific and technological development with the agents of the external environment".

In this scenario, the Dental School of the Federal University of Bahia (FOUFBA) approved, on February 2015, the establishment of proposal 8863 – permanent action project under the title "Integrated Project of Attendance to Traumas in Childhood and Adolescence", named as Extension/Research Unit in Dental Trauma at the Dental School of UFBA (NEPTI FOUFBA), with the purpose to assist children and adolescents seeking for the service in the college due to occurrence of dental traumas.

Dental trauma is one of the most frequent public health problems affecting children and adolescents, representing situations often present in dentistry and pediatric dentistry attendances[4-7]. Trauma can be caused by violence or accidents. Accidental causes are related to the child's development stage and behavior. The neuromuscular and intellectual development leads children to expand their view of the environment and explore it more extensively, acquiring autonomy and becoming more vulnerable to accidents, thus justifying the high prevalence of dental trauma in this stage of development of the individual[8].

Many studies have been conducted all over the world on the prevalence of dental injuries due to trauma, and in Brazil the scientific production on this issue has grown[8,12]. A systematic review conducted by Azami-Aghdash *et al*.[5] on the epidemiology of trauma observed that, among 44 articles selected on the subject, 16 were produced in Brazil and the other 28 were from different countries, demonstrating a high number of cases in children and adolescents. Epidemiological studies related to dental trauma provide knowledge on the risk profile for this type of lesion, based on variables such as main etiologies, most affected teeth, patient's gender and age, most frequent type of trauma and related socioeconomic aspects[5, 9].

The most frequent etiology of dental trauma in these studies is fall from the own height, affecting the primary teeth[5-7,10]. In permanent teeth, the most frequent causes are sports and recreational activities[6,11,12]. The maxillary anterior region is the most affected by trauma, affecting mainly the central incisors[5,6,10,12-17]. Biological factors as lack of lip sealing and marked overjet may contribute to the increased prevalence of trauma in this region. Some studies agree with this association, but others did not find statistical significance between biological factors and the prevalence of trauma[11,14]. Regarding gender, in lesions involving primary teeth, the literature indicates no significant difference between boys and girls[6,15,18,19]. However, for permanent teeth, boys present a higher rate of

involvement, due to the type of recreational activity developed during this stage[7,10,16]. Subluxation is the lesion most frequently found in supporting tissues[13,23], while enamel fractures are the most prevalent among dental tissue injuries[8,13,21-23].

These variables suggest a risk profile that should be known by dental professionals, to enable them to provide guidance on prevention and care quickly and effectively, because this involves children and adolescents, a group that demands greater skill in procedures, especially in emergency situations[24]. In the case of dental injuries, the correct intervention and search for dental care by the caretaker of the child/adolescent should be immediate. Prompt attendance is important for a better prognosis[14,19]. Many parents/caretakers seek emergency medical care immediately, and others neglect the injuries because they do not consider such care as necessary. Usually, this neglect occurs when physical alterations are undetectable by laypersons, when there are no complaints of pain, when they consider that trauma had low intensity impact and also when they affect the primary teeth[5,6,11,18,19]. The dental professional is only sought when the affected tooth is already compromised by the sequel, when it is often unfeasible to maintain it in the dental arch[18].

Despite the understanding and knowledge on risk factors associated with dental trauma, there is still no real prevention strategy, since they commonly occur by chance[17]. As a suggestion to prevent dentoalveolar trauma, there might be better supervision by the parents/caretakers of the child, and the use of mouthguards during sports or recreational activities that involve greater physical contact between individuals[15].

The NEPTI FOUFBA is located in Salvador, within the institution, and assists children and adolescents who suffered dentoalveolar injuries by free demand or by referral from hospitals, emergency care units, basic health units, private dental clinics, among other health facilities. The NEPTI FOUFBA assists emergency situations, as well as children and adolescents who have suffered trauma and did not receive immediate care. The latter present sequelae resulting from these lesions. All patients receive long-term follow-up according to the type of trauma. Most patients seeking care in the unit are of low socioeconomic level, because this is a public IES that mainly assists patients registered in the Brazilian Public Health System (SUS).

Thus, this study aimed to determine the profile of care offered at NEPTI FOUFBA, analyzing the patient's age and gender, affected teeth, type, etiology, classification and place where trauma occurred, enabling dentists to know the population at risk in the region.

2 METHODOLOGY

This cross-sectional study was conducted on data from NEPTI FOUFBA, in the period from March 2016 to January 2018. It is part of a larger project submitted and approved by the Institutional Review Board of FOUFBA (CAAE 6611217.0.0000.5024).

The study group included all patients attending the service in the aforementioned period. The individual information from children and adolescents assisted at the project, as well as their clinical and radiographic data, were obtained from the registry in a dental chart, especially developed for that purpose. This chart was calibrated on a pilot study prior to this research. Data were protected by free consent and assent forms, signed by the parents/caretakers of the child, respectively.

Registry of the type of trauma followed the classification of Andreasen *et al*.[22] It should

be mentioned that a single tooth may have a registry of one or more types of trauma, which may affect exclusively dental or supporting tissues, or all tissues concomitantly. The etiology was divided into fall from the own height, recreational activities (cycling, skateboarding, swimming, jumping and soccer, among others), collision with static object (table, chair, window, among others) and violence. The place of occurrence was classified as home, street/square, schools/nurseries and others (water parks, sports courts, churches, stores, banks, among other establishments).

Some data were classified as not informed by the caretaker, because NEPTI FOUFBA offers both immediate care and assistance to patients who seek the service days, months or even years after the occurrence of dental trauma, and the caretaker often does not remember the history or does not know the type of trauma that occurred.

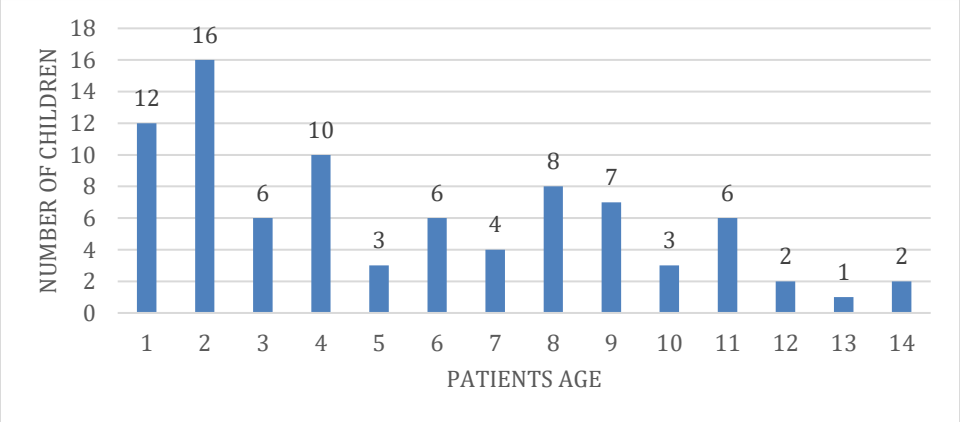
Data were stored in a database in the Excel software and statistically analyzed. Descriptive analysis was performed.

3 RESULTS

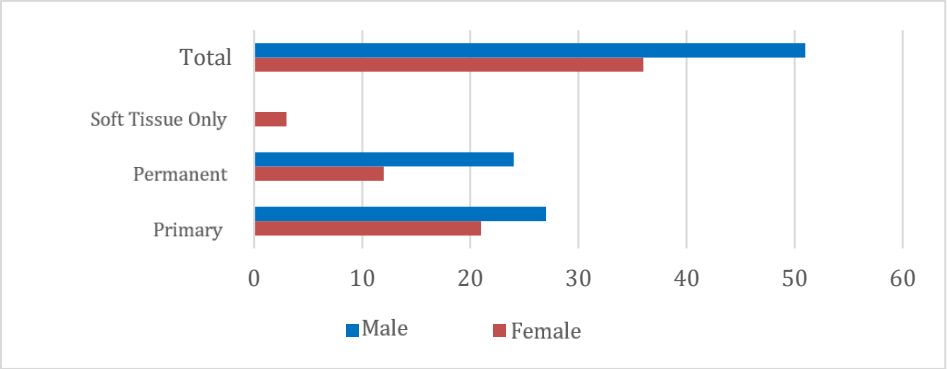
In the period, 86 patients were assisted, and 2 returned with a new trauma. Thus, the sample consisted of 88 episodes of dental trauma in 86 children and adolescents.

The mean age in the 86 patients was 5.5 years (±3.7), with greater number of traumas in children in the age group of schoolchildren from 1 to 9 years, with higher number of trauma patients aged 2 years (18%). The minimum age was 1 year, and the maximum age was 14 years (graph 1).

Among the 86 patients, 50 were males (58.1%) and 36 were females (41.9%). In both primary and permanent teeth, there was higher number of boys affected by trauma compared to girls. The three records of trauma only in soft tissue occurred in girls, as observed in graph 2.



Graph 1. Age of patients assisted at NEPTI FOUFBA after occurrence of dental trauma



Graph 2. Gender of patients assisted at NEPTI FOUFBA according to the type of tooth affected and soft tissues

Fall from the own height was the main cause of trauma in primary teeth (72.3%), followed by recreational activities (12.8%), collision with objects (6.4%) and violence (8.5%). In permanent teeth, 50% of patients had recreational activities as etiology, followed by falls (33.3%), collision with objects (8.3%) and violence (8.3%). Among traumas affecting only soft tissues, 66.7% were due to recreational activities and the other 33.3% were related to falls (table 1).

The most frequent sites of trauma were at home (76.6% in primary teeth, 38.9% in permanent teeth and 66.7% in soft tissue), in the street (14.9% in primary teeth and 30.6% in permanent teeth) and at school (6.4% in primary teeth and 11.1% in permanent teeth) (table 1).

Concerning the number of affected teeth, only one tooth was affected by the traumatic injury in 55% of patients, followed by trauma to two teeth in 37%. A total of 127 teeth were affected, including primary and permanent teeth. The upper central incisors were the most affected teeth (87%), followed by the upper lateral incisors (10%). There was no registry of lower lateral incisor in the study sample, as observed in graphs 3 and 4.

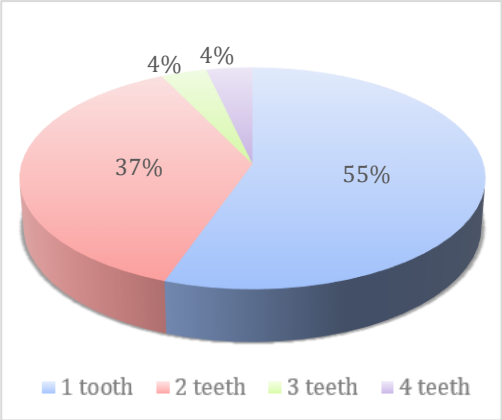
There were 132 traumas to teeth, affecting 56 permanent teeth and 76 primary teeth, and 3 injuries involving only soft tissues. There were 67 (49.6%) traumas in supporting tissues, 57 (42.2%) in dental tissues, 3 cases in which only the soft tissue was affected (2.2%) and 8 cases in which the type of trauma was not registered in the record (5.9%).

In primary teeth (n=76), there were 25% of cases of subluxation, followed by avulsion and lateral displacement, both with 10.5% when supporting tissues were affected. In dental tissues involving primary teeth, there were 9 cases of coronal fractures with pulp exposure (11.8%), 8 enamel fractures (10.5%), 4 root fractures (5.3%), and no cases of enamel and dentin fracture in this sample, as shown in table 2.

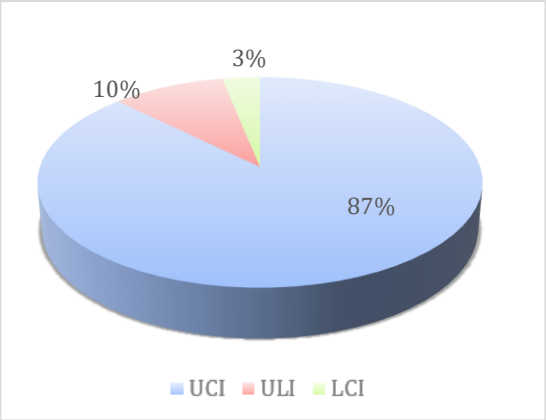
In permanent teeth, in the supporting tissues, there was higher frequency of avulsion, with 10 cases (17.9%), followed by lateral luxation with 4 cases (7.1%), and subluxation with 3 cases (5.4%). In dental tissues, there were 22 enamel and dentin fractures (39.3%), followed by 8 enamel fractures (14.3%) and 6 coronal fractures with pulp exposure (10.7%). There were no alveolar or root fractures associated with permanent teeth (table 2).

Table 1. Etiology and place of occurrence of traumas according to the affected teeth and soft tissues (n=86)

	Primary (n=47)		Permanent (n=36)		Soft tissue only (n=3)	
Etiology	n	%	n	%	n	%
Fall	34	72.3%	12	33.3%	1	33.3%
Recreational activity	6	12.8%	18	50.0%	2	66.7%
Collision with objects	3	6.4%	3	8.3%	0	0.0%
Violence	4	8.5%	3	8.3%	0	0.0%
Place of trauma						
Home	36	76.6%	14	38.9%	2	66.7%
Street	7	14.9%	11	30.6%	0	0.0%
School	3	6.4%	4	11.1%	0	0.0%
Others	0	0.0%	5	13.9%	1	33.3%
Not informed	1	2.1%	2	5.6%	0	0.0%



Graph 3. Number of teeth affected by trauma (n=83).



Graph 4. Group of teeth most affected by trauma (n=127).

Table 2. Type of trauma according to the type of tooth (n=132)

Type of trauma (n=132)	Primary (n=76)		Permanent (n=56)	
	n	%	n	%
Supporting tissue				
Avulsion	8	10.5%	10	17.9%
Lateral luxation	8	10.5%	4	7.1%
Intrusive luxation	6	7.9%	1	1.8%
Extrusive luxation	2	2.6%	1	1.8%
Subluxation	19	25.0%	3	5.4%
Alveolar fracture	5	6.6%	0	0.0%
Dental tissue				
Enamel fracture	8	10.5%	8	14.3%
Enamel and dentin fracture	0	0.0%	22	39.3%
Coronal fracture with pulp exposure	9	11.8%	6	10.7%
Root fracture	4	5.3%	0	0.0%
Not informed	7	9.2%	1	1.8%

4 DISCUSSION

The inseparability between teaching, research and extension is necessary for the provision of quality higher education. The promotion of university extension open to the population participation, inclusion of extension in the curriculum and application of its actions to different community sectors aim to promote a great and positive social impact[1-3]. Additionally, the scientific research resulting from these actions, involving students and professors of higher education, result in the perfect and desirable teaching-research-extension tripod for the promoting institution.

In this context, NEPTI FOUFBA aims at recording, diagnosing, treating and following cases of dental trauma that affect children and adolescents who are referred to the service or who freely seek it. Additionally, dental trauma is considered one of the main oral health problems with high prevalence in children and adolescents. Thus, as a consequence of this extension action in FOUFBA, there is also scientific production aimed at characterizing this population that seeks emergency or late care due to dental trauma. These results can support the development of trauma prevention policies and also aid the clinical decision making during dental care.

This survey included the registries of 86 patients with two recurrences of traumas, adding up to 88 causes of trauma in children and adolescents. In this sample, the age group with the highest prevalence of trauma was 1 to 9 years of age, a stage of development when children begin to take the first steps and explore the environment. At the school age, activities related to leisure, sports and games contributed to a high frequency of trauma from 6 to 11 years. The literature indicates that children aged 1 and 3 years are more subject to falls due to inherent developmental characteristics such as curiosity and lack of motor coordination[8]. Campos *et al*.[6] found the age group of 1 to 4 years as the most affected in primary teeth. Kramer *et al*.[13] found in their study on children aged 3 to 12 years that the age group 7 to 9 years had the highest number of dentoalveolar trauma. The male gender presented more cases of trauma compared to the female gender in this study.

Trauma can be caused by accident (falls, recreational activities, collision with objects) or due to acts of violence. In this study, there were records of violence in 8.5% of patients with trauma in primary teeth and 8.3% in permanent teeth. The prevalence of children and adolescents affected by dental trauma caused by violence is high. Among the lesions investigated at Instituto Médico Legal in Feira de Santana (BA), 39.2% were dental injuries due to violence[23]. In the study of Malta *et al*.[7], the head and neck region was the most affected by traumas due to accidents in the age group 2 to 5 years, and related to violent acts in the range 6 to 9 years. The study by Carvalho *et al*.[24] also observed that the head and neck region is an area with high prevalence of lesions compared to the other body regions. This area is directly related to the work of dental professionals, who must notify situations suggestive of violence.

Injuries due to accident are related to the child's stage of development and behavior[8]. According to several authors, falls are the most frequent cause of trauma to primary teeth[5-7,10], corroborating the results found in the present study, in which falls were responsible for trauma to primary teeth in 72.3% of patients. Accidents resulting from recreational activities as cycling, non-motorized tricycles, sports and other games are the main causes of dentoalveolar injuries affecting permanent teeth in older children[6,10]. In this study, for permanent teeth, traumas resulting from recreational activities were the most frequent (50%).

According to some authors, home is the

main place where traumatic injuries affecting primary teeth occur[5-7,10], and this study also revealed that the highest percentage of injuries occurred at home (76.6% in primary teeth, 38.9% in permanent teeth and 66.7% in soft tissue). When the permanent teeth were affected by trauma, the accidents occurring at home (38.9%) and in the street (30.6%) presented similar values. This fact is due to expansion of the environment for the practice of recreational activities by developing children and adolescents[8]. However, the lack of standardization and categorization of these variables across the different studies precludes and restricts comparisons between results.

The upper central incisors were the most affected by trauma, corroborating the findings found in other studies, which evidenced that the maxillary anterior region was the most affected, especially the central incisors[5,6,10,12-17]. Most traumas affected one tooth (54%), in accordance with findings from other studies[13,14,19], followed by two (36%). Guedes *et al*.[16] and Pereira *et al*.[10] found two or more affected teeth in their studies, disagreeing with the results found in this sample.

In primary teeth, subluxation (25%) was the most frequent trauma to supporting tissues and, in dental tissue, coronal fractures with pulp exposure (11.8%) were the most frequent, followed by enamel fractures (10.5%). These results are similar to those found in the literature, showing that the most frequent traumas to primary teeth involving supporting tissues are subluxations, and enamel fractures in dental tissues[5,6,9,10,14,18,19]. Jung *et al*.[4] also observed that coronal fractures with pulp exposure and subluxations were the most common types of trauma in dental and supporting tissues, respectively. The high prevalence of subluxations in the primary dentition is due to the high bone resilience, which dissipates the impact of trauma, protecting the dental structure[20].

In permanent teeth, avulsion (17.9%) was the most frequent type of trauma involving supporting tissues; concerning trauma to hard tissues, there were enamel and dentin fractures (39.3%). In traumas to permanent teeth, enamel fractures are the most frequent lesions found in the literature[5,9,10], disagreeing with the present results.

Some information collected from the patient and caretaker regarding how the lesions occurred, important data for diagnostic conclusion, may be inaccurate. This is possible because the caretaker of the child and adolescent often does not remember or is not sure about how the trauma occurred. Some patients were treated when there were already signs and/or sequelae of an old trauma. Discoloration, external resorption, calcifications, pulp necrosis, mobility and change in tooth position in the arch were some sequelae observed during clinical-radiographic examination. Parents should be vigilant and search prompt dental care as soon as possible to avoid or minimize possible sequelae.

Although this study did not collect data about the socioeconomic, demographic and educational status of the parents/caretakers of patients attending NEPTI FOUFBA, it was possible to observe that most of them are in vulnerable socioeconomic situation and present low educational level. Despite having access to treatment, many do not search for care after trauma. According to Kramer *et al*.[13], factors as low educational level and advanced maternal age had high relationship with the low adherence to trauma treatment and low importance assigned to follow up.

In this study, it was possible to identify the profile of patients treated at NEPTI FOUFBA. However, because this is a sample of patients from a reference center, the results may not be representative of the population. This study reflects the role of NEPTI FOUFBA in the

promotion of university extension open to population care and participation in the city of Salvador (Bahia).

5 CONCLUSION

Based on the present results, it was possible to identify the profile of patients treated at NEPTI FOUFBA. The most affected age was 2 years (in the age group between 1 and 9 years); boys suffered more dentoalveolar injuries compared to girls; the most affected teeth were the upper central incisors; and in most cases only one tooth was affected. Falls from the own height and recreational activities were the most common causes of dental trauma, which occurred more frequently at home, mainly resulting in subluxation, enamel fractures and coronary fracture with pulp exposure of primary teeth. In permanent teeth, avulsion and enamel and dentin fractures were the most frequent.

RESUMO

Prevalência de trauma dental em crianças e adolescentes atendidos no NEPTI da FOUFBA

A indissociabilidade entre ensino, pesquisa e extensão é almejável para a oferta do ensino odontológico de qualidade. O estudo teve por objetivo determinar o perfil dos pacientes atendidos no Núcleo de Extensão/Pesquisa em Trauma Dental na Faculdade de Odontologia da Universidade Federal da Bahia. A pesquisa foi realizada com 86 pacientes de ambos os sexos, com idade entre 0 e 14 anos, apresentando lesões alvéolo-dentárias. Dois indivíduos já haviam sido atendidos anteriormente, retornando com novo trauma, totalizando 88 episódios de traumatismos. Os dados foram coletados de março de 2016 a janeiro de 2018 e as variáveis avaliadas foram idade e sexo do paciente, dentes afetados, tipo, etiologia, classificação e local onde ocorreu o trauma. Dos 86 pacientes 58,1% eram meninos e 41,9% meninas, com idades variando entre 1 e 14 anos, com média de 5,5 (± 3,7) anos. Na maioria dos casos um dente foi afetado e os incisivos centrais superiores foram os mais atingidos. Nos dentes decíduos a subluxação foi o trauma mais frequente nos tecidos de suporte e a fratura coronária com exposição pulpar nos tecidos dentais. Nos dentes permanentes a avulsão foi o trauma mais frequente nos tecidos de suporte e as fraturas do esmalte e da dentina nos tecidos dentários. Foi possível caracterizar o perfil dos pacientes que foram tratados com lesões dentárias no projeto, permitindo aos cirurgiões-dentistas conhecer a população de risco da região, as principais causas e os traumas mais frequentes.

Descritores: Relações Comunidade-Instituição. Educação Superior. Epidemiologia. Traumatismos dentários.

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