

Association between Bucco-Dental Trauma Types in Handicapped Patients

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Abstract

The purpose of the present study was to detect percentile of oral trauma occurrences among handicapped patients enrolled in five institutions in Belém, State of Pará. These are neurologically disabled patients with delayed neuropsychomotor development and poor cognition in some cases. They were diagnosed with the following conditions: cerebral palsy, Down syndrome, autism, and attention deficit hyperactivity disorder (ADHD). A total of 355 handicapped patients were examined as follows: 288 with cerebral palsy in which 29.82% presented some kind of bucco-dental trauma occurrence; 85 with Down syndrome in which 18.07% presented bucco-dental trauma occurrence; 12 with ADHD in which 25% presented some kind of bucco-dental occurrence; and 10 with autism in which 40% presented occurrence of some type of bucco-dental trauma. Analysis of the data showed evidence that the most frequent types of bucco-dental trauma found in these handicapped patients were enamel fracture (27.61%) and enamel and dentine fracture without pulp exposure (23.80%). Maxillary central incisors were the dental group mostly affected by trauma (82.29%), followed by maxillary lateral incisors (14.58%). The most frequently cause of such traumas involved falls during walking or running, and from hammock bed or chair (75%), followed by games (14.58%). Bucco-dental traumas occurred mostly in the age group of 1 - 7 years old (59.49%) and 7 - 14 years old (29.11%). Finally, Occurred mostly at home (78.43%), and some cases in the street (9.80%).

Keywords: Bucco-Dental Traumatism; Handicapped Patients; Pedodontics; Children; Teenagers

Abbreviation

ADHD: Attention Deficit Hyperactivity

Introduction

Dental traumas are the most commonly found lesions in children and teenagers, either isolated or associated with other facial lesions. They may occur in both primary and permanent dentition and their treatment depends on type, duration and intensity of the lesion. Exfoliation of primary teeth and odontogenesis of permanent teeth are also considered [1]. Moreover, dental traumas may result in functional and esthetic concerns.

The number of etiologic factors involving dental trauma is high, with falls being the main cause. The trauma produced by fights, automobile accidents, games, and sports are also common, with skate boards and roller skates contributing to the increase in the incidence of dentofacial trauma [1,2]. In fact, dentofacial trauma are common during the life mainly in childhood.

With handicapped children, on the other hand, the same cases theoretically would not happen regarding etiology, consequences, etc. Being handicapped does not limit certain activities that may be considered a starting point to the occurrence of dentofacial trauma.

Within this context, theoretically, the neurologically handicapped patients would not have to worry about dentofacial trauma as much as “normal” patients in terms of neuro psychomotor development. Thus, the presence of a particular limitations, which in many cases represents a barrier to performing common activities (e.g. running, playing around, jumping, walking, practicing sports, etc.), could be faced as a factor inhibiting the occurrence of dentofacial traumatism in this kind of patient.

Authors are unanimous in affirming that the incidence of traumatic events is twice higher in boys than in girls who had suffered a trauma, occurring more predominantly in the age range of 8 - 11 years old. In fact, more than 40% of the school-age children have more than one dental traumatism. Maxillary central incisors are the dental group mostly affected by traumatic dentofacial events, accounting for 70% [3,4].

When one refers to the occurrence of bucco-dental traumatic events in neurologically handicapped children presenting delay in their neuropsychomotor and cognitive development, the most common finding is that mental retardation and epilepsy may be responsible for the occurrence of dentofacial traumatism [5].

For Correa [6], “handicapped patient is the individual presenting a particular deviation from the physical, mental, social or emotional normality who needs special care over the entire life or for a period of his or her life”.

Non-progressive cerebral palsy or chronic encephalopathy in the childhood is not considered a specific illness, however the term is accepted to designate one set of neuropsychomotor dysfunctions which are caused by lesions in the central nervous system. When it is found in the maturation phase, includes the following: weakness, muscular rigidity or paralysis, balance deficiency or irregular locomotion, and involuntary or uncoordinated movements.

The Down syndrome, 21-trisomy syndrome or mongolism, is characterized by mental deficiency and physical anomalies due to the exceeding presence of genetic material in the chromosome 21. The incidence rate is seen in one in every seven hundred children, being more frequent among those conceived by women over 40 [7,8].

Autism is a disorder affecting mental and emotional development and impairing learning, communication, and social skills. It often manifests itself during the first three years of life, being difficult to be diagnosed. This pathological condition occurs in approximately 5:10.000 births, manifesting mostly in boys than in girls [8].

In 1995, Arnold and Jensen [9], reported that the attention deficit hyperactivity disorder (ADHD) represents the most serious congenital neurobehavioral condition in children and teenagers. These individuals find very difficult to write, walk, brush their teeth and tie their shoelaces. Although their coefficient of intelligence is normal, they have an unsatisfactory performance in classroom due to their lack of attention and collaboration regarding the school activities. The prevalence of ADHD ranges from 3 to 5% among school-age children, affecting mostly males.

According to Sanders., *et al.* [8], there is an elevated incidence of dental lesions in neurologically and mentally impaired patients, a phenomenon is strictly related to factors such as poor motor coordination, epilepsy, or lack of personal specialized training programs in institutions that provide shelter to this kind of patient. The use of drugs prescribed by neurologists for neurological control of the patients also becomes the cause of bucco-dental traumatism. The cause of dental fractures would involve the violent clenching of the teeth in these patients 3 or 4 hours after taking the drug.

The objective of the present work was to investigate type and distribution of diverse demofacial trauma among in neurologically handicapped patients, including the presence of ADHD and poor neuropsychomotor and cognitive development, represented by the following types of diagnosis: cerebral palsy, Down syndrome, autism, and hyperactivity. In this context, we will be investigating etiology, age group versus higher incidence, type of trauma versus frequency, physical environment (stage), and most frequently affected dental group. Therefore, the several situations affecting these kinds of patients are known so that special treatments can be established.

Materials and Methods

Anamnesis, visual clinical examination (visual inspection), and previously elaborated clinical records were employed in this research. All neurologically handicapped patients from the city of Belém, State of Pará, were enrolled in the following PNE educational institutions: CEDi, IONPA, SABER, Fundação Pestalozzi do Pará and APAE.

The study was more intensively performed on patients with some kind of syndrome and/or neurological alterations responsible for the delay in their neuropsychomotor and cognitive development, such as cerebral paralysis, Down syndrome, autism, and ADHD by the fact that these pathological conditions are the most frequently found among the institutions studied.

The anamnesis, focused on investigating the bucco-dental traumatism occurrence, took place during the clinical record service. At the same time, information was collected from both patients and their caregivers by asking them to attend the visual clinical examination, which was performed by previously calibrated examiners under natural and/or adequate artificial light and using wooden spatulas for spreading apart lips, tongue and cheeks to allow a better visual field. The cases referring to the episodes of dental commotion were evidenced through the stories told by the caregivers.

Data on the patient's identification, syndrome and main characteristics of the syndrome were put on clinical records, whereas a questionnaire was applied to the caregivers to fill out the form of the dentofacial trauma. In addition, the caregivers signed an informed consent form.

The statistical analysis of the dentofacial traumatism occurrence was carried out by recording the data collected into Microsoft Word files in the form of tables and texts. The descriptive analysis was performed by using the rule of four simples:

1. Patients with cerebral palsy associated with hyperactivity, autism, microcephaly, hydrocephaly, stroke, mental retardation, epilepsy, mental deficiency, visual and/or hearing deficiency, feeding difficulties, intestinal constipation, and schizophrenia were considered as carriers for a definite picture of cerebral palsy.
2. Patients with Down syndrome patients associated with hyperactivity, autism, visual and/or hearing deficiency, and cerebral palsy were considered as carriers of Down syndrome.
3. Patients with autism associated with hyperactivity were considered as autistics.
4. Among the patients with ADHD, only those presenting this type of isolated pathological clinical picture were considered as such. In other words, no association was found in clinical pictures associated with either cerebral palsy, Down syndrome or autism.

Among the handicapped patients, it was observed that the level of neuropsychomotor and cognitive involvement ranged from the mildest (where the patient is able to perform many daily-life activities such as feeding, clothing, hygiene, mobility, locomotion and communication) to the most severe (where the patient is totally dependent, almost always requiring the use of special carts or wheel chairs adapted to locomotion, special cutlery with thickened handle, cups and glasses with drinking straws and wide handles, and plates with suckers for the feeding process).

As a method for ranking the dental traumatic occurrences found, we used the type of classification recommended by Nogueira [1].

Results

	Male		Females		Total
	Number of cases	Percentage %	Number of cases	Percentage %	Percentage %
Presence of dental trauma	40	16.59	28	11.61	68 (28.2%)
Absence of dental trauma	101	41.90	72	29.87	173 (71.77%)
Total	141	58.49	100	41.48	241 (100%)

Table 1: Total of handicapped patients examined according to gender and presence or absence of dental trauma. Source: Nogueira, et al. 2003.

We can observe that handicapped male patients suffered a higher number of traumas (16.59%) considering the total of 241 handicapped patients.

	With Trauma			Without Trauma			Total
	Male	Female	Total	Male	Female	Total	
	Number of cases			Number of cases			
Cerebral palsy	31	21	52	59	46	105	157
Down syndrome	03	05	08	33	24	57	65
Hyperactivity	04	0	04	06	01	07	11
Autism	02	02	04	03	01	04	08
Total	40	28	68	101	72	173	241

Table 2: Handicapped patients examined and the association with presence or absence of trauma according to type of mental condition and gender.

Source: Nogueira, et al. (2003)

Shows 52 patients with cerebral palsy, 8 with Down syndrome, 4 hyperactive patients, and 4 autistics who suffered dental traumas. We emphasize here that we found no hyperactive female patient with dental trauma and that female patients with Down Syndrome, on the other hand, had a higher incidence of dental trauma.

Nº	Trauma	Number of cases	Percentage %
1	Enamel and dentin fracture without pulp exposure	25S	26.89
2	Commotion	24	25.81
3	Enamel fracture	23	24.74
4	Fissure	09	9.68
5	Enamel and dentin fracture with pulp exposure	5	5.37
6	Avulsion	5	5.37
7	Intrusion	1	1.07
8	Extrusion	1	1.07

Table 3: Frequency of type of dental trauma among handicapped patients in Belém, 2003.

Source: Nogueira, et al. (2003)

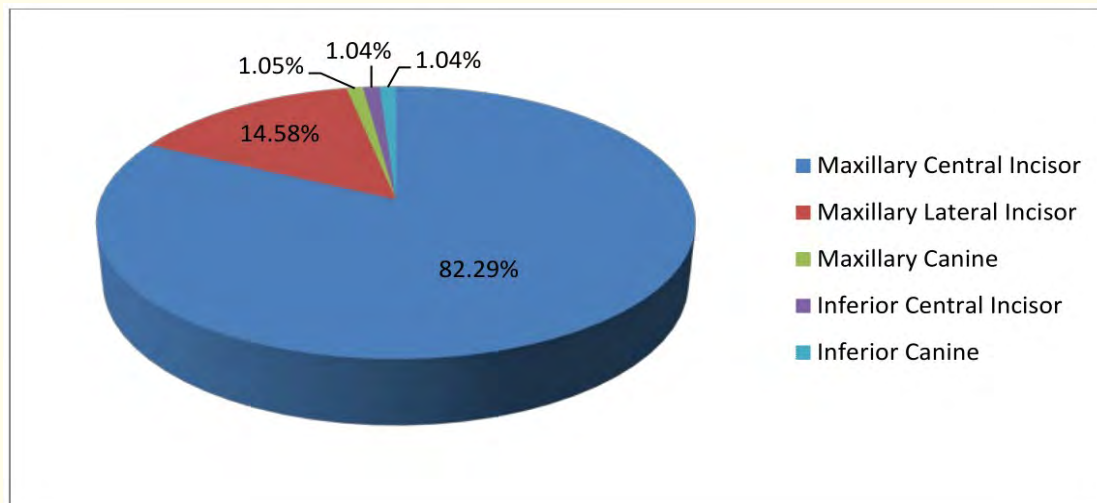
As to the type of trauma found among the handicapped patients, we observed that the enamel and dentin fracture without pulp exposure (26,89%) were more frequent followed by the commotions (25,81%) and enamel fractures (24,74%).

Table 4 shows evidence that falls are the most frequent cause (32.83%) of the dental trauma in the handicapped patients examined. We still observe that 28.36% of the patients did not know how and where their trauma had occurred. As for the places, we identified that dental trauma mostly occurs among handicapped patients at their homes, opposing to leisure places (2.94%). A significant number of 20 patients (29.41%) do not remember where they suffered dental trauma. In the present research, the age group of higher occurrence of dentofacial traumatism in handicapped patients was from 0 to 7 years old (51.86%).

		Number of Cases	Percentage %
Causes	Falling down	22	32.83
	Trick	15	22.38
	Collision with objects or people	09	13.44
	Fortuity	02	2.99
	Don't know	19	29.36
Age group	0 to 7 years old	125	51.81
	7 to 14 years old	116	48.14
Places	Home	37	54.42
	Street	06	8.82
	School	03	4.41
	Leisure (pool, river, etc.)	02	2.94
	Don't remember	20	29.41

Table 4: Causes, handicapped patients' age and place of higher occurrence of dental traumas.

Source: Nogueira, et al. (2003)



Graph 1: Percentage of trauma cases according to damaged teeth in handicapped patients in Belém, 2003.

Source: Nogueira, et al. (2003)

In table 5, when relating the type of mental condition to the type of trauma occurred in handicapped patients, we observe that dental commotion was more common in patients with cerebral palsy (29.58%). In patients with Down syndrome, enamel and dentin fracture without pulp exposure represented 53.85% of the cases. In patients with autism and hyperactivity, the type of dental trauma more commonly found in this research was enamel fractures, with 75% and 40%, respectively. We also found that dental commotions occurred in hyperactive patients, accounting for 40% of the cases – a significant data despite the small number of patients.

Mental condition	Type of dental trauma	Number of occurrence	Percentage %
Cerebral palsy (71 cases)	Commotion	21	29,58
	Enamel/dentin fracture without pulp exposure	18	25,36
	Enamel fracture	13	18,30
	Fissure (bite their own teeth)	08	11,27
	Enamel/dentin fracture with pulp exposure	05	7,04
	Avulsion	05	7,04
	Extrusion	01	1,41
Down syndrome (13 cases)	Enamel/dentin fracture without pulp exposure	07	53,85
	Enamel fracture	05	38,46
	Commotion	01	7,69
Hyperactivity (5 cases)	Enamel fracture	02	40
	Commotion	02	40
	Enamel fissure	01	20
Autism (4 cases)	Enamel fracture	03	75
	Intrusion	01	25

Table 5: Types of dental trauma related to type of mental condition in handicapped patients in Belém, 2003.

Source: Nogueira., et al (2003)

Discussion

We had examined 157 cerebral palsy patients, with 52 presenting occurrence of dentofacial traumatism, 31 in males and 21 in females. The findings are in accordance with Sanders., et al. [8], who report that the patients with cerebral paralysis are more susceptible to dentofacial traumas, mainly affecting anterior teeth of the maxilla. This situation is closely related to the increasing tendency of falls resulting from cognitive and neuro psychomotor impairment because of the irreversible cerebral lesion affecting these patients. Moreover, decreased extensor reflex and protrusion of the upper anterior teeth were also found.

Result show that, 8 cases out of 65 Down Syndrome had dentofacial trauma, with 3 being males and 5 females. One of the justifications for such a finding could be the fact that these patients present characteristics of mental deficiency concomitantly with some physical anomalies, which leads to an impossibility to relate mental level to chronologic age, thus interfering with their daily activities [7,10].

Similarly, it was observed that out of the 11 ADHD patients, 4 presented occurrence of dentofacial traumatism, affecting all the males patients studied. This is justified by the fact that they are almost always running, climbing up and down the stairs and, occasionally, falling down. Moreover, these lesions are not always part of an accidental event, for this kind of patient tends to suffer more physical abuse

from the parents than a healthy child because ADHP, in the majority of the cases, represents a determinant factor for the impatience of the parents and/or caregivers [6]. Such a situation can be aggravated, developing then the battered-child syndrome [1,11,12], which is a term coined by ignorance and/or psychological problems of the parents and/or caregivers. Moreover, some facial proportions typically seen in hyperactive children, such as pointy chin, short upper lip, and wide mouth, can in a certain way favor the incidence of bucco-dental traumatism in this patients [13].

Finally, it was also observed that out of the 8 autism patients, half presented occurrence of dentofacial traumatism, affecting both genders equally. This finding could be justified by the fact that these patients frequently present decreased muscular tonus, poor motor coordination (because of the lack of tongue coordination, they tend to swallow the food without chewing it), hyperactive knee reflexes, and strabismus, whereas 30% develop epileptic episodes [10].

Based on the results found in this present research, we observed that in the 241 patients examined, the most common types of dentofacial trauma were enamel and dentin fractures without pulp exposure (26.89%), followed by commotion (25.81%) and enamel fractures (24.74%). These findings are in accordance with Meira, *et al.* [14] and Macko, *et al* [15].

By analyzing the results obtained from the dental group with higher incidence of dentofacial traumatism, it was shown that maxillary central incisors were the teeth most commonly affected by traumatic events (82.29%), followed by maxillary lateral incisors (14.58%). These findings are in the accordance with Nogueira [1,16], who affirms that in both primary and permanent dentitions the teeth most frequently hit by traumatic events are the maxillary central incisors, followed by maxillary lateral incisors. This finding is also corroborated by Macko [15], Herforth [17] and Scarpari, *et al* [18].

The types of causes mostly accounting for the occurrence of dentofacial traumatisms showed in this present research that falls (walking, running or falling from hammock bed, chair, or bicycle) were the most frequent causes of traumatic events involving handicapped patients (32.82%), followed by games (22.38%). These findings are in accordance with Issao and Guedes Pinto [19], who affirmed that falls are the main causes accounting for the occurrence of traumatic events.

Still, in the analysis of the results, it was shown that the age groups most affected by traumatic events ranged from 0 to 7 years old (51.86%) and from 7 to 14 years old (48.14%). These findings are in accordance with McDonald and Avery [20], who report that such handicapped patients aged between 1.5 and 2.5 years old were more susceptible to dental traumas as they are just learning to walk. For Finn [21], 80% of the traumas involving oral cavity were found in pre-school children. Hotz [22] reports that children aged 2 - 3 years old were more likely from suffering some kind of dentofacial traumatism as they were completely unaware about the risks. Nogueira [1] affirms there are a vast range of opinions on the occurrence of traumatism in primary dentition, almost always relating age group to poor motor coordination. Thus, for the majority of the cases, the age group of 18 - 36 months old corresponds to the highest incidence of traumatic events.

With regard to school-age children, those aged between 7 and 11 years old were found to be more susceptible to traumatic events [17,22,23].

With regard to the places of occurrence of traumatic events involving handicapped patients, it was shown that the most common place is own patient's home (54.42%), followed by streets (8.82%) and school (4.41%). These findings are in accordance with Nogueira, *et al.* [16], who report an incidence of 52% for traumatic events at house, 16% for traumatic events in the streets, and 9% for traumatic events in schools [24,25].

Conclusion

The total occurrence of dental traumatismos in handicapped patients were 27.16%. The highest percentage of traumatic dentofacial events involved handicapped male patients, the most frequently age group affected ranged from 0 to 7 years old.

The most frequently dental trauma found among handicapped patients involved enamel and dentin fracture, the dental group most commonly affected by traumatic dentofacial events consisted of maxillary central incisors, being the most commonly causes involved falls (walking, running, falling from hammock, bed, or chair) and the place (stage) of higher incidence was their own home. It is necessary, when treating dentofacial traumatic events in handicapped patients, to consider their physical, intellectual and motor limitations for establishing preventive alternatives to avoid such traumas.

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Conflict of Interest

No conflict of interest.

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