Pesquisa Brasileira em Odontopediatria e Clínica Integrada

ISSN: 1519-0501

apesb@terra.com.br

Universidade Federal da Paraíba

Brasil

Pelli Paiva, Paula Cristina; Neves de Paiva, Haroldo; Alves Lamounier, Joel; Zarzar, Patrícia Maria

Prevalence of Dental Trauma and Association with Alcohol Consumption, Demographic and Clinical Factors Among 12-Year-Old Schoolchildren: An Exploratory Study

Pesquisa Brasileira em Odontopediatria e Clínica Integrada, vol. 14, núm. 2, 2014, pp. 151-159

Universidade Federal da Paraíba

Paraíba, Brasil

Brazilian Research in Pediatric Dentistry and Integrated Clinic 2014, 14(2):151-159
DOI: http://dx.doi.org/10.4034/PBOCI.2014.142.09
ISSN 1519-0501

Original Article

Prevalence of Dental Trauma and Association with Alcohol Consumption, Demographic and Clinical Factors Among 12-Year-Old Schoolchildren: An Exploratory Study

Paula Cristina Pelli Paiva[1], Haroldo Neves de Paiva[2], Joel Alves Lamounier[3], Patrícia Maria Zarzar[4]

[1]Post-graduate Program in Health Sciences, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.
[2]Post-graduate Program in Odontology, Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, MG, Brazil.
[3]Department of Child and Adolescent Health, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.
[4]Department of Pediatric Dentistry and Orthodontics, Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.

These authors contributed equally to this work.

Author to whom correspondence should be addressed: Paula Cristina Pelli Paiva. Praça Doutor Prado, 31 Diamantina, Minas Gerais. Phone: 55(38)35314079. E-mail: paulacpp@ig.com.br.

Academic Editors: Alessandro Leite Cavalcanti e Wilton Wilney Nascimento Padilha

Received: 28 January 2014 / Accepted: 25 May 2014 / Published: 10 June 2014

Abstract

Objective: To investigate the prevalence of traumatic dental injury (TDI) of the permanent incisors and association with alcohol consumption, socioeconomic status, gender, overjet and lip coverage among 12-year-old schoolchildren in the city of Diamantina, in the state of Minas Gerais, Brazil. **Material and Methods:** An exploratory cross-sectional study was carried out with a convenience sample of 101 schoolchildren (46.5% males and 53.4% females) selected from public and private schools. The diagnosis of TDI was performed by a dentist who had undergone a training and calibration exercise using the Andreasen classification. Data analysis involved the determination of frequency distribution and the chi-squared test ($p<0.05$). **Results:** The prevalence rates of TDI, alcohol consumption and binge drinking were 33.7%, 37.6% and 24.8%, respectively. The main type of TDI was enamel fracture (53.6%), followed by enamel + dentin fracture without pulp exposure (n=29; 4%). Only 9.8% of the adolescents with TDI underwent subsequent treatment. Significant associations were found between TDI and the male gender ($p=0.029$), overjet ($p<0.0001$) and inadequate lip coverage ($p<0.0001$). No associations were found with socioeconomic status ($p=0.579$), household income ($p=0.776$), alcohol consumption ($p=0.281$) or binge drinking ($p=0.207$). **Conclusion:** High prevalence rates of TDI, alcohol consumption and binge drinking were found among the 12-year-olds analyzed. TDI was associated with gender and lip coverage, but no associations were found with socioeconomic status or alcohol consumption.

Keywords: Dental trauma; Binge drinking; Adolescent; Oral Health.

Introduction

Dental trauma is one of the most serious public health problems among children and adolescents. This is due to its high prevalence, high psychosocial impact and the high cost of treatment [1]. The prevalence of traumatic injuries reported in population-based studies is high, ranging from 2.66% [2] to 58.6% [3]. In Brazil, prevalence studies of permanent dentition demonstrated that results relating to 12-year-old students ranged from 10% [4] to 58.6% [3].

There are several factors associated with the etiology of dental trauma, with the most important being impacts, falls, sporting activities, and car and bicycle accidents [5]. Predisposing anatomic factors also add to the risk of dental trauma, such as accentuated overjet [6,7] and inadequate lip protection [8]. Other risk factors associated with dental trauma, such as environmental factors and the adoption of risk behaviors such as alcohol consumption are rarely discussed in literature [9,10]. An expansion of the discussion of this subject may increase understanding of the problem and assist in the implementation of prevention programs and greater control of these public health problems.

The aim of this study was to investigate the prevalence of dental trauma and assess its association with gender, overjet, lip protection, socioeconomic status and alcohol consumption among 12-year-old adolescents from the city of Diamantina, Minas Gerais.

Material and Methods

Sample characteristics

This study was conducted in Diamantina, a municipality of approximately 46,372 inhabitants located in the northeast of the state of Minas Gerais (IBGE) [11]. The study population included a convenience sample totalling 101 12-year-old students from two public schools and one private school.

The study was approved by the Ethics and Research Committee of the Federal University of Minas Gerais (317/11). The authorization of the participating schools was obtained, as well as the free and informed consent of the participants and their parents. Participants had their confidentiality guaranteed.

The criteria for inclusion used were: adolescents enrolled in public and private schools in the urban area of the city of Diamantina who were 12 years old on the day of the examination, who agreed to participate in the study, and whose participation was authorized by their parent/guardian signing the applicable consent form. Adolescents not authorized by their parent/guardian, who declined to participate in the study or had cognitive difficulties that would prevent the application of the research tool were excluded.

Clinical data

The team consisted of a previously trained and calibrated examiner and an annotator. The Kappa values for intra and extra examiner calibration were 0.79 and 0.85, respectively. The

prevalence of dental trauma was measured using the Andreasen classification [12]. Data collection was carried out in school on previously scheduled days and times. A room was reserved for the clinical examinations, avoiding the embarrassment of students being examined in front of their school classmates. For the clinical exam, the student was positioned sitting in front of the examiner. The permanent incisors were examined with the aid of previously sterilized clinical instruments and artificial lighting (Petzl Zoom head lamp; Petzl America, Clearfield, UT, USA) to accurately detect the items included in the classification. The teeth were cleaned and dried with gauze. The dental crown was examined with the aid of dental mirror for loss of tooth substance, change in color, intrusion, extrusion, lateral luxation or avulsion, and was then compared to the contralateral teeth. A clinical probe was used for the removal of residues and evaluation of the presence and extent of aesthetic restorations. Special care was taken to avoid cross contamination.

To measure the size of overjet, straight edge tongue depressors were used. The child was positioned in a centric occlusion position and overjet measured from the labial surface of the lower incisor to the incisal labial surface of the most prominent upper incisor. The tongue depressor was positioned perpendicular to the buccal surface of the lower incisors and marked with HB grafite at the point of contact with the buccal surface of the upper incisors. The measurement of overjet was achieved by marking the reading with a digital caliper. A measurement of ≥3 mm was considered to represent accentuated overjet [6].

For the evaluation of lip protection, the method proposed by O'Mullane[8] was adopted, as appropriate. This involves ascertaining whether the lip coveres the upper incisors when at rest. To do this it was necessary to observe the students without their knowledge.

Non-clinical data

The AUDIT instrument, originally validated in Brazil [13], consists of ten questions about recent use of alcohol, symptoms of dependence and alcohol-related problems. Responses are scored from 0 to 4. To assess the consumption of alcoholic drinks, the study focused on 12-year-old adolescents, and a shorter version of the test, the AUDIT-C, was used. The test consists of questions related to the frequency and amount of alcohol consumed. Responses were scored from 0 to 12 [14]. The AUDIT-C questionnaire is comprised of the following questions: 1. With what frequency have have you consumed alcoholic beverages in the last year?; 2. How many units of alcohol do you consume in a normal day?; and 3. How often do you consume five or more drinks on a single occasion? Response options to the first question were: never, once a month or less, 2-4 times per month, 2-3 times a week, 4 or more times per week. For question 2 the answers were: 1, 2, 3 or 4, 5, 6 or 7, 8 or more. For question 3 the answers were: Never, less than once per month, once per month, once per week, daily, or almost every day. This quick, easily applicable tool has been used previously with adolescents and found suitable for use with this population group [9,10].It has the advantage of highlighting study participants who are beginning to have problems with alcohol [14].

The abuse of alcohol is defined as consuming five drinks or more on a single occasion [15]. To characterize the abusive consumption of alcohol the third question of the AUDIT-C tool was used. Responses were dichotomized as 0 for those who never consumed alcohol abusively, and 1 for those who consumed alcohol abusively once a month or less, to daily or almost every day.

Socioeconomic variables were collected using the ABA-ABIPEME [16] instrument, which is related to ownership of possessions. Responses were dichotomized into upper socioeconomic classes (A and B) and lower socioeconomic classes (C, D and E). Family income was evaluated by the number of minimum wages received by all economically active members residing with the teenagers, and categorization was performed from the median.

All adolescents with dental trauma were referred to the Diamiantina municipal dental clinic for free treatment.

Descriptive analysis of the data for sample characterization was performed, followed by bivariate analysis using the Chi-squared test with a significance level of $p<0.05$. The Statistical Package for Social Sciences 19.0 (SPSS) program was used.

Results

The convenience sample consisted of 101 students (46.5% males and 53.5% females. The prevalence of dental trauma was 33.7%, 37.6% of participants consumed alcohol, and 24.8% reported excessive consumption of alcohol. Most students attended public schools n = 83 (82.2%), belonged to a low socioeconomic class family n = 80 (79.2%), and had a family income of up to 3 minimum wages n = 77 (76.2%).

The teeth most affected were the maxillary central incisors and there was no statistical difference between the right and left (p = 0.999) incisors. Most students had only one traumatized tooth n = 32 (91.4%) and the most prevalent injury was enamel fracture (n = 22/53, 6%) followed by enamel and dentin fracture without pulp exposure (n = 12/29, 4%) (Table 1).

Table 1. Distribution of dental trauma, according to teeth affected, number of teeth involved and type of traumatic injury in a sample of 101 children from the city of Diamantina, MG.

Variable	n	%
Affected teeth		
11	13	33.3
12	2	5.1
21	12	30.8
22	4	10.2
32	3	7.7
31	1	2.6
41	4	10.3
Total	39	100
Number of affected teeth		
One	32	91.4
Two	2	5.7

Three	1	2.9
Total	35	100
Type of injury		
Enamel fracture	22	53.6
Enamel / dentin fracture without pulp exposure	12	29.4
Restoration due to trauma	4	9.8
Intrusive luxation	1	2.4
Coloration change	2	4.8
Total	41	100

Statistically, dental trauma was significantly associated with gender (p = 0.024), increased overjet (p <0.0001) and inadequate lip protection (p <0.0001) but was not associated with socioeconomic status (p = 0.579), the consumption of alcoholic beverages (p = 0.281) or abusive consumption of alcoholic beverages(p = 0.207). Table 2 shows the frequency distribution and the result of the association between the dependent variable presence of dental trauma and the independent variables.

Table 2. Association between dental trauma and the independent variables among 101 students aged 12 years from the city of Diamantina, MG.

Independent Variables	Yes n(%)	No n(%)	Total n(%)	Value of p[1]	OR (IC 95%)*
Gender					
Masculine	21 (61.8)	26(38.8)	47(100)	0.029	2.48IC95%(1.09-5.95)
Feminine	13 (38.2)	41(61.2)	54(100)		
Overjet					
≥ 3 mm	26 (54.2)	22 (45.8)	48 (100)	0.0001	6.64IC95%(2.59-7.05)
< 3 mm	8 (15.1)	45 (84.9)	70 (100)		
Labial projection					
Adequate	9 (17.3)	43 (82.7)	52 (100)	0.0001	4.97IC95%(2.00-12.4)
Inadequate	25 (51.0)	25 (49.0)	49 (100)		
Socioeconomic condition					
High	6 (17.6)	15 (22.4)	21 (100)	0.579	7.4IC95%(0.26-2.12)
Low	28 (82.4)	52 (77.6)	80 (100)		
Family income					
½ a 3 salaries	26 (78.8)	52 (76.1)	78 (100)	0.766	1.16IC95%(0.42-3.18)
> 3 salary	7 (21.2)	16 (23.9)	23 (100)		
Consumption of alcoholic drinks					
Yes	15 (45.5)	19 (34.3)	34(100)	0.281	1.54IC95%(0.68-3.73)
No	23 (54.5)	44 (65.7)	67(100)		

[1] Pearson's Chi-squared test. Significant association at the level of 5.0%. * - OR odds ratio – CI Confidence Interval

Discussion

Adolescence is characterized by doubt, conflict, change and discoveries in the life of an individual. Physical and psychological differences eventually cause adolescents to become more vulnerable to environmental and social situations [17]. The high prevalence of dental trauma and the consumption of alcoholic drinks reported in this study may be a consequence of the state of vulnerability inherent during this period [17]. This vulnerability may undermine the psychological,

social or mental condition of adolescents, highlighting the need to address these serious public health problems [18].

This study chose adolescents aged 12 as this age coincides with the end of mixed dentition and is the period of the highest incidence of dental trauma [12]. Another justification for using this age is the precocity with which adolescents are experimenting with alcohol [18]. It is essential to be aware of this reality among the group studied. The prevalence of dental injuries in this study was 33.7%, and similarly high values have been reported for the cities of Montes Claros (34.9%) [19] and Blumenau (29.7%) [20]. Lower figures, however, were found in studies based in Pelotas (12.6%) [21], João Pessoa (20%) [22], Recife (15%) [23], Campina Grande (12.7%) [24] and Belo Horizonte (24.7%) [10]. The diverging values reported may be partly explained by the different methodologies used, as well as by cultural and socioeconomic disparities in each region. In a recent review of literature on the epidemiology of dental trauma in Brazil, the authors focused on geographical characteristics, socioeconomic and cultural differences and highlighted the need for more studies on the topic [25].

The maxillary central incisors were the most affected teeth, probably due to such teeth having a more anterior and prominent position in the dental arch, something that is predisposed to trauma [12]. Most adolescents had only one injured tooth and the most frequent injury observed was enamel fracture. These results corroborate with national [9,10,19-24] and international studies [5,26-28] that have evaluated the type and number of affected teeth, as well as the type of injuries observed.

Dental trauma was more frequent in males and this difference was statistically significant, a finding that agrees with the results of most studies, which also reported greater dental trauma among boys [9,10,19-25]. Some studies have shown that males are up to twice as likely to suffer trauma as females. This is perhaps due to their greater participation in sports and street games [11].

The collection of socioeconomic data by means of questionnaires completed by parentsand analysis of the relationship between alcohol consumption and dental trauma differentiated the present study from other investigations in this subject area. Furthermore, the present study focuses on a specific age and analyzes alcohol use at an early age.

There is no consensus among existing literature regarding the association between socioeconomic status and dental trauma [30]. The present study did not find a statistical association for any of the indicators adopted. In this study, no statistical association was observed for any of the indexes adopted. This result agrees with other studies conducted in Brazil [5,9,21,23]. Some studies found a statistical association among adolescents from higher social classes, a result which disagrees with that of the present study, although this difference may be partly explained by greater access to sports, parks, clubs and toys of such adolescents, without, however, the proper use of protective equipment [9,29]. Well-designed longitudinal studies are important to better understand the association between socioeconomic status and dental trauma.

The prevalence of dental trauma increases directly in proportion to increased overjet [7]. In order to associate the risk of dental trauma with the values of overjet, a meta-analysis of the results of 11 articles identified by a literature search of Medline (1966 to 1996) was conducted. It was concluded that children with overjet greater than 3 mm are approximately twice as likely to suffer dental trauma than those with overjet of less than 3 mm, which is the reason why this value was adopted in the present study to characterize increased overjet. Many studies have shown an association between an increase in overjet size and a greater propensity of dental trauma, which coincides with the results observed in the sample studied [3-7,9,10].

Inadequate lip protection was statistically associated with the presence of dental trauma. One of the functions of the upper lip is to absorb the impact and protect the teeth during an accident. Children who do not have proper lip protection are more prone to fracturing of their anterior teeth fractured [8,9,21].

No statistically significant association was found in this study between the consumption of alcohol and the occurrence of dental trauma, ($p = 0.281$). However, in a study of students aged 14 to 19 years old, using the same methodology, it was observed that dangerous alcohol use was associated with dental trauma regardless of demographic or clinical variables [9]. While this difference is not statistically significant in the present study, the results indicate a trend toward a higher incidence of dental trauma in adolescents who consume alcohol. The high prevalence of alcohol consumption in general, as well as in adolescents who report having drunk five units of alcohol on a single occasion, is of concern as this is a vulnerable population due to intense changes that occur in the transition between childhood and adulthood, and the adolescent's inclusion in the educational system.

The main consequences of alcohol consumption are physical, social and psychological problems [18]. Alcohol consumption is considered a risk factor for anti-social behaviour, crime, poor school performance, interpersonal violence, accidental injuries and traffic accidents [30]. The earlier the onset of alcohol consumption, the greater the risk of serious consequences arising, and as a result professionals who deal with this issue should be attentive to potential risks and consequences. Therefore, longitudinal epidemiological studies with representative samples are necessary to investigate the possible association/causality of alcohol as a mediator for the increased prevalence of dental trauma.

Conclusion

The prevalence of dental injuries and alcohol consumption by adolescents was high. The prevalence of dental trauma was associated with male gender, accentuated overjet and inadequate labial protection. Dental trauma was not associated with the consumption of alcoholic drinks or socioeconomic status.

References

1. Ramos-Jorge J, Paiva SM, Tataounoff J, Pordeus IA, Marques LS, Ramos-Jorge ML. Impact of treated/

untreated traumatic dental injuries on quality of life among Brazilian schoolchildren. Dent Traumatol 2014; 30(1):27-31.
2. Grimm S, Frazão P, Antunes JL, Castellanos RA, Narvai PC. Dental injury among Brazilian schoolchildren in the state of São Paulo. Dent Traumatol 2004; 20(3):134-8.
3. Marcenes W, Zabot NE, Traebert J. Socio-economic correlates of traumatic injuries to the permanent incisors in schoolchildren aged 12 years in Blumenau, Brazil. Dent Traumatol 2001; 17(5):222-6.
4. Soriano EP, Caldas AF, Diniz de Carvalho MV, Amorim Filho HA. Prevalence and risk factors related to traumatic dental injuries in Brazilian schoolchildren. Dent Traumatol 2007; 23(4):232-40.
5. Glendor U. Aetiology and risk factors related to traumatic dental injuries – a review of the literature. Dent Traumatol 2009; 25(1):19:31.
6. Nguyen QV, Bezemer PD, Habets L, Prahl-Andersen B. A systematic review of the relationship between overjet size and traumatic dental injuries. Eur J Orthod 1999; 21(5):503–15.
7. Bauss O, Freitag S, Röhling J, Rahman A. Influence of overjet and lip coverage on the prevalence and severity of incisor trauma. J Orofac Orthop 2008; 69(6):402-10.
8. O'Mullane DM. Injured permanent incisor teeth: an epidemiological study. J Ir Dent Assoc 1972; 18(4):160-173.
9. Oliveira Filho PM, Jorge KO, Ferreira EF, Ramos-Jorge ML, Tataounoff J, Zarzar PM. Association between dental trauma and alcohol use among adolescents. Dent Traumatol 2013; 29(5):372-7.
10. Jorge KO, Oliveira Filho PM, Ferreira EF, Oliveira AC, Vale MP, Zarzar PM. Prevalence and association of dental injuries with socieconomic conditions and alcohol/drug use in adolescents between 15 and 19 years of age. Dent Traumatol 2012; 28(2):136-41.
11. IBGE-Demographic Census 2010 – District Data for Minas Gerais. [cited 2012 Jun 12 12]. Available from: <http://www.bnb.gov.br/content/aplicacao/prodetur/downloads/docs/mg_7_2_inventario_oferta_turistica_informac_basica_distrito_100708.pdf>
12. Andreasen JO, Andreasen FM, Anderson L. Textbook and color atlas of traumatic injuries to the teeth. 4rd ed. Copenhagen: Munskgaard International Publishers, 2007. 772p.
13. Lima CT, Freire AC, Silva AP, Teixeira RM, Farrell M, Prince M. Concurrent and construct validity of the audit in an urban Brazilian sample. Alcohol Alcohol 2005; 40(6):584-9.
14. Reinert DF, Allen JP. The alcohol use disorders identification test: an update of research findings. Alcohol Clin Exp Res 2007; 31:185-99.
15. Wechsler H, Nelson TF. Binge drinking and the American college student: what's five drinks? Psychol Addict Behav 2001; 15:287-91.
16. Almeida PM, Wickerhauser H. Finding a better socio-economic status classification system for Brazil. J Marketing Res 1988; 19:240-50.
17. Sierra VM, Mesquita WA. Vulnerabilidades e fatores de risco na vida de crianças eadolescentes. São Paulo em Perspec 2006; 20:148-55.
18. World Health Organization. Management of Substance Abuse. The WHO ASSIST Project. Geneva: World Health Organization, 2008. [cited 2012 jun 15 06] <http://www.who.int/entity/substance_abuse/activities/assist/en/.pdf>
19. Paiva PCP, Paiva HN, Jorge KO, Oliveira Filho PM. Estudo transversal em escolares de 12 anos de idade sobre a necessidade de tratamento, etiologia e ocorrência de traumatismo dentário em Montes Claros, Brasil. Arq Odontol 2013; 49(1):19-25.
20. Silveira JLGC, Bana AJ, Arruda JAB. Traumatismos Dentários em Escolares de 12 anos do Município de Blumenau, SC, Brasil. Pesq Bras Odontoped Clin Integr 2010; 10(1):23-26.
21. Schuch HS, Goettems ML, Correa MB, Torriani DD, Demarco FF. Prevalence and treatment demand after traumatic dental injury in South Brazilian schoolchildren.Dent Traumatol 2013; 29(4):297-302.
22. Mota LQ, Targino AGR, Lima MGGC, Farias JFG, Silva ALA, Farias FFG. Estudo do Traumatismo Dentário em Escolares do Município de João Pessoa, PB, Brasil. Pesq Bras Odontoped Clin Integr 2011; 11(2):217-222.
23. Carvalho B, Brito AS, Heimer M, Vieira S, Colares V. Traumatismo Dentário em Adolescentes entre 15 e 19 Anos na Cidade do Recife – PE e Fatores Associados – Estudo Preliminar. Pesq Bras Odontoped Clin Integr 2013; 13(1):95-100.

24. Martins VM, Sousa RV, Rocha ES, Leite RB, Paiva SM, Granville-Garcia AF. Dental trauma among Brazilian schoolchildren: prevalence, treatment and associated factors.Eur Arch Paediatr Dent 2012; 13(5):232-7.
25. Traebert J, Claudino D. Epidemiologia do Traumatismo Dentário em Crianças: A Produção Científica Brasileira. Pesq Bras Odontoped Clin Integr 2010; 12(2):263-72.
26. Adekoya-Sofowora CA, Adesina OA, Nasir WO, Oginni AO, Ugboko VI. Prevalence and causes of fractured permanent incisors in 12-year old suburban Nigerian schoolchildren. Dent Traumatol 2009; 25(3):314-7.
27. Veire A, Nichols W, Urquiola R, Oueis H. Dental trauma: review of common dental injuries and their management in primary and permanent dentitions. J Mich Dent Assoc 2012; 94(1):41-5.
28. Rajab LD, Baqain ZH, Ghazaleh SB, Sonbol HN, Hamdan MA. Traumatic dental injuries among 12-year-old schoolchildren in Jordan: prevalence, risk factors and treatment need.Oral Health Prev Dent 2013; 11(2):105-12.
29. Bendo CB, Vale MP, Figueiredo LD, Pordeus IA, Paiva SM. Social vulnerability and traumatic dental injury among Brazilian schoolchildren: a population-based study. Int J Environ Res Public Health 2012; 9(12):4278-91.
30. MacArthur GJ, Smith MC, Melotti R, Heron J, Macleod J, Hickman M, Kipping RR, Campbell R, Lewis G. Patterns of alcohol use and multiple risk behaviour by gender during early and late adolescence: the ALSPAC cohort. J Public Health 2012; 34(Suppl 1):20-30.