Traumatic dental injuries in young children

INTRODUCTION

Dental traumatisms are the main emergency events in dentistry. Traumatic injuries are the result of impacts, where the attacking force overcomes the resistance found in bone, muscle and dental tissue and the extent of those injuries is directly related to the intensity, type and duration of the impact. Its occurrence is more frequent in childhood, due to the observed relationship between growth factors and physical and mental development of children. Trauma in the primary dentition may result in sequelae both on the traumatized teeth as on their successors. The deciduous teeth that have suffered trauma may have bleeding pulp, color changes, premature loss, internal or external resorption, pulp obliteration, ankylosis and pulp necrosis. The permanent successors the most common changes are hypocalcification and enamel hypoplasia, beyond the root laceration or coronary, odontoma formations, interruption or change of root formation and disturbances in eruption. Traumatic injuries in primary dentition generate discomfort situations, because it compromises the oral cavity and there is an emotional involvement of the child and family.

Children with trauma in the primary dentition requires a different approach from that held in the permanent dentition, this is because there is a close relationship between the deciduous tooth apex affected by trauma and the germ of the successor permanent tooth.

The upper arch and the central incisive are the most affected, starting with enamel fracture, followed by the color change, which are the most common types of trauma. The most frequent cause is a fall from height.
It is important to conduct a good interview, a good clinical examination and laboratory tests to provide a quick and appropriate treatment plan and postoperative follow-up, and in the cases of dentoalveolar trauma, it is important to know how to classify injuries and the structures involved. In the literature there is a great variety of studies trying to establish a pattern of involvement, however, there is still controversy. The lack of knowledge regarding the measures to prevent and treat cases of trauma and guide caregivers is also a problem.

Traumatisms in the primary dentition are common in children, since they are starting their activities as walking, running, cycling, and are a direct cause of loss of deciduous teeth. Therefore further studies to evaluate the prevalence and pattern, of involvement of primary teeth should be encouraged in an attempt to seek for more effective ways of preventing and improving the quality of life for children. For these reasons, it is the general practice dentist obligation, not only to the pediatric dentist, to provide emergency care to patients suffering from these injuries. First, knowing reassure the parents and guardians, as they are going through a time of great emotional discharge, but also by performing proper diagnosis and treatment.

The objective of this study is to verify the presence of dental trauma in children aged 0-6 years old at the Regional Hospital of Presidente Prudente. And also check the most frequent types of its causes and if there was specialized care.

**MATERIAL AND MÉTHOD**

This study was approved by the Research Ethics Committee of the University of West Sao Paulo, and all those responsible for the patients who participated in the survey were duly informed and signed the Free and Informed Consent Form. Seventy-eight children who attended the Hospital were evaluated 45 (57.5%) male and 33 (42.5%) female, with ages ranging between 0 and 6 years. The exclusion criteria were: children whom parents or guardians refused to participate or refused to sign the consent form; children who did not fit the age group 0-6 years and have some systemic condition that prevents them from having their proper motor development.

They were evaluated through a validated qualitative questionnaire applied to parents or guardians, where they were questioned about the presence of trauma, the cause and whether there were treated in specialized care.

The data collected on record were reported in Microsoft Excel spreadsheet for further statistical analysis. For this we used the Statistica Statsoft® South America software, using the correlation nonparametric Spearman.

**RESULTS**

Seventy-eight mothers or guardians who frequented the Regional Hospital of Presidente Prudente of the pediatric wards and pediatric beds were interviewed. Of the total, 35 (44.8%) reported trauma in primary teeth and 43 (55.2%) reported no occurrence of trauma (Figure 1).

![Figure 1: Prevalence of dental trauma.](image)

According to the evaluation of the questionnaires, it can be seen that the most affected gender was male 24 (68.5%) and female 11 (31.5%) (Figure 2). Of the 35 affected, 100% reported that the trauma was related to fall or hit, which is equivalent to a physical trauma. When it comes to age, most of the trauma occurred at 2 years 10 (28.5%), followed by 4 years 9 (25.5%) and 6 years 8 (23%), and 3 years old with 5 (15%) and 5 years old with 3 (8%) (Figure 3).

![Figure 2: Prevalence of dental trauma by gender.](image)

The region with most prevalence of trauma was the upper anterior 32 (91.5%), followed by the lower anterior 2 (5.5%), and the region with less trauma was the upper posterior region 1 (3%) (Figure 4). The most affected teeth due to trauma was the upper right central incisive 17 (48.5%), followed by the upper left central incisive 12 (34.3%), while the left lower central incisive is 3 (8.5%). The teeth that were less affected were the upper right lateral incisive and the upper right first molar and upper left canine 1 (2.9%) (Figure 5). In 23 (65.5%) there were

![Figure 3: Age of dental trauma.](image)
no reports of color change in dental crown, only 12 (34.5%) reported presence of browning (Figure 6). The treatment was sought in most cases 27 (77.2%) only 8 (22.8%) did not seek treatment for trauma (Figures 7 and 8).

In cases that the mother or responsible were looking for treatment only 8 (22.8%) were performed by a pediatric dentistry, and 27 (77.2%) was conducted by a general practice dentistry (Figure 8). After applying the Spearman correlation test, it was found positive correlation ship between the following variables (p <0.005): Darkening X Mobility; Darkening X Search for treatment; Mobility X Browning; early loss X Satisfaction; Search for X treatment satisfaction; X Early Loss.

**DISCUSSION**

Dentoalveolar trauma is considered a public health problem due to its high occurrence, and to have physical and emotional consequences and high cost of treatment.28

Traumatic injuries mainly affect the anterior teeth, thus, great problems of pediatric dentistry, it reaches a large number of children28 as seen in our study.

When a professional is asked to meet a patient who suffered trauma, he needs to be ready to solve physical problems and also, emotional problems of the child and family. The professional should be prepared to calm the child and parents.29

The prevalence and incidence of these injuries have increased in several countries. The highest number of trauma in primary teeth occurs between the ages of 10 months to 3 years old. Boys are more affected and the most affected teeth are the maxillary central incisive.28 These facts were confirmed in our study. Children of the city of Florianópolis, in 2002, were found with a high prevalence of trauma in primary teeth, aged 1-3 years in boys, due to fall, with multiple dental trauma and dental luxation as more frequent injury.25,29

According to the study of Chowdary et al.28 the male are more affected (66%), corroborating with our results (68.5%).

In 44.6% of the teeth soft changes were observed in the color of the crown and in our work we also observed 65.5%.25,29 Granville-Garcia et al.26 also found high prevalence of trauma in primary dentition, with greater involvement of the male, and the tooth 61. However, the enamel fracture was the type of injury that was most found. The same data confer with the results published by Kawabata et al.31 e Sousa et al.32

When the occurrence of injuries is studies it is found a large involvement of patients with 1 year of age, and accidents at home are the most common cause. There is no gender difference. However, there is great variability of results according to the region studied.33

Rajab et al.33 found a higher prevalence of injuries involving boys, with the falls in schools being the most common cause. The same was
verified by Kramer et al.\(^4\) in 2009, that found that 3-4 years old are the most prevalent ages.

Kramer et al.\(^4\) found a prevalence of 23.6\% of traumatism, with no statistically significant difference between gender. The most affected age group was 2-3 years old. The authors claim that this age group is most affected; it is the time when the child begins to acquire autonomy. Already at 12 months old, children have certain limitation of movement and many teeth are not erupted yet.

Wendt et al.\(^5\) observed the prevalence of trauma is 36.6\%, while Bhayya and Shyagalli\(^6\), noted that 76.13\%, in our study, we observed the prevalence of 44.8\%.

Losso et al.\(^27\) noted the importance of dealing with traumatic injuries in deciduous teeth, always thinking of the consequences to the permanent successor. The authors found prevalence in the age group of 1 to 3 years old.

Patients with protrusion of the superior central incisive are at a higher risk group\(^30\). However, a study with children in Saudi Arabia in 2001 found no relationship with accentuated overjet\(^37\).

As in our study, Chalisery et al.\(^38\), found that the upper central incisors are the most affected in cases of dental traumatism.

Regarding the etiological factors, falls resulting from sports and games always appear as the main factor. Second, are the objects and car accidents\(^28\). Researches have shown that caregivers and teachers do not have adequate knowledge of how to handle patients that suffered trauma, which probably happens in developing countries\(^39,41\). On the other hand, developed countries show a better preparation of teachers in schools, and also better prepared environments to prevent their occurrence.

Low demand for specialized care after traumatic injuries in deciduous teeth is actually found in the literature. It can be attributed to the lack of knowledge of the consequences to the germ of the permanent tooth\(^36\).

Assunção et al.\(^1\) state that there is a great variability of results when studying age, gender, etiology and the most affected teeth regarding dental trauma in early childhood, which is mainly due to region studied.

We as dentists should be engaged in the role of preventing the occurrence of trauma. Prevention is predominant in pediatric dentistry, like fighting to prevent caries, periodontal disease, malocclusion and other oral diseases. We must also try to prevent the occurrence of dental injuries. Unfortunately, our ability to prevent such things is limited. Live and grow results in a high risk of trauma. Children only learn to walk after several falls. Preventive measures including excessive protrusion correction from anterior incisive, use of chairs and seat belts, use of mouth guard in sports and parental supervision in recreational activities for children are necessary measures to prevent this type of problem\(^28\).

**CONCLUSION**

Dental trauma occurred in the primary dentition in 44.8\% of the studied population, and the most affected gender was male (68.5\%), at the age of 2 years old (25.71\%) in the anterior region (91.4\%) in the upper central incisive (51.42\%). By employing the Spearman correlation test, there was a positive correlation between the following factors: darkening and mobility, dimming and demand for treatment, early loss and satisfactory treatment, seeking treatment and satisfactory treatment.

**REFERENCES**

1. Assunção LRS, Cunha RF, Ferelle A. Análise dos traumatismos e suas seqüelas na dentição decídua: uma revisão de literatura. Pesqui bras odontopediatria clín integr. B. Odontopediatria. Clin. Integr. 2007;7(2):173-79.
2. Duarte DA, Bonecker MJS, Sant’anna GR, Suga SS. Caderno de odontopediatria: lesões traumáticas em dentes deciduos: tratamento e controle. Santos; 2001.
3. Moss SJ, Macaro H. Examination, evaluation and behavior management following injury to primary incisors. NY State Dent J. 1985;51(2):87-92.
4. Campos JADB, Zuanon ACC, Pansani CA. Traumatismo na dentição decídua e suas conseqüências na dentição permanente. ROBRAC 2001;10(30):26-8.
5. Alexandre GC, Campos V, Oliveira M. Luxação intrusiva de dentes deciduos. Rev Assoc Paul Cirur Dent. 2000;54(3):215-19.
6. Santos V, Seabra S, Chevitareze Z. Traumatismo dentário numa visão de promoção de saúde. Saúde & Amb Rev. 2010;5(1):1-7.
7. Zembruski C. Estudo da prevalência de traumatismos na dentição decídua em pré-escolares do município de Canoas RS [dissertação]. Campinas: Universidade Camilo Castelo Branco; 2001.
8. Cunha RF, Pugliese DMC. Vieira AE. Oral trauma in Brazilian patients aged 0-3 years. Dent traumatol. 2001;17(5):210-12.
9. Della Valle D, Chevitarese ABA, Modesto A, Castro LA de. Freqüência de traumatismo dentário em bebês. Rev Ibero-am Odontopediatr Odontol Bebê. 2003;6(34):464-69.
10. Meira R, Barcelos R, Primo LG. Respostas do complexo dentino-pulpar aos traumatismos em dentes deciduos. JBP – J Bras Odontopediatr Odontol Bebê. 2003;6(29):50-5.
11. Porto RB, Freitas JS, Cruz MR, Bressani AE, Barata JS, Araújo FB. Prevalence of dento-alveolar traumatisms in the urgency pediatric dental clinic of FO UFRGS. Rev Fac Odontol
12. Vasconcellos RJJH, Oliveira DM, Nogueira RVB, Maciel AP, Cordeiro MC. Trauma na dentição decidua: enfoque atual. Rev cir traumatol buco-maxilo-fac. 2003;3(2):17-24.

13. Simões FG, Leonardi DP, Baratto Filho F, Ferreira EL, Fariniiuk LF, Sayão SMA. Fatores etiológicos relacionados ao traumatismo alvéolo-dentário de pacientes atendidos no pronto socorro odontológico do Hospital Universitário Cajuru. RSBO. 2004;1(1):50-5.

14. Scarpini CEO, Possobon RF, Moraes ABA. Ocorrência de traumatismo em dentes deciduos de crianças atendidas no Cepae-FOP/UNICAMP. J Bras Odontopediatr Odontol Bebê. 2004; 7(35):33-40.

15. Zaze ASF, Assunção LRS, Provenzano MGA, Franzin LCS, Ferelle A, Cunha RF. Avaliação de traumatismos dentários em crianças assistidas em um pronto atendimento odontológico. Pesq Odontol Bras. 2004;18(sup):221.

16. Oliveira FAM, Oliveira MG, Orso VA, Oliveira VR. Traumatismo Dentoalveolar: revisão de Literatura, Rev cir traumatol buco-maxilo-fac. 2004;4(1):15-21.

17. Amorim NA, Silva TRC, Santos LM, Tenório MDH, Reis JIL. Urgência em Odontopediatria: perfil de atendimento da Clínica Integrada Infantil da FOUFAL. Pesq Bras Odontopediatr Clin Integr. 2007;7(3):223-27.

18. Moura LFAD, Ferreira DLA, Melo CP, Sady MCLM, Moura MS, Mendes RF et al. Prevalência de injúrias traumáticas em crianças assistidas na clínica odontológica infantil da Universidade Federal do Piauí, Brasil. Pesq. Bras. Odontopediatria Clin Integr. 2008;8(3):341-45.

19. Gulinelli JL, Saïto CT, García-Júnior IR, Panzarini SR, Poi WR, Sonoda CK et al. Ocurrence of tooth injuries in patients treated in hospital environment in the region of Araçatuba, Brazil during a 6-year period, Dent Traumatol. 2008;24(6):640-44.

20. Tzigkounakis V, Merglová V. Attitude of Pilsen primary school teachers in dental traumas. Dent Traumatol. 2008;24(5):528-31.

21. Trombini CS, Feldens EG, Feldens CA. Luxação intrusiva em dentes deciduos: relato de caso, Stomatos, 2008;14(27):74-86.

22. Cabral ACR, Duarte DA, Climene Valentim. Prevalência das injúrias traumáticas na dentição decidua. Rev odontol Univ Cid São Paulo. 2009;21(2):137-43.

23. Oliveira MSB, Carneiro MC, Amorim TM, Maia VN, Alvarez AV, Vianna MIP et al. Contexto familiar, traumatismo dentário e oclusopatias em crianças em idade pré-escolar: ocorrência e fatores associados. Rev Odontol UNESP. 2010; 39(2):81-8.

24. Cardoso M, de Carvalho Rocha MJ. Traumatized primary teeth in children assisted at the Federal University of Santa Catarina, Brazil. Dent Traumatol. 2002;18(3):129-33.

25. Siqueira MB, Gomes MC, Oliveira AC, Martins CC, Granville-Garcia AF, Paiva SM. Predisposing factors for traumatic dental injury in primary teeth and seeking of post-trauma care. Braz Dent J. 2013;24(6):647-54.

26. Firmino RT, Siqueira MBLD, Vieira-Andrade RG, Gomes GB, Martins CC, Paiva SM et al. Prediction factors for failure to seek treatment following traumatic dental injuries to primary teeth. Braz oral res. 2014;28(1):1-7.

27. Losso EM, Tavares MCR, Bertoli FMP, Baratto Filho F. Traumatismo dentoalveolar na dentição decidua. RSBO. 2011;8(1):e1-20.

28. Chowdary GN, Hemalatha R, Vijayakumar R, Ganhesh R, Selvakuma H, Manguyarkarasi S. Prevalence of traumatic dental injuries in primary teeth: A retrospective study. SRM J Res Dent Sci. 2014;5(1):11-3.

29. Souza Filho MD, Moura MS, Araújo RSRM, Araújo MAM, Moura LFAD. Prevalência de traumatismo dentário em pré-escolares de Teresina, PI. Arq Odontol. 2011;47(1):18-24.

30. Granville-Garcia AF, Menezes VA, Lira PIC. Prevalência e fatores sócios-demográficos associados ao traumatismo dentário em pré-escolares. Odontol clín-cient. 2006;5(1):57-64.

31. Kawabata CM, Sant'Anna GR, Duarte DA, Mathias MF. Estudo de injúrias traumáticas em crianças na faixa etária de 1 a 3 anos no município de Barueri, São Paulo, Brasil. Pesqi Bras Odontopediatria Clin Integr. 2007;7(3):229-33.

32. Sousa DL, Moreira Neto JJS, Gondim JO, Bezerra Filho JG. Prevalência de trauma dental em crianças atendidas na Universidade Federal do Ceará / Prevalence of dental trauma in children attending the Federal University of Ceará. Rev Odonto Ciênc. 2008;23(4):355-59.

33. Rajab LD. Traumatic dental injuries in children presenting for treatment at the Department of Pediatric Dentistry, Faculty of Dentistry, Universit of Jordan. Dent Traumatol. 2003;19(1):6-11.

34. Kramer PF, Gomes CS, Ferreira SH, Feldens CA, Viana ES. Traumatismo na Dentição Decídua e Fatores Associados em Pré-Escolares do Município de Canela/RS, Pesq Bras Odontopediatr Clin Integr. 2009;9(1):95-100.

35. Wendt FP, Torriani DD, Assunção MC, Romano AR, Bonow ML, da Costa CT, Goettem MS et al. Traumatic dental injuries in primary dentition: epidemiological study among preschool children in South Brazil. Dent Traumatol.2010; 26(2):168-73.
36. Bhayya DP, Shyagali TR. Traumatic injuries in the primary teeth of 4- to 6-year-old school children in gulbarga city, India: a prevalence study. Oral Health Dent Manag. 2013; 12(1):17-23.

37. Al-Majed I, Murray JJ, Maguire A. The Prevalence of dental trauma in 5-6 and 12-14 year-old boys in Riyadh, Saudi Arabia. Dent Traumatol. 2001;17(4):153-58.

38. Chalissery VP, Marwah N, Jafer M, Chalisserry EP, Bhatt T, Anil S. Prevalence of anterior dental trauma and its associated factors among children aged 3-5 years in Jaipur City, India – A cross sectional study. J Int Soc Prev Community Dent. 2016;6(1):35-40.

39. Hanan SA, Costa SK. Conhecimento dos professores de 1ª a 4ª série de escolas públicas municipais de Manaus/AM frente à avulsão dentária. Pesq Bras Odontoped Clin Integr 2010;10(1):27-33.

40. Glendor U. Epidemiology of traumatic dental injuries-12 year review of the literature. Dent Traumatol. 2008;24(6):603-11.

41. Khahabuka FK, Plasschaert A, van ’t Hof M. Prevalence of teeth with untreated dental trauma among nursery and primary school pupils in Dae es Salaam, Tanzania. Dent Traumatol. 2001;17(3):109-13.

CONFLITO DE INTERESSES
Os autores declaram não haver conflitos de interesse.

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