Dental Traumatology

Dental Traumatology 2010; 26: 346-350; doi: 10.1111/j.1600-9657.2010.00891.x

Prevalence of traumatic dental injuries in preschool children in Kuwait – a screening study

Abdulaziz A. Hasan¹, Muawia A. Qudeimat¹, Lars Andersson²

¹Department of Developmental and Preventive Sciences, Faculty of Dentistry, Kuwait University, Safat, Kuwait; ²Department of Surgical Sciences, Faculty of Dentistry, Kuwait University, Safat, Kuwait

Correspondence to: Dr. Abdulaziz A. Hasan, Department of Developmental and Preventive Sciences, Faculty of Dentistry, Kuwait University, P.O. Box 24923, Safat – 13110, Kuwait Tel.: +965-6633-6869 Fax: +965-2531-0626 e-mail: aahasan@hsc.edu.kw Accepted 6 February, 2010 Abstract – Aims: This is the first study in Kuwait to determine the prevalence, etiology, classification of trauma, teeth involved, place of injury and treatment received after dental trauma in preschool children. Material and methods: A total of 500 preschool children presenting at a dental screening day in all governorates of Kuwait were clinically examined for signs of trauma to their primary teeth. The parents were then interviewed and a prevalidated questionnaire was completed with the demographic data of the participant and history of the dental trauma. Results: A total of 243 (48.6%) males and 257 (51.4%) females were screened. The age range was 2–6 years (mean age of 4.31 \pm 1.03 years). Fifty-six children (68 teeth) suffered trauma to their primary teeth making a prevalence of 11.2%. Majority of dental traumas occurred at home (n = 49, (87.5%) followed by at street (n = 4, 7.1%) and at school (n = 3, 5.4%). The most common reason of oral trauma was falls (n = 53, 94.6%). The most commonly affected tooth was the maxillary right primary central incisor (n = 29, 42.6%) followed by the maxillary left primary central incisor (n = 26, 42.6%)38.2%). There were 20 teeth with enamel fractures (29.4%), 18 teeth had enamel- dentin fractures (26.5%) and 10 teeth had complicated crown fractures (14.7%). There were 17 luxated teeth (25%) and only three primary teeth (4.4%)were avulsed. The only statistically significant relation found in this study was between the type of trauma and the type of the treatment provided. Of the traumatized teeth, 23 (33.8%) did not receive any type of dental or medical care. *Conclusion*: In spite of the low prevalence of dental trauma in Kuwaiti preschool children, it is highly recommended to plan a community wide trauma prevention campaign targeting parents, children and medical/dental care providers.

Injuries to the oral cavity comprise about 5% of all somatic injuries in all age groups and the majority of these injuries are dental (1). In the preschool ages, the proportion of oral injuries is as high as 17% of all somatic injuries (1). The incidence and prevalence of dental trauma in preschool children varies widely between and within countries and among different age groups studied (2-38). These variations could be due to the differences in populations studied, methodology used for the different studies and/or the variation in the evaluated variables. Dental trauma is more common in younger children (preschool-age) and primary teeth are therefore more affected than the permanent ones (1, 3, 3)25, 26). A prevalence in the society between 7% and 42%has been reported for the primary dentition (2-33). Upper central incisors are the primary teeth most prone to trauma probably because of its prominent location (2-38). Children in preschool ages have a first peak of dental injuries between the age of 2 and 4 years (3, 6, 9, 20, 24, 25, 27, 37). Children at these ages are still learning to walk or beginning to grasp the skills of running which increase the risk of falling due to their lack of coordination and experience (8, 20, 24, 27). The most common reason of dental trauma in preschool children was reported to be falls (1, 6, 8, 24, 25, 28, 34, 35, 38). In the primary dentition, it has been demonstrated that boys are more exposed to dental trauma than girls (4, 8, 10, 11, 14, 27, 29, 34). This could be due to the fact that boys are more involved in aggressive plays and sports and more active in street activities. There are also studies indicating that the gender difference was not statistically significant (2, 3, 6, 7, 9, 13, 15, 16, 22).

In recent years, there has been a trend towards more modern children activities associated with computer games and it is noticed that many preschool children spend less time in sport and/or street activities than before (39, 40). This may have an influence in the prevalence of dental trauma in this age group. There is a dearth of data in Kuwait with regard to the incidence, prevalence, type and causes of dental trauma. Only one study examined 1583 Kuwaiti children, between the age of 13 and 14, and found that boys are at higher risk of maxillary permanent incisor trauma than girls (41). However, there seems to be no studies carried out on the prevalence of primary tooth injuries in Kuwait and very few from the region (3, 21, 31).

The objective of this study was to determine the prevalence of dental injuries in preschool children and to describe etiologic factors, classification of such injuries, teeth involved, place of injury and treatment received.

Materials and methods

This study was conducted at all the five governorates of Kuwait during the period of July to August 2008. The sampling for this study was children attending dental screening, which is offered to all children in Kuwait every year. The screening is carried out at specified days by the dental centers to screen children from birth to 6 years of age. The first 100 children from each of the five dental centers, presenting at screening days were selected to be included in the study. A total of 500 children, 6 years of age and younger were included in this study. A pediatric dentist clinically examined all subjects for signs of previous dental trauma to their primary teeth. The clinical examination evaluated persistent traces of dental trauma, teeth involved and the type of injury. Previous dental trauma was categorized as: (1) fracture, (2) luxation, (3) avulsion and (4) soft tissue injuries. Fractures were subdivided into (1a) enamel fracture, (1b) enamel-dentin fracture, (1c) complicated crown fracture, (1d) root fracture, and (1e) fractures involving bone. Soft tissue trauma was categorized as (4a) laceration, (4b) contusion, (4c) abrasion, and (4d) soft tissue avulsion. The specified location for these types of injuries were recorded (lips, tongue, frenum, cheeks, gingival and mucosa). In conjunction to the examination, parents of the children were interviewed by the examiner to establish if the child had been previously subjected to trauma and gather further specific information concerning the dental trauma. Parents were asked if the child's teeth were displaced, discolored and/or had mobility as a result of a trauma. A standardized form was used and the following data was recorded; the cause of the trauma (classified into fall, sport, traffic and fight), place where it happened (home, school, street or other places), the age of child when the teeth were traumatized and if the

Table 1. Demographic characteristics of the participant subjects

	Boys (%)	Girls (%)	Total
Number	243 (48.6)	257 (51.4)	500
Mean age (years)	4.38	4.25	4.31
Mean age at trauma (years)	2.8	3.0	2.9

child received any dental treatment following the trauma, gender, residential area, nationality, child's order in the family, number of children in the family and medical history were also recorded in a predesigned questionnaire. Informed consent was obtained from parents for inclusion of data in the study. Data management and statistical analysis were carried out using statistical package, SPSS version 15.0. (SPSS Inc., Chicago, IL, USA) In addition to prevalence rates and descriptive statistics, Chi-squared test was used to assess any association of trauma with different categorical demographical and clinical variables. The probability level, P < 0.05 was considered significant.

Results

A total of 500 children were included in this study. This sample was about 50–70% of the total pediatric patients presented to each center during the screening days. The study period was from the first week of July to the last week of August, 2008. All children, parents and guardians were willing to participate. A presentation of the participants is seen in Table 1. There were 49% boys and 51% girls. The mean age of the included children who were participating was 4.3 ranging from 2 to 6 years old. Fifty six of the 500 children either showed direct signs of previous trauma or had been subjected to trauma as revealed by the interview. This is a prevalence of 11.6% in the population. There were no significant difference between injured boys and girls.

Type of trauma per child in relation to cause and location is presented in Table 2. The majority of dental traumas occurred at home (n = 49, 88%). The most common reason of oral trauma was reported to be falls (n = 53, 94.6%). Most injured patients had been subjected to dental injuries (93%) involving the anterior teeth. The tooth most commonly affected was the maxillary right incisor (n = 29, 43%) followed by the maxillary left incisor (n = 26, 38%); the maxillary left lateral incisor (n = 7, 10%) and then the maxillary right

Table 2. Type of trauma per child (tooth) in relation to cause and location

Type of trauma	Cause		Location				
	Falls	Sports	Fights	Home	School	Street	Total
Soft tissue injuries	4	0	0	4	0	0	4
Dental injuries							
Luxation	9 (15)	0	1 (2)	8 (14)	2 (3)	0	10 (17)
Avulsion	2 (3)	0	0	1 (1)	0	1 (2)	2 (3)
Fractures	38 (45)	2 (3)	0	36 (43)	1 (1)	3 (4)	40 (48)
Total	53 (63)	2 (3)	1 (2)	49 (58)	3 (4)	4 (6)	56 (68)

Table 3. Distribution of children with traumatic dental injuries by number of involved teeth in Kuwaiti preschool children

	One tooth [<i>n</i> (%)]	Two teeth [n (%)]	Total
Fracture	32 (62)	8 (15)	40 (77)
Luxation	3 (6)	7 (13)	10 (19)
Avulsion	1 (2)	1 (2)	2 (4)
Total	36 (70)	16 (30)	52 (100)

Table 4. Distribution of injured Kuwaiti preschool children by age at trauma

Age (months)	п	%
24–35	6	10.7
36–47	20	35.7
48–59	14	25.0
60–71	13	23.2
>72	3	5.4
Total	56	100.0

lateral incisor (n = 6, 9%). This difference was not statistically significant. Thirty-six (70%) subject had a single tooth trauma while 16 (30%) had two traumatized teeth (Table 3). There were no cases subjected to more than two injured teeth. The mean age at which children sustained these injuries is presented in Table 4.

The dental injuries and the action provided can be seen in Table 5. Tooth fracture was the most common type of trauma (n = 48, 70.6%). There were 20 teeth with enamel fractures (29.4%), 18 teeth had enameldentin fractures (26.5%) and 10 teeth had complicated crown fractures (14.7%). There were no crown-root, root or bone fractures reported in this study. There were 17 luxated teeth (25%) and only three primary teeth (4.4%) were avulsed. Only four cases (7%) presented with soft tissue injuries (lip laceration and tongue biting) which involved no trauma to the teeth. Parents reported that they never sought any dental treatment for the soft tissue injuries. The only statistically significant relation found in this study was between the type of trauma and the type of the treatment provided.

One-third of the dental injuries (23 teeth) had not been treated at all because the injured child never visited a dentist after the trauma. Fifteen injured teeth were seen for a consultation with no dental treatment necessary. Restorative treatment was delivered to 17 teeth (all of which were fractures) and 13 teeth were extracted.

Discussion

Trauma to the primary teeth is common with a prevalence of 7-42% in preschool children (2-33). In this study, the prevalence of dental injuries for Kuwaiti preschool children aged between 2 and 6 years was found to be 11.2%. This result was similar to other studies carried out on preschool children in Jerusalem, Sweden, Nigeria and Brazil (2, 4, 6, 12, 13). Other investigators reported higher prevalence of dental trauma in the same age group reaching 42% (2, 3, 5, 7-11, 14-33). Reasons for this difference in the reported prevalence can be offered by the fact that different researchers adopted different diagnostic criteria, screening procedure including sample size; age group under investigation; screening location; and the examination for the presence of trauma. Another possible explanation is the rising of safety concerns for children nowadays, where much of their indoors and outdoors leisure time is usually spent in an adult-supervised setting (42). Also, there is a possibility that the examining investigator directly evaluated children and interviewed their parents, regarding history of oral trauma without having access to records and/or radiographs. For this reason the examiner in this study had to rely on the oral conditions at the time of the examination and the reliability of parents'/guardians' to remember the details of any oral trauma. This poses a risk for under registration. These could be all possible reasons for the low prevalence of dental injuries in Kuwaiti children. However, while studies conducted in Jerusalem and Brazil found a prevalence of 9.4% and 11% (7, 12), other studies using similar methodology carried out also in Brazil reported a prevalence of 39% and 42% (14, 15).

There is no consensus among researchers regarding the most common type of trauma in the primary dentition. Some found that uncomplicated crown fractures more commonly encountered (2, 3, 7-11, 13, 14, 19, 22, 33) and others reported luxation injuries as the most frequently reported injury in preschool children (6, 27, 28, 30, 34-36). However, most of the later studies were conducted in the emergency room of a hospital, a university's paediatric dentistry clinic or private practice which increases the chance of reporting more severe injuries. In the current work, uncomplicated crown fractures were the most common type of trauma to primary teeth in preschool children (70.6%). Again, this difference in the reported type of trauma is probably due to differences in sample selection and methodology of screening. Also, another possible explanation for the

Table 5. Type of dental trauma (per tooth) in relation to the provided treatment

Type of trauma	No treatment	Consultation with antibiotic prescription	Consultation with no consequent treatment	Restorative treatment	Extraction	Total teeth
Luxation	3 (17.6)	0 (0)	10 (58.8)	0 (0)	4 (23.5)	17 (100)
Avulsion	0 (0)	1 (33.3)	2 (66.7)	0 (0)	0 (0)	3 (100)
Enamel	14 (70)	0 (0)	0 (0)	6 (30)	0 (0)	20 (100)
Enamel-dentin	6 (33.3)	0 (0)	2 (11.1)	10 (55.6)	0 (0)	18 (100)
Complicated crown	0 (0)	0 (0)	0 (0)	1 (10.0)	9 (90)	10 (100)
Total	23 (33.8)	1 (1.5)	14 (20.6)	17 (25.0)	13 (19.1)	68 (100)

high prevalence of enamel/dentine/crown fractures in this study is that luxation injuries in the primary dentition tend to heal spontaneously without treatment (43) and may have been undiagnosed during examination and parents may have not noticed such an injury or forgot details of earlier injuries. There were three avulsed teeth (4.4%), all were as a result of falling.

More than one-third of all reported injuries in this study occurred between 36 and 48 months. This was in agreement with previous studies which showed that the peak of dental trauma in preschool children is usually in the 2–4 age group (3, 6, 9, 20, 24, 25, 27, 37). Oliveira et al. found that among 892 Brazilian 0.4–4.9 years old, the highest percentage for reported injuries was recorded in the 3–4 years old group (12). It is hypothesized that children at this age still do not have a well established muscle coordination, and they have a tendency to fall and injure their teeth (8, 20, 24, 27).

Contrary to the findings of Skaare and Jacobsen who reported that in a sample of 20 000 Norwegian children in the 1-8 years age group (23), accidents that led to oral injuries were evenly distributed between home (38%) and kindergarten/school (32%), preschool children in this study suffered dental trauma most frequently at home (87.5%). Other researches reported similar finding (14, 28). Robson et al. reported that in 419 Brazilian children aged 0–5 years 79% of the injuries occurred at home. There is current evidence that young children are exposed to an abundance of home activities that include television watching, using the computer and playing video games (39). In addition, the average daily high temperatures in the summer season in Kuwait ranges from 42°C to 46°C; the highest recorded temperature is 52°C. This high outdoor temperature may force children in Kuwait to spend more time and perform more indoor activities.

The data of this study showed that gender was not a statistically significant factor of oral trauma which is in an agreement with findings of other recent studies (2, 3, 6, 7, 9, 13, 15, 16, 22). This may also reflect the change in habits in Kuwait from previous more outdoor play activities where boys used to run a higher risk for injuries, to more home related activities such as television and computer games with a lower risk for injuries. However, other studies reported higher incidence in injuries in preschool boys compared to girls (4, 8, 10, 11, 14, 27, 29, 34).

Dental injuries (93%) were more common than soft tissue injuries (7%) in this study. This is in accordance with a Swedish study where injuries to the oral region and not only dental injuries were included (1). Also, in a recent Norwegian study on children aged 1–8 years, soft tissue injuries were recorded in 6% of the surveyed sample (23). This low reported level of soft tissue injuries could be due to failure of parents to notice soft tissue injuries at the time of trauma or since the fact that soft tissue injuries heal faster with no later consequences.

Maxillary anterior teeth were the only injured teeth in this study with the maxillary right central incisor being the most affected tooth (43%). In most of the injured cases only one tooth was affected (69%). This finding was also observed in other studies (1, 2, 7–9, 11, 12, 16, 29).

In this study, many injuries were left by the parents without consulting a dental clinic for management. This is in accordance with other studies which have reported delayed consultation or consultation only when complications are occurring (6, 15, 16, 28, 33, 36). Al-Jundi reported an average of 5 months between dental trauma and seeking dental care (31). Also, Osuji and Eyuboglu et al. reported that 10% and 15% of their study subjects sought dental care 12 months after the trauma (6, 36). It is imperative that information should be provided to the society about the importance to visit a dental clinic immediately after trauma since there is a potential risk for more severe complications.

A statistically significant relation was found between the type of trauma and the type of treatment provided. Of all traumatized teeth, 33.8% did not receive any type of dental treatment, 1.5% received consultation with antibiotics provided and 20.6% received consultation with no consequent treatment. This is in agreement with findings from other research where it was reported that the most common treatment provided after trauma to primary teeth was examination and monitoring (32, 34, 36, 44, 45). Most of these injuries in the current study were enamel fractures (70%). The reason for this could be that parents and/or children do not usually notice these small fractures or they felt that they do not need to be treated. Pugliesi et al. noted that cases of dental hard tissue injuries tend to delay seeking treatment more than cases of supporting tissue injuries (33). However, it should be noted that the current work is considered a populationbased study and that the oral injuries that were treated might escape the investigator's attention (36).

In all three avulsions, none of the teeth were replanted. This practice is in agreement with the international guidelines on management of avulsed primary teeth in order not to risk an injury to the underlying permanent germ (46). There were 13 extracted teeth; most of them were due to complicated crown fractures (nine teeth, 90%). This high percentage of extraction could be as a result of a more radical approach to injured primary teeth in order not to interfere with the underlying permanent tooth germ, or due to the severity of the fracture, difficulty of restoring the teeth, pulpal complications which led to either pathosis or root resorption or possibly due to difficulty for dentists to perform pulpal therapy on the young children.

This study was the first to retrospectively investigate the prevalence of dental trauma, types, leading causes, teeth involved, place of injury and treatment received after the dental trauma in preschool children in Kuwait. Although the findings showed that the prevalence of dental trauma was at the lower range in the preschool children, the authors recommend a community wide campaign to educate parents, children and dental/medical care providers on dental trauma prevention and treatment. The authors also suggest future studies to evaluate the trend of dental trauma in preschool children in Kuwait taking into consideration radiographical evaluation when possible. With an increase in quality of record keeping, clinical and hospital based studies rather than population-based studies can be performed in the future.

References

- Petersson EE, Andersson L, Sorensen S. Traumatic oral vs non oral injuries. An epidemiological study during one year in a Swedish county. Swed Dent J 1997;21:55–68.
- Zadik D. A survey of traumatized primary anterior teeth in Jerusalem preschool children. Community Dent Oral Epidemiol 1976;4:149–51.
- Yagot KH, Nazhat NY, Kuder SA. Traumatic dental injuries in nursery schoolchildren from Baghdad, Iraq. Community Dent Oral Epidemiol 1988;16:292–3.
- Forsberg CM, Tedestam G. Traumatic injuries to teeth in Swedish children living in an urban area. Swed Dent J 1990;14:115–22.
- Bijella MF, Yared FN, Bijella VT, Lopes ES. Occurrence of primary incisor traumatism in Brazilian children: a house-byhouse survey. J Dent Child 1990;57:424–7.
- Osuji OO. Traumatised primary teeth in Nigerian children attending university hospital: the consequences of delays in seeking treatment. Int Dent J 1996;46:165–70.
- Otuyemi OD, Segun-Ojo IO, Adegboye AA. Traumatic anterior dental injuries in Nigerian preschool children. East Afr Med J 1996;73:604–6.
- Cunha RF, Pugliesi DM, de Mello Vieira AE. Oral trauma in Brazilian patients aged 0-3 years. Dent Traumatol 2001;17:210–2.
- Kramer PF, Zembruski C, Ferreira SH, Feldens CA. Traumatic dental injuries in Brazilian preschool children. Dent Traumatol 2003;19:299–303.
- Granville-Garcia AF, de Menezes VA, de Lira PI. Dental trauma and associated factors in Brazilian preschoolers. Dent Traumatol 2006;22:318–22.
- 11. Rodriguez JG. Traumatic anterior dental injuries in Cuban preschool children. Dent Traumatol 2007;23:241-2.
- Oliveira LB, Marcenes W, Ardenghi TM, Sheiham A, Bonecker M. Traumatic dental injuries and associated factors among Brazilian preschool children. Dent Traumatol 2007;23:76–81.
- Beltrão EM, Cavalcanti AL, Albuquerque SS, Duarte RC. Prevalence of dental trauma children aged 1-3 years in Joao Pessoa (Brazil). Eur Arch Paediatr Dent 2007;8:141–3.
- Robson F, Ramos-Jorge ML, Bendo CB, Vale MP, Paiva SM, Pordeus IA. Prevalence and determining factors of traumatic injuries to primary teeth in preschool children. Dent Traumatol 2009;25:118–22.
- Jorge KO, Moysés SJ, Ferreira e Ferreira E, Ramos-Jorge ML, de Araújo Zarzar PM. Prevalence and factors associated to dental trauma in infants 1-3 years of age. Dent Traumatol 2009;25:185–9.
- Avşar A, Topaloglu B. Traumatic tooth injuries to primary teeth of children aged 0-3 years. Dent Traumatol 2009;25:323–7.
- 17. Bastone EB, Freer TJ, McNamara JR. Epidemiology of dental trauma: a review of the literature. Aust Dent J 2000;45:2–9.
- 18. Glendor U. Epidemiology of traumatic dental injuries a 12 year review of the literature. Dent Traumatol 2008;24:603–11.
- Carvalho JC, Vinker F, Declerck D. Malocclusion, dental injuries and dental anomalies in the primary dentition of Belgian children. Int J Paediatr Dent 1998;8:137–41.
- 20. Flores MT. Traumatic injuries in the primary dentition. Dent Traumatol 2002;18:287–98.
- Al-Majed I, Murray JJ, Maguire A. Prevalence of dental trauma in 5-6 and 12-14 year old boys in Riyadh, Saudi Arabia. Dent Traumatol 2001;17:153–8.
- Garcia-Godoy F, Morban-Laucer F, Corominas LR, Franjul RA, Noyola M. Traumatic dental injuries in preschoolchildren from Santo Domingo. Community Dent Oral Epidemiol 1983;11:127–30.
- 23. Skaare AB, Jacobsen I. Primary tooth injuries in Norwegian children (1-8 years). Dent Traumatol 2005;21:315–9.
- Anderesen JO, Andereasen FM, Andersson L. Textbook and color atlas of traumatic injuries to the teeth – chapter 8. 4th edn. Oxford: Blackwell Munksgaard; 2007.

- Andreasen JO, Ravn JJ. Epidemiology of traumatic dental injuries to primary and permanent teeth in a Danish population sample. Int J Oral Surg 1972;1:235–9.
- HolmAK, ArvidssonS. Oral health in preschool Swedish children.
 Three-year-old children. Odontol Revy 1974;25:81–98.
- Llarena del Rosario ME, Acosta Alfaro VM, Garcia-Godoy F. Traumatic injuries to primary teeth in Mexico City Children. Endod Dent Traumatol 1992;8:213–4.
- Onetto JE, Flores MT, Garbarino ML. Dental trauma in children and adolescents in Valparaisio, Chile. Endod Dent Traumatol 1994;10:223–7.
- Gábris K, Tarján I, Rózsa N. Dental trauma in children presenting for treatment at the Department of Dentistry for Children and Orthodontics, Budapest, 1985-1999. Dent Traumatol 2001;17:103–8.
- Altay N, Güngör HC. A retrospective study of dento-alveolar injuries of children in Ankara, Turkey. Dent Traumatol 2001;17:201–4.
- Al-Jundi SH. Dental emergencies presenting to a dental teaching hospital due to complications from traumatic dental injuries. Dent Traumatol 2002;18:181–5.
- 32. Kargul B, Caglar E, Tanboga I. Dental trauma in Turkish children, Istanbul. Dent Traumatol 2003;19:72–5.
- 33. Pugliesi DM, Cunha RF, Delbem AC, Sundefeld ML. Influence of the type of dental trauma on the pulp vitality and the time elapsed until treatment: a study in patients aged 0-3 years. Dent Traumatol 2004;20:139–42.
- Sandalli N, Cildir S, Guler N. Clinical investigation of traumatic injuries in Yeditepe University, Turkey during the last 3 years. Dent Traumatol 2005;21:188–94.
- Lam R, Abbott P, Lloyd C, Lloyd C, Kruger E, Tennant M. Dental trauma in an Australian rural centre. Dent Traumatol 2008;24:663–70.
- Eyuboglu O, Yilmaz Y, Zehir C, Sahin H. A 6-year investigation into types of dental trauma treated in a paediatric dentistry clinic in Eastern Anatolia region, Turkey. Dent Traumatol 2009;25:110–4.
- 37. Garcia-Godoy F, Garcia-Godoy F, Garcia-Godoy FM. Primary teeth traumatic injuries at a private pediatric dental center. Endod Dent Traumatol 1987;3:126–9.
- Andreasen JO. Etiology and pathogenesis of traumatic dental injuries. A clinical study of 1,298 cases. Scand J Dent Res 1970;78:329–42.
- Robinson JL, Winiewicz DD, Fuerch JH, Roemmich JN, Epstein LH. Relationship between parental estimate and an objective measure of child television watching. Int J Behav Nutr Phys Act 2006;3:43.
- Johnson KA, Klaas SJ. The changing nature of play: implications for pediatric spinal cord injury. J Spinal Cord Med 2007;30:S71–5.
- Artun J, Behbehani F, Al-Jame B, Kerosuo H. Incisor trauma in an adolescent Arab population: prevalence, severity, and occlusal risk factors. Am J Orthod Dentofacial Orthop 2005;128:347–52.
- Fishman C. The smorgasbord generation. Am Demographics 1999;13:54–60.
- Borum MK, Andreasen JO. Sequelae of trauma to primary maxillary incisors. I. Complications in the primary dentition. Endod Dent Traumatol 1998;14:31–44.
- 44. Cunha RF, Pugliesi DM, Percinoto C. Treatment of traumatized primary teeth: a conservative approach. Dent Traumatol 2007;23:360–3.
- Glendor U, Halling A, Andersson L, Andreasen JO, Klitz I. Type of treatment and estimation of time spent on dental trauma-a longitudinal and retrospective study. Swed Dent J 1998;22:47–60.
- 46. Flores MT, Malmgren B, Andersson L, Andreasen JO, Bakland L, Barnett F et al. Guidelines for the management of traumatic dental injuries. III. Primary teeth. Dent Traumatol 2007;23: 196–202.

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.