*International Journal of Paediatric Dentistry* 2005; **15:** 177–184

# Dental emergencies presenting to a university-based paediatric dentistry clinic in the West Indies

R. S. NAIDU[1], D. BOODOO[1], T. PERCIVAL[1] & J. T. NEWTON[2]
[1]*School of Dentistry, University of the West Indies, Trinidad and* [2]*Guy's, King's and St. Thomas's Dental Institute, King's College, London, UK*

**Summary.** *Objectives.* The aims of the present study were to investigate the type and prevalence of dental emergencies presenting at a teaching hospital paediatric emergency clinic in Trinidad, and to describe the socio-demographic factors related to the use of the service.

*Design and methods.* The authors used a prospective study of consecutive dental patients presenting to a paediatric emergency clinic. Data recorded included type of presenting emergency and socio-demographic variables.

*Results.* Data were available for 309 participants; 47% were male and 53% female. The average age of the participants was 8·66 years (SD = 3·75 years; range = 1–16 years). Seventy-three per cent of the participants' parents were involved in manual work or unemployed, and 21% were in nonmanual/professional employment; the occupation was not known in 6% of cases. Caries-related problems accounted for 74% of emergencies. Dental trauma mostly affected the upper permanent incisor teeth, with concussion, subluxation and intrusion being the most common injuries.

*Conclusion.* Dental emergencies presenting to this university-based clinic were predominantly related to caries and trauma. The service was more frequently utilized by children in the mixed dentition stage, children from lower socioeconomic groups and those living in the local area. The frequency of caries-related problems indicates the need for more community-based preventive strategies, including encouraging greater attendance for routine dental care and dental health education. Strategies for oral health promotion should also be developed to prevent dental trauma.

## Introduction

Adequate provision of primary dental care must include emergency care for children. These services are often delivered within dental teaching hospitals, and together with offering a service to the public, provide clinical exposure and training for dental undergraduate and postgraduate students.

The University of the West Indies (UWI) School of Dentistry in Champs Fleurs, Trinidad was established in 1989 and is the only dental school in the English-speaking Caribbean. The dental school occupies a site within a large general hospital that provides primary, secondary and tertiary care to the public. Trinidad and Tobago is a two-island state, and the most southerly of the Caribbean chain of islands. This developing country is a republic within the British Commonwealth, having gained independence from the UK in 1962. Trinidad covers an area of 4779 square kilometers while Tobago, the smaller island, has an area of 297 square kilometers. Twenty-three per cent of the 1·3 million population are under 15 years of age, and one-quarter of the population live in rural areas [1]. The dental hospital and school is located in the north of the island approximately 10 km east of the capital, Port of Spain.

Correspondence: Rahul Naidu, Lecturer in Community Dentistry, Faculty of Medical Sciences, University of the West Indies, Eric Williams Medical Sciences Complex, Champs Fleurs, Trinidad, West Indies. E-mail: rahul@trinidad.net

The UWI School of Dentistry's Child Dental Health Unit provides a 'walk-in' emergency clinic for children up to the age of 16 years. It is staffed by dental interns working under the supervision of clinical academic staff. Dental interns are new graduates of the school. Working in small groups, they undertake two, 4-week rotations in paediatric dentistry as part of their mandatory pre-registration training year. The clinic operates from Monday to Friday (08:00–16:00 h), but does not offer an out-of-hours or weekend service. Apart from a hospital registration fee (TT$44, approximately £4), provision of dental care for children in the clinic is free.

Studies from the USA and UK have reported that pain caused by toothache/abscess and dental trauma were the most frequently presenting complaints at hospital-based paediatric dental emergency clinics [2,3]. The use of hospital/health-centre-based emergency dental care services for children has also been shown to be related to socioeconomic and demographic factors, with children from lower socioeconomic groups being more likely to use these types of services than private dental practices [2,4,5].

There are no published data on the use of primary dental care services in the West Indies or on the emergency dental care of children in Trinidad.

The aims of the present study were:

- to describe the type and prevalence of emergencies presenting at a paediatric emergency clinic in Trinidad; and
- to describe the socio-demographic factors related to the use of this service.

## Subjects and methods

Between October 2002 and May 2003, information was collected on consecutive patients attending the UWI paediatric dental emergency clinic. All new emergency cases attending the clinic who consented to an examination were included in the data. Reviews and follow-up cases were excluded. The information collected related to demographic variables (i.e. age, sex, ethnicity, area of residence and occupation of the attending parent/guardian), the presenting complaint, the teeth involved, and details related to the cause, type and severity of the traumatic dental injury, if present. The criteria for ethnicity and occupation were based on Singh & Mustapha [6]. The criteria for the type of injury were based on those described by Welbury [7]. Data were gathered by the attending dental interns and entered onto a nine-item data collection form ('Appendix 1'). All the interns were trained in the use of the data collection form by one of the investigators (R.S.N.). Approval for the study was gained from the North-west Regional Health Authority, the hospitals' governing body. In order to report descriptive statistics, data were processed and analysed using the Excel, Version 5, and SPSS, Version 10, computer programs.

## Results

Data were available for a total of 309 participants. There were 143 males (47%) and 160 females (53%). Data on gender was missing for six cases. The average age of the participants was 8·66 years (SD = 3·75 years; range = 1–16 years). One hundred and seventy-six participants (57%) were of African ethnicity, 90 (29%) were Indian and 36 (12%) were of mixed race. The ethnicity of six subjects (2%) was not known.

Table 1 shows the occupation of the child's attending parent/guardian. Seventy-three per cent of participants' parents/guardians were involved in manual work or were unemployed. The locality of the residence of the participants is shown in Table 2.

The most common presenting problems were toothache and dental abscess (Table 3).

Table 4 describes the teeth involved at presentation. Upper incisors and lower molar teeth were common sites for problems. Ten per cent of the children showed evidence of rampant caries.

The mean age of children presenting with dental trauma was 8·9 years. Of the 41 children presenting

**Table 1.** Occupation of the participants' parent/guardian* ($n$ = 309).

| | Participants | |
|---|---|---|
| Occupation of attending parent/guardian | Number | Percentage |
| Professional | 1 | < 1 |
| Middle professional | 19 | 6 |
| Lower nonmanual | 46 | 15 |
| Skilled manual | 52 | 17 |
| Unskilled manual | 53 | 17 |
| Unemployed/housewife | 120 | 39 |
| Retired | 0 | |
| Old-age pensioner | 0 | |
| Not known/missing data | 18 | 6 |
| Total | 309 | 100 |

*Based on Singh & Mustapha [6].

**Table 2.** Locality of the residence of the participants and population/dental clinics* by county.

| | Participants ($n$ = 309) | | | Dental clinic | |
|---|---|---|---|---|---|
| Area of residence (by county) | Number | Percentage | Population | Private | Government |
| St George | 209 | 68 | 451 306 | 81 | 18 |
| St David and St Andrew | 5 | 2 | 66 648 | 4 | 8 |
| Caroni | 60 | 20 | 198 524 | 26 | 6 |
| Victoria | 10 | 3 | 181 136 | 35 | 6 |
| St Patrick | 1 | < 1 | 116 395 | | 6 |
| Nariva/Mayaro | 0 | – | 34 249 | 2 | 6 |
| Not known/missing data | 24 | 8 | – | – | – |

*Central Statistics Office of Trinidad and Tobago, 2000 Census.

**Table 3.** Type of presenting dental emergency* ($n$ = 309).

| | Participants | |
|---|---|---|
| Type of dental emergency | Number | Percentage |
| Toothache (without abscess) | 182 | 59 |
| Dental abscess | 45 | 15 |
| Traumatic dental injury | 41 | 13 |
| Soft-tissue trauma | 8 | 3 |
| Post-extraction haemorrhage | 0 | |
| Acute herpetic stomatitis | 1 | < 1 |
| Exfoliating tooth | 12 | 4 |
| Post-anaesthetic chewing | 0 | |
| Cervical lymphadenitis | 2 | < 1 |
| Post-extraction infection | 0 | |
| Maxillary sinusitis | 0 | |
| Parotitis/mumps | 0 | |
| Erupting tooth | 7 | 2 |
| Other | 17 | 6 |
| Rampant caries (i.e. extensive caries on multiple teeth in the primary or permanent dentition) | 28 | 9 |

*Participants may have presented with more than one of the items listed, and therefore, the percentages do not total 100%.

with traumatic injuries, 61% were male. Forty-nine per cent of injuries occurred at school, 44% at home and 7% in other places. Table 5 shows the proportion of different teeth involved in a traumatic injury. Information was collected on how the injury occurred and the nature of the problem found upon examination, and this is summarized in Table 6.

## Discussion

The mean age of subjects in the present study was older than that of those used in similar studies in the USA [2] and the UK [3], where 5 years was the mean age, but the findings still suggest that this service is used mainly by children in the early mixed dentition.

Trinidad has two main ethnic groups: Africans and Indians. The larger proportion of children of African ethnicity using this service is most likely related to the local demographics of County St George (the county in which over two-thirds of participants resided).

The service was more frequently used by people from lower socioeconomic groups, based on occupation of the attending parent/guardian. Although proxy measures of socioeconomic status vary between studies, i.e. use of Medicaid/public insurance programmes, or Super Profiles, this is a similar finding to both the USA [2] and the UK [3,4], where

**Table 4.** Teeth involved in the presenting emergency as a proportion of the teeth affected in the primary or permanent dentition.

| | Primary dentition ($n$ = 236) | | Permanent dentition ($n$ = 242) | |
|---|---|---|---|---|
| Tooth | Number | Percentage | Number | Percentage |
| Maxillary central incisor | 34 | 14 | 36 | 15 |
| Maxillary lateral incisor | 24 | 10 | 13 | 5 |
| Maxillary canine | 18 | 8 | 2 | 1 |
| Maxillary premolar | 0 | – | 8 | 3 |
| Maxillary molar | 47 | 20 | 36 | 15 |
| Mandibular central incisor | 8 | 3 | 2 | 1 |
| Mandibular lateral incisor | 7 | 3 | 0 | – |
| Mandibular canine | 8 | 3 | 0 | – |
| Mandibular premolar | 0 | – | 90 | 37 |
| Mandibular molar | 90 | 38 | 55 | 23 |
| Total | 236 | 100 | 242 | 100 |

**Table 5.** Teeth involved in a traumatic dental injury as a proportion of all trauma cases* ($n = 41$).

| | Primary dentition ($n = 236$) | | Permanent dentition ($n = 242$) | |
|---|---|---|---|---|
| Tooth | Number | Percentage | Number | Percentage |
| Maxillary central incisor | 8 | 20 | 29 | 71 |
| Maxillary lateral incisor | 2 | 5 | 8 | 20 |
| Maxillary canine | 2 | 5 | 1 | 2 |
| Maxillary premolar | 0 | – | 1 | 2 |
| Maxillary molar | 0 | – | 0 | – |
| Mandibular central incisor | 0 | – | 0 | – |
| Mandibular lateral incisor | 1 | 2 | 0 | – |
| Mandibular canine | 0 | – | 0 | – |
| Mandibular premolar | 0 | – | 0 | – |
| Mandibular molar | 0 | – | 0 | – |

*Since more than one tooth could have presented in each case, the proportions do not total 100%.

**Table 6.** Information about the cause and type of injury.

| | Participants | |
|---|---|---|
| Type of injury | Number | Percentage |
| Cause of tooth/jaw/soft-tissue injury | | |
| Fall | 27 | 59 |
| Bicycle/rollerblade/skateboard | 4 | 9 |
| Hit by object | 5 | 11 |
| Car accident | 1 | 2 |
| Other | 9 | 20 |
| Total | 46 | 100 |
| Type of luxation injury | | |
| Concussion | 7 | 23 |
| Subluxation | 6 | 20 |
| Extrusive luxation (partial avulsion) | 4 | 13 |
| Lateral luxation | 3 | 10 |
| Intrusive luxation | 7 | 23 |
| Avulsion | 3 | 10 |
| Total | 30 | 100 |
| Dental hard tissue injury type | | |
| Enamel infraction (crack) | 0 | 0 |
| Enamel fracture | 6 | 19 |
| Enamel–dentine fracture | 13 | 42 |
| Complicated crown fracture (pulp exposed) | 9 | 29 |
| Crown root fracture (pulp not exposed) | 0 | 0 |
| Crown root fracture (pulp exposed) | 3 | 10 |
| Root fracture | 0 | 0 |
| Total | 31 | 100 |
| Soft-tissue injuries | | |
| Lip laceration/abrasion | 16 | 73 |
| Tongue laceration | 0 | – |
| Palate laceration | 0 | – |
| Cheek laceration | 1 | 5 |
| Other | 5 | 23 |
| Total | 22 | 100 |
| Bone injury | | |
| Mandibular fracture | 0 | 0 |
| Maxillary fracture | 0 | 0 |
| Other | 1 | 100 |
| Total | 1 | 100 |

most of the children using similar services came from lower socioeconomic groups.

As mentioned above, the majority of participants came from the local area (County St George). This is the most populous county in the island and includes the capital in the west (Port of Spain). Data from the UK suggest that children from lower socioeconomic groups are likely to use services close to their homes [4]. Furthermore, in Trinidad, free dental treatment for children (up to the age of 12 years) is available from Government dental clinics. However, County St George, like many areas of Trinidad, is under-served in this respect (Table 3), and this may also influence the demand for the service offered by the UWI dental school. It should also be noted that, because of the availability of materials, equipment and dental personnel, the range of treatments offered for children in Government dental clinics is smaller than that offered by the dental school.

### *Caries-related problems*

In the present study, toothache and dental abscess were by far the most common presenting emergencies, followed by traumatic dental injury. This is similar to findings from the USA [2] and the UK [3]. However, the proportion of children presenting with caries-related problems (74%) was much higher compared to the above studies, which reported 30% and 49%, respectively.

The high frequency of caries-related emergencies might be partly explained by the caries prevalence in the population. Although no recent data exists for Trinidad and Tobago, a previous national child dental health survey reported a DMFT for 12-year-olds of 4·9, with only 14% being caries free [8],

indicating a high caries experience in the permanent dentition. In the present study, primary molars were one of the most frequent sites of presenting problems. Data on early childhood caries in the Caribbean population is scarce, but a recent study from Anguilla (another island in the British West Indies) reported a prevalence of 37% in children aged between 24 and 71 months, with most decay in the primary molars [9]. For children attending general dental practices in the UK, total decay experience in the primary molars was a significant predictor of pain and sepsis requiring extraction or antibiotics [10]. It has also been shown that children who use routine preventive dental services are significantly less likely to use emergency services for caries-related pain or problems [11]. This highlights the need to promote regular dental attendance, along with providing dental health education and advice during routine dental care, in order to reduce the incidence of dental caries and pain in young children living in Trinidad and Tobago.

*Dental trauma*

The incidence of dental trauma presenting as an emergency in the present study was actually much less than in similar studies in the USA [2,12], the UK [3] and Jordan [13]: US = 27% and 37%; UK = 23%; and Jordan = 31%.

It has been reported that many dental injuries occur outside of office hours [15]; however, the UWI clinic does not offer an out-of-hours service. This may have influenced the apparent lower incidence of trauma-related dental emergencies since these cases may have been seen by casualty departments in other hospitals/health centres.

Socio-cultural factors may also influencing the use of the service. For instance, attendance for emergency treatment of dental trauma by children has been shown to be less likely if the child comes from a lower socioeconomic group, and is not concerned about the appearance of her or his teeth [14]. Children not in pain as a result of dental trauma are less likely to attend for treatment [14], and interestingly, Thomas [16] has reported that people of Caribbean origin are better able to tolerate pain than other ethnic groups.

Dental injuries presenting as an emergency were more frequent in boys, mostly occurred at school and were most often the result of a fall. This is consistent with other published reports [3,10–12,17], and also with paediatric trauma data from general hospital casualty (emergency rooms) in Trinidad, which show that the most common causes of paediatric injury overall were falls, presenting mainly in male children in the 4- to 9-year-old age groups [18].

Again consistent with other studies [3,11,12], the teeth most frequently affected by trauma were the upper incisors, both in the primary and permanent dentition. However, the type of injury sustained was quite varied, with concussion, subluxation and intrusion presenting with about the same frequency.

With respect to the severity of hard-tissue injury, enamel dentine fractures and complicated crown fracture (pulp involvement) were the most common injury, a finding which is similar to the few similar studies which have reported the severity of dental injury [11,12].

Lip lacerations accounted for almost three-quarters of the soft-tissue injuries and were largely associated with trauma to the anterior teeth. Although, by definition, lateral luxation and intrusion injuries involve damage to the alveolar bone, in the present study, bone injury was concerned with larger fractures of the jaws. Only one injury of this type was reported, which suggests that the UWI clinic is probably not the first point of contact for more severe forms of dental/facial injury. These cases are most likely being seen in oral surgery or general hospital casualty departments in the first instance.

The present study did not investigate the treatment undertaken, but adequate care to improve the prognosis of injured teeth depends on professional knowledge, aspects of service delivery, and awareness of agreed protocols for treatment and referral [19,20]. Staff offering dental trauma services should be regularly exposed to trauma patients to maintain high-quality diagnostic and treatment skills, and ideally, be involved in the initial and definitive treatment [15]. In an effort to address the issue of quality of care, clinical guidelines have been developed describing the immediate and long-term treatment for traumatic dental injuries in children [21–23].

Provision of adequate services should also be supported by public health initiatives to prevent dental injuries in children. For example, health promotion strategies have included advocating early intervention with increased overjets, widespread use of mouth guards for contact sports, safe playgrounds, and dental health education for parents, teachers and healthcare workers on the care of damaged or avulsed teeth [24].

Delayed presentation and treatment of traumatic dental injuries may result in a reduced prognosis,

compromised aesthetics and the potential for increased costs. Therefore, highlighting the importance of immediate treatment should form part of dental health education messages. Such programmes are yet to be implemented in Trinidad and Tobago, and will require multi-sectoral collaboration between the dental profession, schools, parent groups, sports clubs, health authorities and the media.

## Conclusion

Dental emergencies presenting to a university-based paediatric dental clinic were predominantly related to caries and trauma. The service was more frequently utilized by children in the mixed dentition stage, who were more likely to be from lower socioeconomic groups and from the local area. The frequency of caries-related problems indicates the need for more community-based prevention, including encouraging greater attendance for routine dental care and dental health education.

Oral health promotion strategies should also be developed to prevent dental trauma. Further research on this service should include investigating the type of emergency treatment/follow-up care undertaken, and measuring its effectiveness against international standards.

## Acknowledgements

The authors would like to thank Dr Sheldon Ramai and the UWI dental interns who assisted with data collection, and Miss Analiza Roach for her administrative support.

**Résumé.** *Objectifs.* Etudier le type et la prévalence des urgences dentaires se présentant à la clinique d'urgence pédiatrique de l'hôpital universitaire de Trinidad et décrire les facteurs socio-démographiques liés à l'utilisation de ce service.
*Protocole et Méthodes.* Etude prospective des patients consécutifs se présentant à la clinique d'urgence pédiatrique. Les données recueillies comprenaient le type d'urgence et les variables socio-démographiques.
*Résultats.* Les données ont concerné 309 patients, 47% de garçons et 53% de filles. L'âge moyen des participants était de 8,66 ans (ET = 3,75; allant de 1 à 16 ans). Soixante trois pour cent des parents des participants avaient un travail manuel ou étaient sans emploi, 21% avaient une profession non manuelle. Il n'y avait pas de réponse connue dans 6% des cas. Les problèmes liés aux caries représentaient 74% des urgences. Les traumas dentaires affectaient essentiellement les incisives permanentes maxillaires avec ébranlement, subluxation et intrusion pour les plus fréquentes.
*Conclusion.* Les urgences dentaires se présentant à la clinique universitaire étaient essentiellement reliées aux caries et aux traumas. Le service était plus souvent utilisé par les enfants en denture mixte, les enfants issus de milieux socio-économiques défavorisés et ceux habitant dans les environs. La fréquence des problèmes liés aux caries indique le besoin de plus de stratégies préventives communautaires incluant l'encouragement à plus de contrôle dentaire de routine et plus d'éducation dentaire. Les stratégies de promotion de la santé buccale devraient également développer la prévention des traumas.

**Zusammenfassung.** *Ziele.* Die Untersuchung von Häufigkeit und Form Zahnverletzungen, die in einer pädiatrischen Notfallambulanz eines Lehrkrankenhausen in Trinidad vorgestellt wurden, sowie zur Inanspruchnahme dieser Einrichtung assoziierte soziodemographische Faktoren.
*Ergebnisse.* Es waren Daten für 309 Teilnehmer (47% männlich, 53% weiblich) verfügbar. Das mittlere Alter lag bei 8.66 Jahren (+/– 3.75; Spannweite 1 bis 16 Jahre). Dreiundsiebzig Prozent der Eltern der Teilnehmer waren arbeitslos oder gingen einer einfachen manuellen Tätigkeit nach, 21% waren nichtmanuell/professionell beschäftigt, bei 6% war die Beschäftigung unbekannt.

Kariesbedingte Probleme lagen bei 74% der Notfälle vor. Zahntrauma betraf meist die oberen bleibenden Schneidezähne mit Konkussion, Subluxation und Intrusion als häufigste Verletzungsformen.
*Schlussfolgerung.* Zahnärztliche Notfälle, welche an dieser Universitäts-basierten Einrichtung vorgestellt wurden waren meist durch Karies oder Zahntrauma bedingt. Die Einrichtung wurde meist von Kindern in der Wechselgebissphase besucht, von Kindern niedrig privilegierter sozioökonomischer Gruppen und solchen aus der unmittelbaren Umgebung der Einrichtung. Die Häufigkeit kariesbedingter Probleme weit auf die Notwendigkeit für stärkere Gruppenprophylaxebemühungen einschließlich der Förderung regelmäßiger Zahnpflege und Zahngesundheitserziehung. Strategien der Mundgesundheitsförderung im Hinblick auf Zahntrauma sollten ebenfalls entwickelt werden.

**Resumen.** *Objetivos*. Investigar el tipo y la prevalencia de presentación de urgencias dentales en una clínica de urgencias pediátricas de un hospital universitario en Trinidad y describir los factores sociodemográficos relacionados con el uso del servicio.
*Diseño y métodos*. Estudio prospectivo de presentación consecutiva de pacientes dentales en una clínica de urgencias pediátricas. Los datos registrados incluyeron el tipo de urgencia y variables sociodemográficas.
*Resultados*. Se dispusieron los datos de 309 participantes, 47% varones y 53% mujeres. La media de edad de los participantes fue de 8,66 años (DS = 3,75, rango 1 a 16 años). El 73% de los padres de los participantes estaban implicados en un trabajo manual o estaban sin empleo, el 21% en un empleo no manual/profesional y el 6% desconocido. Los problemas relacionados con la caries ocuparon el 74% de las urgencias. El traumatismo dental más frecuente afectó a los incisivos permanentes superiores, siendo las lesiones más comunes, la concusión, la subluxación e intrusión.
*Conclusión*. Las urgencias dentales presentadas en esta clínica universitaria estaban relacionadas predominantemente con la caries y el traumatismo. El servicio era utilizado con más frecuencia por niños en dentición mixta, los niños de grupos socioeconómicos bajos y los que vivían en el área local. La frecuencia de problemas relacionados con la caries indica la necesidad de más estrategias preventivas basadas en la comunidad incluyendo el alentar una mayor asistencia para los cuidados dentales rutinarios y la educación de la salud dental. Las estrategias de promoción de la salud bucal también deberían desarrollarse para prevenir los traumatismos dentales.

## References

1 Pan American Health Organization. Regional health analysis. In: Pan American Health Organization (ed.). *Health in the Americas*. Washington, DC: Pan American Health Organization, 2002: 1–87.
2 Agostini FG, Flaitz CM, Hicks MJ. Dental emergencies in a university-based paediatric dentistry postgraduate outpatient clinic: a retrospective study. *Journal of Dentistry for Children* 2001; **68**: 316–321.
3 Flemming P, Gregg TA, Saunders DF. Analysis of an emergency dental service provided at a children's hospital. *International Journal of Paediatric Dentistry* 1991; **1**: 25–30.
4 Tickle M, Moulding G, Milsom K, Blinkhorn A. A study of primary dental care provision in young children with special reference to deprived communities. *British Dental Journal* 2000; **188**: 559–561.
5 Von Kennel D, Viangeli D, Casamassimo PS, Wilson S, Preisch J. Social factors associated with paediatric emergency visits for caries-related dental pain. *Paediatric Dentistry* 2001; **23**: 56–60.
6 Singh H, Mustapaha N, Haqq E. Patient satisfaction at health centers in Trinidad and Tobago. *Public Health* 1999; **110**: 251–255.
7 Welbury RR. *Paediatric Dentistry*, 2nd edn. Oxford: Oxford University Press, 2001.
8 Adewakun AA. Oral health. In: Pan American Health Organisation (eds). *Health in the Caribbean*. Washington, DC: Pan American Health Organization, 1997: 221–235.
9 Adewakun AA, Betran-Aguilar ED. Early childhood caries in Anguilla, British West Indies. *American Journal of General Dentistry* 2003; **16**: 42–47.
10 Milsom KM, Tickle M, Blinkhorn AS. Dental pain and dental treatment of young children attending the general dental service. *British Dental Journal* 2002; **192**: 280–284.
11 Powers LJ, Grana JR, Keen ND, Hanchak NA. Preventive service utilization as a predictor for emergency dental examinations. *Community Dental Health* 2000; **17**: 20–23.
12 Wilson S, Smith GA, Preisch J, Casamassimo PS. Epidemiology of dental trauma treated in an urban paediatric emergency department. *Paediatric Emergency Care* 1997; **13**: 12–15.
13 Al-Jundi SH. Dental emergencies presenting to a dental teaching hospital due to complications from traumatic dental injuries. *Dental Traumatology* 2002; **18**: 181–185.
14 Blinkhorn FA. The aetiology of dento-alveolar injuries and factors influencing attendance for emergency care of adolescents in the North West of England. *Endodontics and Dental Traumatology* 2000; **16**: 162–165.
15 Andreason JO, Andreason FM. Dental trauma. In: Pine CM (ed.). *Community Oral Health*, 1st edn. Oxford: Wright, 1997: 94–99.
16 Thomas VN. *Pain: Its Nature and Management*. London: Ballière-Tindall, 1997.
17 Marcences W, Alessi ON, Traebert J. Causes and prevalence of traumatic injuries to the permanent incisors of schoolchildren aged 12 years in Jaragua do Sul, Brazil. *International Dental Journal* 2000; **50**: 87–92.
18 Kirsch TD, Beaudreau RW, Holder YA, Smith GS. Paediatric injuries presenting to an emergency department in a developing country. *Paediatric Emergency Care* 1996; **12**: 411–415.
19 Hamilton FA, Hill FJ, Holloway PJ. An investigation of dentoalveolar trauma and it's treatment in an adolescent population. Part 1: The prevalence and incidence of injuries and the extent and adequacy of treatment received. *British Dental Journal* 1997; **182**: 91–95.
20 Maguire A, Murray JJ, Al Majed I. A retrospective study of treatment provided in the primary and secondary care services for children attending a dental hospital following complicated crown fracture in the permanent dentition. *International Journal of Paediatric Dentistry* 2000; **10**: 182–190.
21 Faculty of Dental Surgery Clinical Effectiveness Committee. *UK National Clinical Guidelines in Paediatric Dentistry*. London: Royal College of Surgeons, 1999.
22 Council on Clinical Affairs. *Guideline on Management of Acute Dental Trauma*. Chicago, IL: American Academy of Paediatric Dentistry, 2001.
23 Flores MT, Andreason JO, Backland LK. Guidelines for the management of traumatic dental injuries. *Dental Traumatology* 2001; **17**: 1–4.
24 Welbury RR. The prevention of dental trauma. In: Murray JJ (ed.). *Prevention of Oral Disease*, 3rd edn. Oxford: Oxford University Press, 1996: 147–152.

**Appendix 1: Data collection form**

*(1) Patient details*

AGE: (DOB)——————— SEX: M ☐ F ☐
ETHNICITY: African ☐ Indian ☐ Chinese ☐ Mixed ☐ Other ☐
OCCUPATION OF PARENT/GUARDIAN———
LOCALITY OF RESIDENCE (county)————

*(2) Type of dental emergency*

| | |
|---|---|
| Toothache (without abscess) | ☐ |
| Dental abscess | ☐ |
| Traumatic dental injury | ☐ |
| Soft-tissue trauma | ☐ |
| Post-extraction haemorrhage | ☐ |
| Acute herpetic stomatitis | ☐ |
| Exfoliating tooth | ☐ |
| Post-anaesthetic chewing | ☐ |
| Cervical lymphadenitis | ☐ |
| Post-extraction infection | ☐ |
| Maxillary sinusitis | ☐ |
| Parotitis/mumps | ☐ |
| Erupting tooth | ☐ |
| Other | ☐ |
| Rampant caries present* | ☐ |

(*Extensive caries on multiple teeth in the primary or permanent dentition)

*(3) Tooth (teeth) involved in the presenting emergency if applicable*

| | Primary | Permanent |
|---|---|---|
| Maxillary central incisor | ☐ | ☐ |
| Maxillary lateral incisor | ☐ | ☐ |
| Maxillary canine | ☐ | ☐ |
| Maxillary premolar | — | ☐ |
| Maxillary molar | ☐ | ☐ |
| Mandibular central incisor | ☐ | ☐ |
| Mandibular lateral incisor | ☐ | ☐ |
| Mandibular canine | ☐ | ☐ |
| Mandibular premolar | — | ☐ |
| Mandibular molar | ☐ | ☐ |

*(4) Injuries (if applicable)*

Injury occurred:
AT HOME ☐ AT SCHOOL ☐ OTHER ☐
Cause of tooth/jaw/soft tissue injury:

| | |
|---|---|
| • fall | ☐ |
| • bicycle/roller blade/skateboard | ☐ |
| • hit by object | ☐ |
| • car accident | ☐ |
| • other | ☐ |

Type of luxation injury:

| | |
|---|---|
| Concussion | ☐ |
| • subluxation | ☐ |
| • extrusive avulsion (partial avulsion) | ☐ |
| • lateral luxation | ☐ |
| • intrusive luxation | ☐ |
| • avulsion | ☐ |

Dental hard tissue injury type:

| | |
|---|---|
| • enamel infraction (crack) | ☐ |
| • enamel fracture | ☐ |
| • enamel–dentine fracture | ☐ |
| • complicated crown fracture (pulp exposed) | ☐ |
| • crown root fracture (pulp not exposed) | ☐ |
| • crown root fracture (pulp exposed) | ☐ |
| • root fracture (apical/middle/coronal third) | ☐ |

Soft-tissue injuries:

| | |
|---|---|
| • lip laceration/abrasion | ☐ |
| • tongue laceration | ☐ |
| • palate laceration | ☐ |
| • cheek laceration | ☐ |
| • other | ☐ |

Bone injury:

| | |
|---|---|
| • Fracture of alveolar socket wall | ☐ |
| • Mandibular fracture | ☐ |
| • Maxillary fracture | ☐ |
| • Other | ☐ |