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Prevalence and causes of fractured permanent incisors in 12-year-old suburban Nigerian schoolchildren

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Abstract – The aim of the study was to assess the prevalence and causes of traumatic dental injuries to the permanent dentition of 12-year-old school children in lle-Ife, a suburban population in the south west of Nigeria. A dental trauma cross-sectional survey was carried out through clinical examination of upper and lower permanent incisors and interviews with 415 (212 boys, 203 girls) 12-year-old children attending private and public secondary schools in lle-Ife, in 2004/2005 by one calibrated examiner. Garcia-Godoy's classification was used. The prevalence of traumatic dental injuries was 12.8%. There was no statistical difference in the prevalence between boys and girls P > 0.05. The most common cause of injuries was falls (49.1%), followed by traffic accidents (13.2%), collision against objects or people (11.3%) and misuse of teeth 9.4%. The commonest type of injury was enamel fracture alone (9.9%), followed by enamel-dentine fracture (4.8%). Majority of the accidents occurred at home (60.4%), followed by school (26.4%). The prevalence of traumatic dental injuries was on the increase among suburban Nigerian children in Ile-Ife and it has a potential to be considered an emerging public health problem.

Over the years, many children have reported for treatment, at the Paedodontic clinic of Department of Child Dental Health, Dental Hospital, Obafemi Awolowo University, Ile-Ife Nigeria, because of trauma to anterior teeth. Majority of these children reported for treatment for many days, months or years after sustaining injuries to their teeth often with complications. This calls for concern. Consequently, traumatic injuries to the teeth constitute the most devastating dental condition experienced by children.

Dental injuries could have improved outcomes if public were aware of first aid measures and the need to seek immediate treatment (1–4). Traumatic dental injuries can become an important public health problem (5, 6) as not only is their prevalence relatively high (7-10) but also because they have a substantial impact on children's daily life (11, 12). The problem of the fractured permanent incisor is a perplexing one to the parent, child and especially the dentist. The permanent incisors are important both functionally and aesthetically and the fracture of one or more of these teeth may have psychological effect upon the individual. A study showed that the trauma to the face, teeth and soft tissues can result in physical and emotional complications (13). Physical and psychological discomfort, pain and other complications such as tendency to avoid laughing or smiling which can affect social relationship have been reported as part of the effects which traumatized anterior teeth can cause (14).

The five leading causes of dentofacial injuries in pediatric population were falls, collision with an object,

bicycle accidents, assault and motor vehicle accidents (13). High levels of violence, traffic accidents and greater participation of children in sports have contributed to transform dental traumatic injuries into a public health problem (14). However, fall has been reported as the leading cause of traumatic dental injuries in children (15–20). The maxillary permanent central incisors were the teeth often traumatized (1, 6, 7, 16).

A Medline search has shown that a relatively few population-based studies have been published regarding traumatic dental injuries in African children (21–23). In Nigeria a total of 10 studies (24–34) had been published. Most of the studies were on children in the cities of Lagos, Ibadan, Benin, Enugu, and only three studies on suburban Nigerian children (16, 30, 31). Epidemiological studies on traumatic dental injuries in 12-year-old Nigerian children are sparse (31, 33). This study was carried out in order to assess the prevalence and type of accidents that resulted in traumatic injuries to the permanent incisors of 12-year-old suburban schoolchildren in Ile-Ife, Nigeria.

Material and methods

A cross-sectional survey was carried out through clinical examination of the upper and lower permanent incisors and interviews with 415 (212 boys, 203 girls) 12-year-old schoolchildren attending secondary schools in Ile-Ife, a suburban population in the south-west of Nigeria in 2004/2005.

A random sample was obtained using a list with all students enrolled in the selected schools. A letter was sent to the educational authorities explaining the aim and importance of the study. Another letter was sent to the parents asking permission for their children's participation. Dental examination was carried out by a single dentist supported by a recorder. They were calibrated before the field work using 30 (11-year-old) children. Intra-examiner variability was checked through duplicate examination of every 10th child. Kappa statistics were used on a tooth-by-tooth basis. The examiner sat in front of the children in their classrooms and examined them under natural lighting with the aid of a planemouth mirror. The dentist adopted strict cross-infection preventive measures. Traumatic injuries to the upper and lower permanent incisors were recorded according to the method described by Garcia-Godoy et al.(35). Root fractures were not recorded as no dental radiographs were taken. The data were analysed with IBM computer using spss 10.0 version. Chi-square test was used to test associations between occurrence of dental trauma and gender.

Results

A total of 415 children (212 boys, 203 girls) aged 12-yearold participated in this study. The prevalence of dental injury in the study population was 12.8%. Boys (14.2%) experienced more traumatic dental injuries than girls (11.3%) but the difference was not statistically significant, P > 0.05 (Table 1).

The total number of fractured incisors was 15.9% (Table 2). Enamel fracture alone (9.9%) and enameldentine fracture (4.8%) were the most common types of injuries. Other types of injuries were less common (Table 2).

The commonest cause of traumatic dental injuries was falls (49.1%) followed by road traffic accidents (13.2%)

Table 1. Prevalence of dental injuries to permanent incisors in 12-year-old schoolchildren (n = 415) in Ile–Ife, Nigeria

Gender	Children with dental injuries n (%)	Children with no dental injuries n (%)
Boys Girls	30 (14.2) 23 (11.3)	182 (85.8) 180 (88.7)
$\chi^2 = 0.741, P = 0.389.$		

Table 2. Rate per thousand incisors of different types of dental injuries (n = 3320 incisors)

	Frequency			Relative
Type of dental injury	Male	Female	(<i>n</i>)	frequency of incisors (%)
Enamel fracture	19	14	33	9.9
Enamel/dentine fracture	9	7	16	4.8
Enamel/dentine/pulp exposure	2	1	3	0.9
Other injury (intrusion)	1	1		0.3

Table 3. Frequency distribution of factor related to dental injuries in 53 schoolchildren who have experienced injuries to the permanent incisors in Ile-Ife, Nigeria

	Frequency		
Injury characteristic	Male	Female	n (%)
Knowledge about injury			
Yes	9	6	15 (28.3)
No	21	17	38 (71.7)
Types of accident that resulted			
in dental injury			
Fall (all reasons)	14	12	26 (49.1)
Collision against objects or people	3	3	6 (11.3)
Traffic accidents	4	3	7 (13.2)
Eating		1	1 (1.9)
Misuse (habits of opening bottle with the teeth)	3	2	5 (9.4)
Sports	3	1	4 (7.5)
Bicycle riding	2	1	3 (5.7)
Unknown	1		1 (1.9)
Place of dental injury			· · ·
House	17	15	32 (60.4)
School	9	5	14 (26.4)
Outside (in streets)	4	3	7 (13.2)

and collision against objects or people (11.3%). Misuse of teeth, especially habits of opening the bottle covers with the teeth accounted for 9.4%. The majority of falls occurred when children were playing.

The majority of the accidents occurred at home (60.4%) followed by school (26.4%) and outside (in streets, 13.2%) (Table 3). A high proportion of children (71.7%) who had sustained injuries to their teeth were not knowledgeable about dental injuries (Table 3).

Discussion

The prevalence of traumatic dental injuries to the permanent incisors of 12-year-old schoolchildren in Ile-Ife, Nigeria was 12.8%. Epidemiological studies showed that the prevalence of traumatized anterior teeth varies between different population and age groups (15-22). In Nigeria the prevalence of such dental injuries in children aged between 6 and 16 years ranged from 6.5% to 19.5% (24-34). Different methodologies have been used in Nigerian studies, so caution should be taken when comparing prevalence figures. It is inappropriate, for instance to compare figures found in clinic and hospitalbased studies with population-based studies (8). It is known that clinic and hospital-based studies provide less epidemiological evidence than population-based studies (34). Variation in sampling and diagnostic criteria between different studies may also explain different findings (7).

Few population-based studies on traumatic dental injuries in 12-year-old Nigerian children have been reported (31–33), and were representative of population of schoolchildren in the age of study. In Nigeria, a study was carried out on urban Nigerian 12-year-old school-children in six local government areas of Lagos state with a sample of 1600 children, a prevalence of 9.8% traumatic dental injuries to the teeth was reported (33).

In Ile-Ife, Nigeria a hospital-based study showed that the highest number of cases with traumatic injuries was registered in the 5-year-old and 12-year-old children (32). Previous reported study on traumatic dental injures in the permanent incisors of 12-year-old suburban Nigerian children in Ile-Ife showed a prevalence of 9.8% (30). This study found a prevalence of 12.8%. This showed an increase in traumatic dental injuries in the population studied when compared with previous Nigerian reports (31, 33). The finding is similar to reports from Syria (14) and Brazil (7) in which prevalence of 11.7% and 15.3% were reported and not in agreement with another Brazillian study (9) and Thailand report (6) in which prevalence of 58.6% and 35.0% were reported.

Boys suffered more from traumatic dental injuries than girls but the difference was not statistically significant. This finding is similar to that of a study by Traebert et al. (8) and differs from previous Nigerian studies (16, 32) in which significant numbers of boys injured their teeth more than girls. The permanent central incisors were the most common teeth traumatized. This finding was similar to previous reported studies (6, 8, 30–34). In all reported Nigerian studies the upper incisors were affected by trauma and usually one or two teeth were traumatized. The most common type of injury found in this study was enamel fracture followed by enamel–dentine fracture similar to previous reported Nigerian studies (16, 30) and studies in other developing countries (6, 7, 9, 10).

The study showed that the main types of accidents that resulted in dental injuries were falls and road traffic accidents. These findings are similar to a reported Brazilian study (7). Falls had been reported to be the major cause of traumatic dental injuries in children (6, 8, 10, 16, 34, 36). Majority of falls reported in this study occurred when children were running and playing. Misuse of teeth, especially habits of opening the bottle covers with the teeth is another cause of dental injuries revealed by this study.

This finding is similar to the report from Brazil (10) which showed that misuse of teeth was one of the causes of dental injuries among 13-year-old Brazillian children. A habit of opening bottle covers with the teeth is relatively common in Nigeria and this should be discouraged through dental health education to create awareness of the damaging effect on teeth. Teeth should not be used as openers. Biting hard material was also reported to be the most common activity leading to traumatic dental injuries in 11- to 13-year-old Thai children (6).

The majority of traumatic dental injuries occurred at home and at school during physical leisure activities such as playing soccer, running and cycling. These were the main activities causing children to fall and were related to the aetiology of traumatic dental injuries. These findings are similar to those in other reported studies (6, 8, 36). Families and the educational authorities must provide safe environment for children to play such as provision of specific and appropriate public places for leisure and sports activities with impact absorbing surfaces which could minimize injuries when children fall (8). It is also important that children should be supervised while they are playing to minimize the rate at which they fall and sustain traumatic dental injuries. The use of mouth guards is also recommended for children who are participating in contact sports. Social awareness about dental injury should be stepped up through national and local campaign programmes.

Conclusion

The prevalence of traumatic dental injuries among 12year-old suburban Nigerian children in Ile-Ife was on the increase and has a potential to be considered as emerging public health problem.

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