THE PATTERN OF TRAUMATIC DENTAL INJURIES IN CHILDREN IN A TERTIARY HEALTH CARE FACILITY IN NIGERIA

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Abstract

To assess the causes and pattern of traumatic dental injury (TDI) among children that presented in the dental clinic of a tertiary health institution.

Retrospective review of dental records in the dental clinic for traumatic dental injuries among children up to 16 years. Information retrieved included demographic data, presenting complaint, cause of trauma, where it occurred, how it occurred, and time interval before presentation for care in clinic. Other information retrieved were on lip competence and type of dental injuries. Data analyzed using SPSS Version 20.

Ninety seven (5.7%) subjects; 59 (60.8%) males and 38 (39.2%) females presented with dental trauma. They had a mean age of 6.14 (+ 3.95) years. The 1 to 4 years age group was the majority 38 (39.2%). Most (40.2%) subjects presented for treatment in the clinic less than a week after the injury. The commonest cause of TDI was falls (85.2%), most (76.2%) incidents occurred in homes and their concern at presentation majorly (62.9%). was aesthetics. Increased overjet and lip incompetence was found in 13.4%and 9.9%children, respectively. Seventy-five percent tooth supporting structures injuries and 63.1%dental fractures occurred in the primary and permanent dentitions, respectively. Multiple teeth injury was the commonest presentation.

The commonest cause of TDI was falls and they occurred at homes. The most frequently affected age group was the 1 to 4 year age group and this may have resulted from inadequate supervision /care and hard impact absorbing surfaces.

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Introduction

Traumatic dental injuries (TDI) though preventable, commonly occur in children and adolescents and may affect their quality of life.[1]These occur in infants and toddlers when they are learning to coordinate their motor skills such as in walking, running and climbing while injuries in older children occur as a result of exploring their environment and involvement in impulsive,[2,3,4] rigorous and adventurous activities while playing independently. In a review of epidemiological studies on TDI done by Zaleckiene et al[5]. it was observed that the prevalence varied between 6 to 66.6%. The variation in the prevalence, causes, patterns and severity of traumatic dental injuries within and between populations is as a result of environmental, social and cultural differences. Also, the differences in the population studied and type of study may be responsible for this variation.[1-16]

Apart from predisposing medical conditions (such as psycho neurologic disorders), environments with non impact absorbing hard surfaces and inadequate supervision during play/sports may make a child more susceptible to dental injuries.[6] The facial profile of the child

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such as seen in Angle's Class II div 1 malocclusion; (i.e. protrusion of anterior teeth and poor lip coverage) and weak tooth structures have been implicated in TDI.[6]

Falls are the commonest causes of TDI reported in children[1,2,4] other causes include fights, collisions, sports, road traffic accidents and assaults. Iatrogenic incidents during oral/ ENT surgical procedures that involve use of airway or mouth guards have also been implicated.[17] The home[1,2,4,7] has been identified as the most frequent environment where younger children sustained injuries while older children/adolescents commonly sustained theirs at school /playgrounds during sporting activities.[4]

Inward displacement of the incisors in the alveolar sockets has been reported in various studies as the commonest injury in primary dentition while uncomplicated crown fractures were reported in permanent dentition.[1,2,4,] The quality of life of a child could be affected by the dental injuries sustained or its complications. Therefore the timing of care and quality of care given determine the outcome of treatment. The shorter the interval between the injury and first aid administered and presentation for care or/and in a health facility the better the prognosis of the injured tissue.[17]

The aim of this study was to assess the causes and pattern of traumatic dental injuries in children and adolescents that presented for care in the Paediatric dental clinic of a tertiary health institution in South-South geo-political region of Nigeria

Materials and Methods

This was a 5-years retrospective study of children/adolescents who presented with traumatic dental injuries in the paediatric dental unit of the Dental Centre of the tertiary health institution in Nigeria. Ethical clearance was obtained from the Research and Ethics Committee of the institution. Information was obtained from the dental records with particular reference to:

1. Demographic information: Age as at last birthday and Sex
2. Medical and dental histories
3. The facial profile was noted whether there was increased overjet (>4mm), and the competence of the lips was recorded as either competent or incompetent
4. The cause of the injury, where the injury occurred and how it occurred
5. The time interval between the onset of injury and the presentation in the clinic
6. The type of injury: categorized according to the classification proposed by Andreason[18] whether tooth supporting structure, soft tissue injuries or dental fractures

i. The tooth supporting injuries were classified as Subluxation, lateral luxation, extrusive luxation, intrusive luxation and avulsion

ii. Dental fractures were classified as enamel only, enamel-dentine only, enamel dentine pulp, crown root fracture, root fracture and alveolar bone fracture.

7. The teeth affected; whether primary or permanent dentition, number of subject's teeth affected,

All the information was entered into a data spreadsheet and entered into an IBM SPSS Version 21. Frequency tables were generated for all variables and mean scores computed for numerical variables. Other data analysis tools included chi-square test and Statistical significance was inferred at $p<0.05$.

Results

There were 1,692 children seen during the study period; comprising 905 (53.5%) females and 787 (46.5%) males and 97 (5.7%); [59 (60.8%) males and 38 (39.2%) females] presented with dental trauma. They had an age range between 1 and 15 years and a mean of 6.14 (± 3.95) years. The 1 to 4 years age group was the majority [38 (39.2%)], while the least [6 (6.2%)] was the 13 to 16 year age group. There was a statistically significant difference between males and females in the 13- 16 years age group (Depicted in Table 1).

Age group	Males n (%)	Females n (%)	Total n (%)	p value
1-4 years	22 (57.9)	16 (42.1)	38 (39.2)	0.33
5- 8 years	16 (53.3)	14 (46.7)	30 (30.9)	0.91
9- 12 years	17 (73.9)	6 (26.1)	23 (23.7)	0.44
13-16 years	4 (66.7)	2 (33.3)	6 (6.2)	0.05*
Total	59 (60.8)	38 (39.2)	97 (100)	0.46

Table 1. Distribution of patients with TDI according to age and sex.

Majority (40.9%) of the subjects presented less than a week after incidence of the injury; [i.e. 38.7% presented at the clinic after 24 hours while 2.2% sought care a few hours (less than 24 hours) after the injury] (Figure 1).

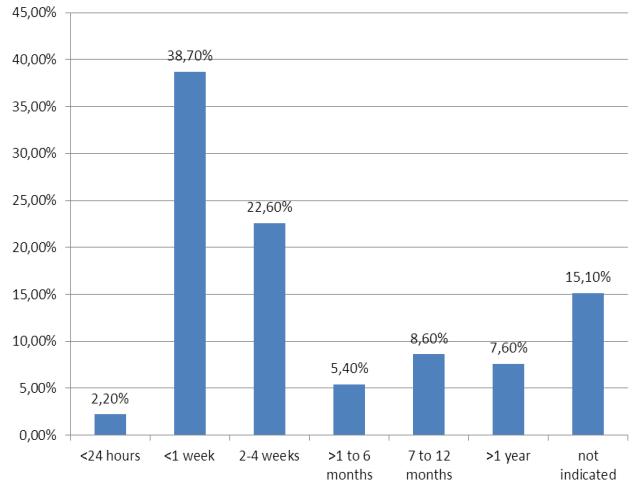

Figure 1. Distribution of patients according to time elapsed between injury and presentation.

The complaints at presentation included dental pain and disturbance in function 25 (25.8%), aesthetics 60 (62.9%) and concern for the well being of the baby that fell 12 (12.4%). Nine (9.3%) cases did not have the cause of the injury documented, of the remaining 88 (91.7%) that indicated the cause, 75 (85.2%) were due to falls while 7 (8.0%) were as a result of collision (details in figure 2).

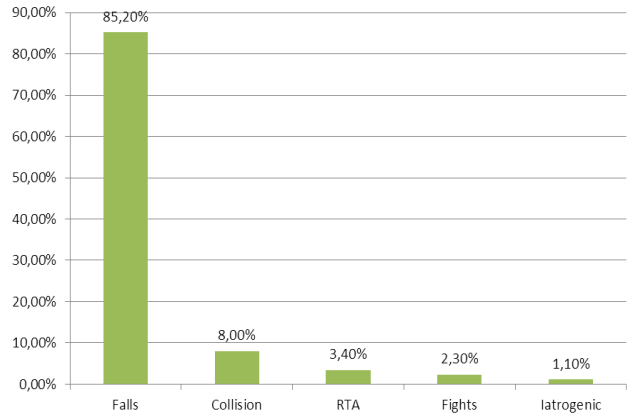

Figure 2. Distribution of patients according to the cause of injury.

Two thirds (67.7%) fell on hard surfaces of floor tiles. Majority (76.2%) of the incidents occurred in homes (Figure 3) and 75% of the injuries that occurred in the 13 to 16 years age group occurred in schools. Thirteen (13.4%) and 9.9% subjects with TDI had increased overjet and lip incompetence, respectively.

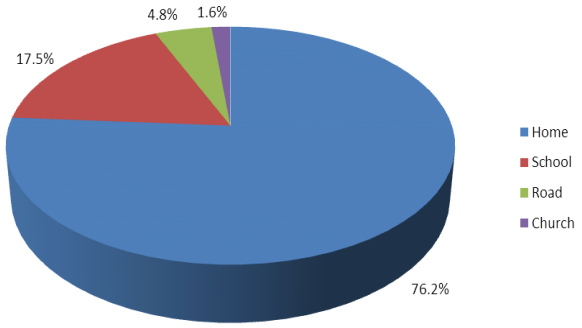

Figure 3. Distribution of patients according to place of injury.

Altogether 137 teeth were injured and 76 (55.5%) were primary teeth. One hundred and thirty two (96.4%) teeth affected were the maxillary incisors; 72 (94.7%) were primary dentition while 60 (98.4%) were permanent teeth. The maxillary central incisors were the most (84.6%) commonly injured teeth (depicted in figure 4); almost occurring equally on both sides of the jaw; 58 maxillary right central incisors and 57 maxillary left incisors. Sixty-five of them (56.5%) were primary dentition and the remaining 50 (43.5%) were permanent dentition. Majority (48.9%) of the subjects had one tooth injury.

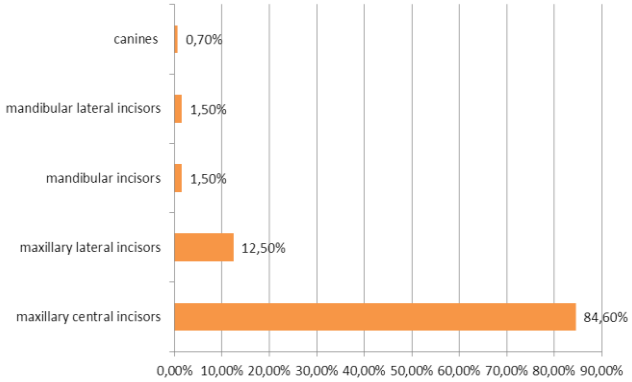

Figure 4. Distribution of the injured teeth according to tooth type.

Eighty four (61.3%) were dental fractures. Majority (23.4%) of the injuries were uncomplicated crown (enamel-dentine) fractures.

Forty three (75.4%) tooth supporting structure injuries occurred in primary dentition and 53 (63.1%) of the dental fractures affected the permanent dentition. Subluxation was the commonest tooth injury in the primary dentition (Table 2). Soft tissue injuries occurred in 6 subjects; 4 gingival lacerations and 2 tongue lacerations.

	Type of dentition		
	Primary teeth (74)	Permanent (67)	Total (137)
Enamel only	6 (8.1)	17 (25.4)	23 (16.8)
Enamel-dentine only	9 (12.2)	23 (34.3)	32 (23.4)
Enamel dentine- pulp	9 (12.2)	13 (19.4)	22 (16.1)
Crown-root fracture	6 (8.1)	0	6 (4.4)
Root fracture only	1 (1.4)	0	1 (0.7)
Subluxation	15 (20.3)	1 (1.5)	16 (11.7)
Extrusive luxation	3 (4.1)	1 (1.5)	4 (2.9)
Lateral luxation	7 (9.5)	3(4.5)	10 (7.3)
Intrusive luxation	14 (18.9)	4 (6.0)	18 (13.1)
Avulsions	4 (5.4)	5 (7.5)	9 (6.6)

Table 2. Distribution of types of injury according to the type of dentition.

Thirty two (37.6%) teeth with dental fractures were primary dentition. Forty seven (77.1%) were tooth supporting injuries in primary teeth. Enamel-dentine fracture was the commonest injury in the permanent dentition while equal proportions had enamel-dentine only and enamel-dentine-pulp in primary dentition (Table 2).

Discussion

The proportion of children that presented in the clinic with traumatic dental injuries was lower than the 9.6% reported on children in Nepal[12]but higher than the 4.5% and 0.75%reported in Nigerians[4] and Indians,[7] respectively. The male preponderance in this study has also been reported in other studies.[4, 7, 9, 12, 15] The male: female ratio of 1.6 to 1 was less than the 2 to 1 - 4 to 1 reported in Nigerians,[1,4] Indians,[7] and Nepal children[12] but similar to that reported in a rural Indian population.[19] In the present study the difference between the males and females was not statistically significant. However, the 13 to 16 years age group had statistically significant differences between males and females. This may be because older males are more active and involved in rigorous activities and contact sports. The statistically insignificant differences seen in the younger age groups could be that at younger ages the males and females are exposed to same play environments and risks.[20] It is noteworthy that the most frequent age of occurrence was age one year (age 1 to 4 years age group) this is contrary to other studies where 9-12 year age group, 12-15 years[7,8] were reported as the most frequently presented age in the clinic.

Majority presented within the first week of injury, and only 2 % accessed care within a few hours after injury. The interval between injuries and presentation for care was longer than a few hours probably because the perception and awareness of parents/caregivers on care and prevention of traumatic dental injuries may have been inadequate.[17, 21] The prognosis of TDI is dependent on the time interval between the occurrence of injury and presentation for care at a health facility.[17] The shorter the interval between the occurrence of the injury and the presentation for care in the clinic for treatment, the better the treatment outcome. Their motivation in seeking care at the dental clinic was majorly because of poor aesthetics. This was also the finding by Oredugba and Nzomiwu.[4]

Medical conditions, lack of supervision during play, hard impact absorbing surfaces and certain facial profiles are known to predispose children to dental injuries.[22]

Angles Class II division 1 (protrusion of anterior teeth) and poor lip coverage found in children also predispose them to more dental injuries than those with normal overjet.[6] In this study over a tenth had increased overjet/teeth protrusion however, the most frequent age group affected by TDI was the one to four years age group whose dentition are not predisposed to trauma since the incisors are upright.[23] Impact absorbing floor surfaces are no longer trendy in homes; softer impact absorbing floorings such as rugs have been sacrificed for the aesthetic (hard tiles and terrazzo) floors.[22] It is known that about the age of one to three years an infant/toddler is toddling and waddling. Until motor skills are learnt and a steadiness in gait, there will be loss of balance and falls, though such falls should not result in injuries. But when the surfaces are not child friendly orofacial injuries may occur

(especially the oral cavity) since the face is a prominent part of the body.

In this present study falls on hard surfaces (tiled floors/stairs) was the commonest cause of TDI this corroborates others studies.[1-4,6,7,14, 20]

Most of the injuries occurred at home though in the teenage age group school was the most frequent place it occurred. This finding in the older age group has also been reported in several studies.[1,4,7,20] Majority of these injuries occurred at home and these were probably as a result of hard floor surfaces and poor supervision/care during play.

Most of the injuries affected primary dentition. This finding is contrary to other studies [4,5] this finding may have been as a result of the age groups (0-8years) most affected (70.1%) in the study. Majority (48.9%) of the injuries were one tooth which corroborates other studies.[1, 4, 14]

The findings from this study show that uncomplicated fractures were the commonest presentation in the subjects. However, the tooth supporting structures injuries and uncomplicated crown fractures were reported as the commonest TDIs in primary and permanent dentitions, respectively this corroborates other studies on TDIs.[4,5] Crown (enamel-dentine) fractures and subluxations were the commonest injuries in the permanent and primary dentitions, respectively. The finding in the permanent dentition agrees with the finding in several other studies.[4, 12, 14] while Subluxation was the commonest injuries in primary dentition and this finding is similar to that reported by Diaz et al[24] and Lam et al in Chileans and Australians, respectively. The maxillary central incisors were the most frequently affected teeth this observation is similar to other studies.[1-16, 20]

The value of the uncomplicated dental fractures in permanent dentition in this present study was lower than the 57.4% reported in an epidemiological study in Nigeria[1] and lower than the 37% reported by Unai et al.[8]. This difference may be due to the fact that the field/ epidemiological study had children and adolescents that may not have presented for care in the clinic. In this study there were no root fractures in the permanent dentition however, all the root fractures were in the primary dentition which contradicts previous reports, this maybe because of the commonest age group affected. Also, the severity of the injuries could be attributed to the poor impact absorbing surfaces and this observation was noted by Oredugba and Nzomiwu.[4]

Conclusion

The commonest cause of TDI was falls and they occurred at homes. The most frequently affected age group was the 1 to 4 year age group and this may have resulted from inadequate supervision /care and hard impact absorbing surfaces. The presentation for care was within the first week of the incident which was due to probably inadequate knowledge or poor attitude to oral health care by the parents/caregivers.

Recommendation

Public enlightenment programmes via the electronic media, ante and post natal clinics and Parents- teachers' fora in school. This would go a long way in educating the children and parents/caregivers on prevention and treatment of Traumatic dental injuries. Consequently, this will lead to better treatment outcome; an offshoot of prompt response and presentation for care in the dental clinics.

Declaration of Interest

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