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Dilaceration among Nigerians: prevalence, distribution, and its relationship with trauma

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Abstract – Dilaceration is the result of a developmental anomaly in which an abrupt change in the axial inclination between crown and root is observed. Its prevalence in various races is different and its association with history of trauma is controversial. This study assessed the prevalence and distribution of dilacerated teeth among Nigerians and also investigated whether there was a relation between a history of trauma and teeth that had dilaceration. A total of 465 records of adult attendees (involving 706 teeth and 256 films) were retrospectively studied. Dilacerated teeth were scored using Hamasha et al.'s criteria. Dilaceration occurred more often in the maxilla, posterior teeth and in women, though no association between a history of trauma and occurrence of dilaceration was found. Prevalence of dilaceration in the population and in all teeth was 4.5% and 2.97%, respectively. Dentists should pay detailed attention to baseline radiographs, especially in maxilla and posterior teeth.

The term dilaceration, sometimes referred to as a hand of a traffic policeman, was first used by Tomes (1). It is defined as a deviation in the linear relationship of a crown to its root (2–4). Moreau (5) used the term 'scorpion tooth' for this condition.

The etiology of this anomaly is controversial (4, 6). The most probable cause is mechanical trauma to the calcified portion of a developing tooth (7, 8). Among others are syndromes (4) and ectopic development of tooth germs (2, 6). However, when a dilacerated tooth is anteriorly located, trauma would seem a more likely factor (9). Otuyemi and Sofowora (10) reported a prevalence of 14.5% trauma to the anterior teeth in rural Nigerians. The effect of trauma depends on the age of occurrence and the trauma causes (11).

Hamasha et al. (12) reported 3.7% dilaceration prevalence in all teeth and 17% rate in all subjects studied. Many authors believe that mandibular third molars are affected most often, while they have shown that it is the maxillary arch that is affected more than the mandibular arch (6, 13). Furthermore, permanent teeth are affected more frequently than primary teeth (14) and posterior teeth more than anterior teeth (6). Although it has been claimed that there is no gender predilection (15), this needs to be confirmed by multiple studies. Dilaceration may occur bilaterally in some patients (16–18).

Dilaceration, as a dental anomaly, influences treatment outcome in teeth that require endodonotic care (19), so studying dilaceration has explicit beneficial influence on patient care. Furthermore, as a marker of certain syndromes, incidental detection of dilacerated tooth can inform the dentist to do a detailed patient assessment. The purpose of this study was to assess the prevalence and distribution of dilaceration among patients attending endodontic clinic of the University of Nigeria Teaching Hospital (UNTH), and to investigate the relation between a history of trauma and teeth that had dilaceration.

Materials and methods

Between February 2004 and August 2005, the dental records of 575 consecutive adult attendees in the endodontic clinic of the UNTH were retrospectively studied. One hundred and ten records from patients younger than 18 years of age or those with either poor quality radiographs or with no periapical radiographs at all were excluded. In addition, patients whose records were incomplete as well as those who had a history of more than one dental attendance or more than one periapical film of the same teeth were excluded. Neither unerupted nor retained primary teeth were scored.

The qualified records (N = 465) contained 706 teeth and 256 periapical films. The films were examined independently by a radiologist and one of the authors (CIU), using Hamasha et al.'s criteria (12). At the end of independent readings, the examiners agreed 96% of the time. Both examiners had a joint session where discrepancies were discussed and resolved. The patients' bio data, dilacerated and non-dilacerated teeth, and history of accidental trauma were recorded.

The data were analyzed using spss v10 software (SPSS, Chicago, IL, USA). Categorical variables were compared

by chi-square test and critical level of significance was set at 0.05.

Results

Four hundred and sixty-five subjects (193 males and 272 females), had 706 teeth (276 males and 430 females) were examined. The ages ranged from 18 to 71 years (x = 33.42 ± 13.63). More females (N = 272, x age = 33.89 ± 13.7) than males (N = 193, x age = 33.72 ± 13.51) included. The distribution of the teeth on the maxillary and mandibular arches was 430 and 276, respectively. Prevalence of dilaceration in the population and in all teeth was 4.5% and 2.97%, respectively.

In the mandible, dilaceration occurred more often in premolars (7.5%), followed by third molars (3.3%), while in the maxilla, it was more prevalent in the first molars (4.7%), followed by the second molars (3.8%) and third molars (3.7%) (Table 1). Dilaceration also occurred more often in the maxilla (3.02%) than in the mandible (2.9%) (Table 2).

Females had more predilections to dilaceration than males (5.5% of the females vs 3.1% of the males). Also, dilaceration occurred more often in the 56+ years age band (5.6%), followed by 46–55 years age range (3.8%).

Trauma occurred in 13% of the population, which all were in the maxillary arch, and in 8.2% of all teeth examined, of which 19.8% occurred in premolars, followed by third molars (17%), first molars (12.8%), and central incisors (0.1%) (P > 0.05).

Discussion

The criteria in the literature for recognizing root dilaceration vary. In this study, the criteria of Hamasha et al. (12) was used in which, a tooth is considered to have a dilaceration towards the mesial or distal direction if there is a 90° angle or greater along the axis of the root or tooth.

As might be expected, this retrospective study shares in the limitations of the similar works. It should be

Table 1. Distribution of examined teeth by prevalence, dilaceration and associated trauma

Tooth type	No. of teeth examined	No. of dilacerated teeth	Prevalence (%)	No. of traumatized teeth
Mandible				
Central incisor	3	-	-	-
Lateral incisor	10	-	-	-
Canine	14	-	-	-
Premolars	67	5	7.5	
First molar	33	-	-	
Second molar	83	1	1.2	
Third molar	60	2	3.3	
Maxilla				
Central Incisor	20	-	-	2
Lateral Incisor	36	1	2.8	3
Canine	10	-	-	23
Premolars	116	2	1.7	23
First Molar	86	4	4.7	11
Second Molar	80	3	3.8	3
Third Molar	82	3	3.7	14

Table 2. Distribution of dilacerated teeth by age and gender

	Age (ye	ars)	Gender						
Jaw	18–25	26–35	36–45	46–55	56+	Female	Male		
Maxilla									
D	4	3	2	1	3	10	3		
N	170	92	82	51	35	263	167		
Р	2.4	3.3	2.4	2	8.6	3.8	1.8		
Mandible									
D	4	0	2	2	0	5	3		
N	113	56	59	29	19	176	100		
Р	3.5	0	3.4	6.9	0	2.8	3		
D = Number of dilacerated teeth; N = Number of teeth examined; P = Prevalence of dilaceration (%).									

emphasized that this study has probably under-estimated the prevalence of dilaceration as only mesial and distal dilacerations have been assessed. Hamasha et al. (12) used the same method and assessed only mesial and distal dilaceration. Furthermore, the current study is limited by the authors' inability to investigate for associated syndromes and developmental anomalies. Jafarzadeh and Abbott (4) reported in their review that dilaceration is associated with some syndromes and abnormalities, such as Smith-Magenis syndrome, Ehlers-Danlos syndrome, Axenfeld-Rieger syndrome, as well as congenital ichthyosis.

The current work is peculiar from the similar previous works in those it is the first to actually investigate the role of trauma in the development of dilaceration. Although the damage frequently follows avulsion or intrusion of the overlying primary predecessor (4), some reports (2, 20–22) have questioned the etiology of dilaceration and do not support the belief that trauma is the major etiologic factor. Some researchers support this claim as most dilacerated teeth are located in the posterior area and these are not prone to direct trauma (12). The results of this study also confirm this claim.

More predilection of the maxilla than the mandible to dilaceration agrees with the study of Malcić et al. (6), but not with that of Hamasha et al. (12). If anterior teeth were affected more often, then dilaceration in the maxilla would have been attributed to the role of trauma. However, Chadwick and Millett (21) had associated posterior teeth predilection to ectopic tooth germ development.

About 13% of the population and 8.2% of the teeth (premolar: 19.8%, third molar: 17%, and first molar: 12.8%) in the current study suffered from trauma. It is thought that trauma plays its role through displacement of already formed hard tissues relative to the developing uncalcified part (9). However, if trauma precedes development of the root deformity, it would occur more often in the maxillary anterior teeth (8). Some authors believe that dilaceration may be a true developmental anomaly that is not related to a history of trauma as is seen in the maxillary lateral incisors, where caution should be exercised in interpreting periapical radiograph as distal angulation of the root to be a normal anatomy of the tooth (22, 23).

Some researchers reported that the prevalence is greater in the posterior teeth and in the maxilla with fewer occurrences among anterior teeth and in the mandible (6), although one study showed that two-thirds of the dilacerations were in the mandible (12). The current study confirmed that the prevalence is greater in the posterior teeth and in the maxilla.

Although dilaceration may occur in each kind of teeth (24), there is no consistency about the most and least affected teeth reported with this condition (4). This study showed that most affected teeth are mandibular premolars and maxillary first molars.

Contrary to a previous study (15), the present work found more dilaceration in females than males. This may be due to the better dental attendance behavior in females.

Previous studies have reported the prevalence of dilaceration with the frequencies ranging from 0.32% (14) to 98% (25). This study showed that prevalence in Nigerian population and in all teeth was 4.5% and 2.97%, respectively. The occurrence rate of dilaceration among teeth (not population) in the present work is similar to that of Hamasha et al. (12) but the rate among Hamasha et al.'s population (12) differs from the figure reported in the current work which may be related to the racial differences [Hamasha et al. (12) determined the prevalence of dilaceration in Jordanian patients; however, this study reported the prevalence in Nigerian patients].

Conclusion

Dilacerated teeth are seen more often in the maxilla than in the mandible and in the posterior than in the anterior teeth, though no association between a history of trauma and occurrence of dilaceration was found.

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