

## The unmet treatment need of traumatized anterior teeth in selected secondary school children in Ibadan, Nigeria

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**Abstract** – Treatment of traumatized anterior teeth is highly desirable to relieve pain, maintain esthetics and to preserve the balance of the anterior part of the mouth; however many may go untreated. The aim of this study was to assess the prevalence of damage to permanent anterior teeth in school adolescents, the average duration of trauma and to ascertain the level of the unmet treatment need. A total of 1532 secondary school children between the ages 12 and 19 years participated in the study. They were randomly selected from public secondary schools in five local government areas in Ibadan using a multistage sampling method. Participants were examined with the aid of mouth mirrors and probes under natural light. Traumatic anterior dental injuries were recorded by the same investigator (DMA) according to WHO classification. One hundred and sixty-five participants sustained injuries to their anterior teeth. Their mean age was  $15.47 \pm 2.09$  years, with a male to female ratio of 1.5:1. The commonest cause was fall (78.8%) with road traffic accident being the least (1.8%). The tooth most commonly injured is the upper left incisor (48.0%) closely followed by upper right central (43.1%). Enamel fracture was seen in 46.5% and enamel–dentine in 42.6% of the traumatized teeth. Most (79.4%) of the children sustained injury to one tooth only. Of the participants, only 30 (18.2%) had previous dental consultation while only nine (5.5%) consulted the dentist following the trauma; however, none of the teeth had any form of restoration. Average time elapsed between trauma and dental examination was about 3.5 years. Many participants had had injury for about 2 years before dental examination. In conclusion, there is a high unmet treatment need of traumatized anterior teeth in the study population.

Traumatic dental injuries could result in avulsion, luxation, coronal and radicular fracture or even unsightly discoloration. Treatment of such injuries is therefore desirable, not only to relieve pain and maintain aesthetics but also to preserve the balance of the anterior part of the mouth during the period of growth and normal development of the face, to preserve masticatory function as well as speech.

A recent review (1) of the literature revealed that many epidemiological and clinical studies worldwide have reported mainly on the prevalence, distribution as well as the types of injuries to the anterior teeth. However, very little information is available on the percentage or proportion of these injuries that go untreated. Zadik et al. (2) reported that 16.8% of traumatized teeth with uncomplicated crown fracture received first aid or restorative treatment while 78.5% of teeth with obvious pulp involvement were treated. Macko et al. (3) found the frequency of restoration to be 18.8% of the fractured teeth of males and 17.8% of females. Furthermore, Hunter et al. (4) observed that despite the wide availability of relatively simple means of restoration and regular clinic attendance by children in South Wales, only 14.8% of traumatized teeth had

received treatment. Todd and Dodd (5) reported that only 10% of the incisors damaged had been treated.

In Nigeria, a very low level of treatment was observed. Falomo (6) reported that 0.7% of the school children in Ibadan with traumatized anterior teeth had received treatment while Otuyemi and Sofowora found that none of the traumatized teeth was restored (7). In all the studies, it would be noticed that the prevalence of damage far exceeds the prevalence of treatment, indicating a high level of unmet need. It is therefore the aim of this study to assess the prevalence of damage to permanent anterior teeth in school adolescents, the average duration of trauma as well as to ascertain the level of the unmet treatment need. This information will help in the design of public enlightenment programs especially to the school children so as to prevent complications which may ensue following untreated traumatized anterior teeth.

### Material and method

A total of 1532 secondary school children between the age of 12 and 19 years participated in the study which was conducted over a period of 6 months (October

2003–March 2004). The children were randomly selected from public secondary schools in the five local government areas in Ibadan using a multistage sampling method. Ibadan is a town in the South Western part of Nigeria with the population of about 2.5 million (8). The participants were examined with the aid of mouth mirrors and probes under natural light, following permission obtained from the state ministry of Education and the schools' principals. Traumatic anterior dental injuries were recorded by the same investigator (DMA) according to WHO Classification (9). Root fractures were excluded from the study because no dental radiographs were taken to ascertain such. None of the traumatized teeth had any form of restoration.

The data were coded and later transferred to spss version 14.0 for analysis (Lead Technologies Inc., Chicago, IL, USA). Descriptive statistics were employed.

## Results

One hundred and sixty-five (10.8%) of the participants had sustained injuries to their anterior teeth. The mean age of these children with traumatized anterior teeth at the time of examination was  $15.47 \pm 2.09$  years, with a male to female ratio of 1.5:1 (Table 1).

Table 2 shows that fall accounted for 78.8% of the causes while road traffic accident was responsible for the least (1.8%), and they were due to motorcycle accidents. Twenty-four (14.5%) of the children could not remember how the incident occurred.

The upper left central incisor was the tooth most commonly injured (48.0%) followed closely by the upper right central (43.1%), no canine was involved. Ninety-four of the 202 (46.5%) traumatized teeth had enamel fracture only, 42.6% had enamel–dentine fracture while the remaining 10.9% had complicated crown fracture (Table 3).

Most of the children (79.4%) sustained injury to one tooth only. Mean number of fractured teeth per person was 1.2 (Table 4).

Table 1. Age and gender distribution of children with traumatized anterior teeth

| Age group (years) | Gender |        | Total |
|-------------------|--------|--------|-------|
|                   | Male   | Female |       |
| 12–15             | 51     | 35     | 86    |
| 16–19             | 48     | 31     | 79    |
| Total             | 99     | 66     | 165   |

Mean age:  $15.47 \pm 2.09$  years.

Table 2. Causes of trauma by age groups

| Age group (years) | Causes |               |                       |       |         | Total |
|-------------------|--------|---------------|-----------------------|-------|---------|-------|
|                   | Fall   | Home accident | Road traffic accident | Fight | Unknown |       |
| 12–15             | 70     | 3             | 3                     | –     | 10      | 86    |
| 16–19             | 60     | 1             | –                     | 4     | 14      | 79    |
| Total             | 130    | 4             | 3                     | 4     | 24      | 165   |

Table 3. Distribution of injured teeth based on WHO classification

| Tooth type | Enamel    | Uncomplicated crown | Complicated crown | Total <i>n</i> (%) |
|------------|-----------|---------------------|-------------------|--------------------|
| 11         | 40        | 36                  | 11                | 87 (43.1)          |
| 12         | 6         | 4                   | –                 | 10 (4.9)           |
| 21         | 43        | 43                  | 11                | 97 (48.0)          |
| 22         | 2         | 1                   | –                 | 3 (1.5)            |
| 31         | 1         | 1                   | –                 | 2 (1.0)            |
| 32         | –         | 1                   | –                 | 1 (0.5)            |
| 41         | 2         | –                   | –                 | 2 (1.0)            |
| 42         | –         | –                   | –                 | – (–)              |
| Total      | 94 (46.5) | 86 (42.6)           | 22 (10.9)         | 202 (100.0)        |

Table 4. Distribution of children by number of injured teeth

| No. injured teeth | Gender |        | Total <i>n</i> (%) |
|-------------------|--------|--------|--------------------|
|                   | Male   | Female |                    |
| One tooth         | 78     | 53     | 131 (79.4)         |
| Two teeth         | 19     | 12     | 31 (18.8)          |
| Three teeth       | 2      | 1      | 3 (1.8)            |
| Total             | 99     | 66     | 165 (100.0)        |

Table 5. Time elapsed from trauma to dental examination among the age group examined

| Time elapsed from trauma to the dental examination (years) | Age groups  |        |                    |             |        |                    |
|--|-------------|--------|--------------------|-------------|--------|--------------------|
|  | 12–15 years |        |                    | 16–19 years |        |                    |
|  | Male        | Female | Total <i>n</i> (%) | Male        | Female | Total <i>n</i> (%) |
| 0–2s   | 18          | 11     | 29 (39.2)          | 11          | 9      | 20 (30.3)          |
| > 2–4  | 18          | 8      | 26 (35.1)          | 8           | 5      | 13 (19.7)          |
| > 4–6  | 10          | 8      | 18 (24.3)          | 16          | 6      | 22 (33.3)          |
| > 6  | –           | 1      | 1 (1.4)            | 9           | 2      | 11 (16.7)          |
| Total  | 46          | 28     | 74 (100.0)         | 44          | 22     | 66 (100.0)         |

As shown in Table 5, 140 (84.4%) participants remembered the time they sustained injury to their teeth. Seventy-four (52.9%) and 66 (47.1%) were in the age groups 12–15 and 16–19 years respectively. For the age group 12–15 years, the longer the time elapsed between trauma and dental examination, the lower the number of participants involved. However, this trend was not noticed in the older age group. In the age group 12–15 years, the highest proportion (39.2%) occurred at 0–2 years time elapsed while in the age group 16–19 years, the highest proportion (33.3%) occurred at >4–6 years. This translates to the time of highest occurrence of trauma in the age group 12–15 years to be at ages 10–13 years and 11–14 years in the age groups 16–19 years taking the average of 0–2 and 4–6 years time elapse respectively.

In Table 6, 43 of the 94 (45.7%) of the teeth with enamel fracture only, 57.2% of the teeth with enamel–dentine fracture and a greater percentage (63.6%) of the

Table 6. Time elapsed from trauma to the dental examination for different type of tooth fracture

| Time elapsed from trauma to the dental examination (years) | Type of tooth fracture WHO Classification |                 |                              |                            | Total |
|--|---|-----------------|------------------------------|----------------------------|-------|
|  | <i>n</i>                                  | Enamel fracture | Uncomplicated crown fracture | Complicated crown fracture |       |
| 0–2  | 49  | 21              | 28                           | 7                          | 56    |
| > 2–4  | 39  | 22              | 16                           | 7                          | 45    |
| > 4–6  | 40  | 17              | 24                           | 5                          | 46    |
| > 6  | 12  | 11              | 1                            | –                          | 12    |
| Could not remember   | 25  | 23              | 17                           | 3                          | 43    |
| Total  | 165                                       | 94 (46.5%)      | 86 (42.6%)                   | 22 (10.9%)                 | 202   |

*n* = no. participants.

Table 7. Previous dental consultation

| Previous dental consultation | Type of tooth fracture (WHO Classification) |                 |                              |                            | Total |
|------------------------------|---|-----------------|------------------------------|----------------------------|-------|
|                              | <i>n</i>                                    | Enamel fracture | Uncomplicated crown fracture | Complicated crown fracture |       |
| No previous consultation     | 135   | 81              | 65                           | 14                         | 160   |
| Routine dental check-up      | 4   | 2               | 4                            | –                          | 6     |
| Following dental trauma      | 9   | 2               | 4                            | 7                          | 13    |
| Other dental problems        | 4   | 2               | 5                            | –                          | 7     |
| Non-related problems         | 13  | 7               | 8                            | 1                          | 16    |
| Total                        | 165   | 94              | 86                           | 22                         | 202   |

*n* = no. participants.

teeth with complicated crown fracture had had the trauma for about 4 years prior to the dental examination without any form of treatment received or restoration done. Previous dental consultation was done by only 30 (18.2%) of the 165 participants of which nine participants went for dental consultation after the trauma. As high as 189 (93.1%) traumatized teeth were never presented for dental assessment after the injury. Of the 13 teeth that were presented following dental injury, seven (53.8%) had complicated crown fracture (Table 7).

## Discussion

Various studies have shown that the prevalence of traumatized anterior teeth vary between different populations and age groups. The prevalence of dental traumatic injury of 10.8% in this study is similar to the findings by Otuyemi (10) among 12-year-old Nigerian children in an earlier study, although various epidemiological studies in Nigeria have reported the prevalence among children aged between 6 and 16 years to be between 6.5 and 19.5% (1).

The male to female ratio of the adolescents with traumatized anterior teeth in this study was 1.5:1 and it is

closely in agreement with previous studies (11, 12). Although present day females have been observed to be more active and more involved in sports than they were decades ago, but they are not quite as boisterous as their male counterparts.

Falls accounted for most injuries in this study, this is in accordance with the observation reported previously in the literature (10) Most of the falls occurred during various sporting activities and differences in traditional sports activities between countries have been identified as fundamental influence in the prevalence of dental traumas (13). It is however interesting that all the reported accident cases, though few were as a result of motorcycle accidents. This etiological factor was not identified in many previous studies done among Caucasians. This identified etiological factor is not surprising when one considers that the means of transportation especially among the adolescents traveling along the major roads in many Nigerian towns have been dominated by motorcycles in recent times. These motorcyclists have been observed to be inadequately trained and thus are very reckless.

The maxillary left central incisor was the most commonly affected tooth type in this study. This is in accordance with the findings by Hargreaves et al. (14) and Delattre et al. (15) but in contrast with those of Stockwell (16) and Garcia-Godoy (17). Furthermore, the type of injury to the anterior teeth has been found to vary according to the place where the study was conducted (18) Akpata (19) and Garcia Godoy et al. (17) found that enamel fracture was the most predominant type of injury which is in agreement with the findings of this study but Otuyemi (18) and Onetto et al. (20) in their studies observed that enamel–dentine fracture was the most prevalent. As these two classes of injury involve only either the enamel or enamel and dentine alone, with no resultant bleeding or severe pain, it may be the reason why majority of the children in this study did not seek any dental treatment following the trauma. Dental injuries resulting in enamel–dentine fracture should, however, be considered an emergency, and thus be treated immediately to relieve any pain, reconstruct lost hard tissues, preserve the vitality of the dental pulp and in the long run prevent the unnecessary loss of the tooth/teeth involved. In this study, most of the trauma cases affected only one tooth and the mean number of injured teeth per person was 1.2, a finding consistent with previous reports (12, 21).

Trauma was observed to be more prevalent among the younger age groups (12–15 years) than the older ones (16–19 years). However, a younger age group of 8–10 years has been previously reported (22) to be the age group at the greatest risk of tooth fracture.

None of the traumatized teeth had received any form of restoration despite the fact that some of the teeth were badly discolored. Apparently the children had not suffered undue pain nor had they been concerned about cosmetic effect of the loss of tooth substance thus as low as 5.5% of the children sought treatment following the dental injury. This observation reflects a higher prevalence of damage as compared with prevalence of treatment and it is in agreement with some previous studies

(6, 7). Low treatment level has been found to be due to unawareness of where to seek treatment and fear of dental treatment (6). Other causes of low treatment level may be low socioeconomic level and inability of parents to take time off work to go to the dentist as well as the fear of contracting infection such as HIV from dental treatment. No previous report was found on the time elapsed between trauma and dental examination in the epidemiological studies encountered. Nevertheless, time is an important factor that is usually considered in the management of traumatized anterior teeth. Although this study reveals a long post-traumatic period among most of the study participants, and yet with no restoration of the injured teeth even though some of the traumatized teeth already had an evidence of pulpal necrosis, it could be observed that the more severe the injury the more the number of teeth presented for dental consultation following trauma as seen in Table 7. This may not be far from the fact that many parents do not pay a close attention to the dental care of their children especially if the child has not complained of the recurrent and persistent pain. As no vitality tests were done and with the poor attitude of the children seen in the study, it might be expected that many more teeth especially those with enamel–dentine fracture will have evidences of pulpal necrosis in the future.

In conclusion, this study reveals that there is very high unmet need of traumatized anterior teeth. It is therefore recommended that parents/guardians should be advised to pay more attention to the dental needs of their wards, while the Government should endeavor to make dental care especially restorative procedures for children readily available and affordable.

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