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## Traumatic Anterior Teeth Injuries Among Incarcerated Inmates in Benin City Nigeria

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**ABSTRACT: Objective:** The purpose of this study was to determine the prevalence, causes and types of traumatic dental injuries to anterior teeth among prisoners in Benin City, Edo state; Nigeria.

**Methods:** Representative sample were selected by systematic random sampling and data was collected by means of structured questionnaire and clinical examination. Traumatic injuries were recorded based on objective signs: Enamel fracture, Dentine fracture, complicated crown fracture (fracture involving enamel-dentine with pulp exposure), Tooth crown discolouration and Exarticulation (avulsion or extraction after trauma).

**Result:** The prevalence of traumatic dental injuries was 20.7%. The entire recorded trauma occurred in male prisoners. Majority of the trauma were due to fights and police brutality (booth of police gun). Maxillary teeth were more commonly involved than mandibular teeth and the commonest type of trauma was enamel fracture (34.1%).

**Conclusion:** The prevalence of dental trauma in the study population indicate the need for the establishment of oral health services in prisons to provide adequate oral health care based on the principles of primary oral health care in order to allow every prisoner to live a healthy life. It also indicated the need for advocated reforms in police treatment of prisoners to guarantee their fundamental human right.

**Key Words:** Dental, Trauma, Anterior teeth, Prison inmates.

### Introduction

Oral condition should be considered a dental public health problem if it is prevalent and has significant impact on the individual, entails substantial cost and is preventable <sup>(1)</sup>. Traumatic dental injury fits these criteria. These injuries range from minor fractures of enamel to a more major damage involving the displacement or avulsion of teeth. Traumatic anterior teeth are commonly seen worldwide and can cause serious aesthetic, functional and psychological consequences <sup>(2)</sup>.

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The prevalence of dental trauma has been reported to have a wide variation in different epidemiological studies. These variations may be caused by several different factors such as data collection method, sample selection and place where the study was conducted<sup>(3)</sup>.

In a study carried out in Nigeria among 6–21 year old in Lagos, the prevalence of trauma was given as 14%<sup>(4)</sup>. In another study carried out among 12 year old Nigerians, approximately 11% had traumatic dental injuries<sup>(5)</sup>. The prevalence of traumatised primary teeth is high being approximately 31% in a study carried out at Ile-Ife in the South Western part of Nigeria<sup>(6)</sup>. In another study at a teaching hospital at Ibadan in the same part of the country, the prevalence of traumatised primary teeth was highest in children aged 4 – 5 years<sup>(7)</sup>. In more recent studies<sup>(8,9)</sup> the prevalence of traumatic dental injuries among 12 year old and 3 – 5 year old Nigerian children was reported to be 10% and 23.2% respectively.

A large United State study indicated that 29.6% of the population 6 to 50 years of age may have sustained traumatic injuries to the anterior teeth<sup>(10)</sup>. In Australian<sup>(11)</sup> the prevalence of trauma to anterior permanent teeth among 6 - 12 year old school children was 22% and 34% was reported among adolescents in North West England<sup>(12)</sup>.

Boys have been reported to sustain dental injuries more than girls<sup>(8, 13, 14)</sup>, but a report showed that girls traumatised their teeth more than boys<sup>(15)</sup>. Other reports showed that there were no differences between boys and girls in their susceptibility to traumatic dental injuries<sup>(6, 7, 16)</sup>.

The most common cause of traumatic dental injuries consistent among various studies is falling onto hard surfaces or object<sup>(3, 12, 17)</sup>. Other causes that have been documented include accident involving bicycles, sports, fight and non-accidental injuries. Overjet greater than 3mm and incompetent lips are predisposing factors<sup>(18, 19, 20)</sup>.

The teeth most commonly affected are the maxillary central incisors<sup>(7, 8, 9, 14)</sup> and the commonest types of injury are variable. Reported study in a private Paedodontic practice in preschool children population showed that concussion was the most common injury<sup>(21,22)</sup>. Other studies reported that enamel fractures were the most common type of injury<sup>(9, 23, 24)</sup>, followed by enamel-dentine fracture and concussion. Another study<sup>(8)</sup> reported enamel-dentine fracture to be most common.

While most studies have investigated traumatic dental injuries among children and adolescents, there are little or no studies carried out on adults and vulnerable group such as prisoners. The purpose of this study therefore was to investigate the prevalence, causes and types of traumatic dental injuries seen among prisoners in Benin City, Edo state; Nigeria.

## **Materials and Methods**

The study was a cross-sectional survey involving prisoners in Benin City. Benin City is the capital of Edo State located in Southern Nigeria with an estimated population of 1,147,188 (2006 census). There are two federal prisons located in the City, this comprises of a maximum and medium prison. Both prisons contain male and female inmates serving various jail terms including those sentenced for life, prisoners condemned to death and awaiting trial. The prisons are provided with infirmary, but no provision for oral health care. Total of 140 inmates were selected from both prisons using the systematic random sampling.

Data was collected by a single examination (OB) using structured questionnaires and oral examination. The structured questionnaires were self-administered and face-to-face interviewer administered for illiterate prisoners. Information obtained includes; sex, age, history of previous trauma, type of tooth affected, number of injured teeth, treatment required and cause of trauma. The inmates were examined with plane mouth mirror while seated on a chair in an open hall well illuminated with natural light. Traumatic injuries affecting the teeth were recorded based on objective signs:

Enamel fracture, Dentine fracture, complicated crown fracture (fracture involving enamel-dentine with pulp exposure), Tooth crown discolouration and Exarticulation (avulsion or extraction after trauma). Only inmates who did not consent to the study were excluded. The protocol for the study was approved by the Ethics Committee of the University of Benin Teaching Hospital. Permission to use prisoners was also granted by Prisons authority in Benin City and informed consent was obtained from the subjects.

## **Data Analysis**

The questionnaires were sorted out; responses scored, coded and entered into the computer for analysis. Data entered were analyzed using Statistical Package for Social Sciences (SPSS version 13; SPSS Inc. Chicago, IL). Chi-

square was used to test association between variables where necessary. Significance was determined at alpha ( $\alpha$ ) = 0.05 and all p values were interpreted in a two-tailed manner.

## Results

The prevalence of traumatic dental injuries was 20.7% and the 29 injured inmates presented with 44 traumatised teeth. Most of the inmates who sustained injury had one traumatised tooth 65.5%, 24.1% had two teeth affected and one had five teeth traumatised (3.5%) (Table 1). The entire recorded trauma occurred in male prisoners and the 26-33 years old age group presented with largest number of injuries 51.7%. The difference was statistically significant  $p=0.05$  (Table 2).

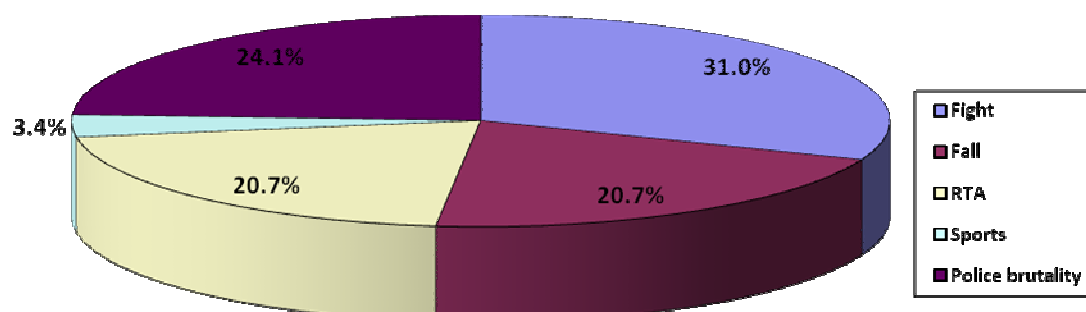
Thirty percent of the trauma was due to fights, 24.1% of the inmates claimed that the trauma was due to police brutality (booth of police gun), while fall and road traffic accident accounted for 20.7% of the traumatic injuries respectively. The distribution is shown in Figure 1. The most commonly involved teeth were the upper central incisors with the upper right central involved in 45.5% of cases and upper left central in 31.8% of cases. The upper lateral incisors were involved in 11.4% of cases. The commonest type of trauma was enamel fracture (34.1%) and this was closely followed by enamel-dentine fracture (31.8%). Avulsion was seen in 20.5% of inmates. These findings are illustrated in Figure 2 and 3.

**Table 1:** Distribution of Number of Injured Teeth

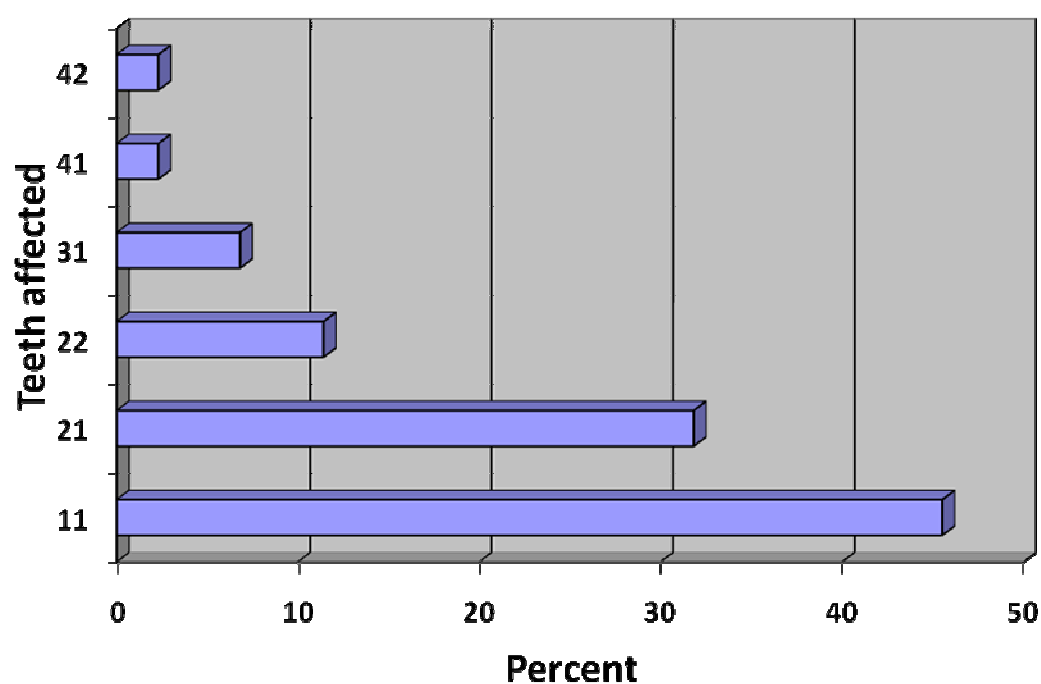
Number of Injured Teeth	Frequency	Percent
1	19	65.5
2	7	24.1
3	2	6.9
5	1	3.5
<b>Total</b>	<b>29</b>	<b>100.0</b>

**Table 2:** Age Distribution of Traumatic Dental Injury

Age in Years	Frequency	Percent
18-25	5	17.2
26-33	15	51.7
34-41	5	17.2
42-49	4	3.9
50 above	-	-
<b>Total</b>	<b>29</b>	<b>100.0</b>

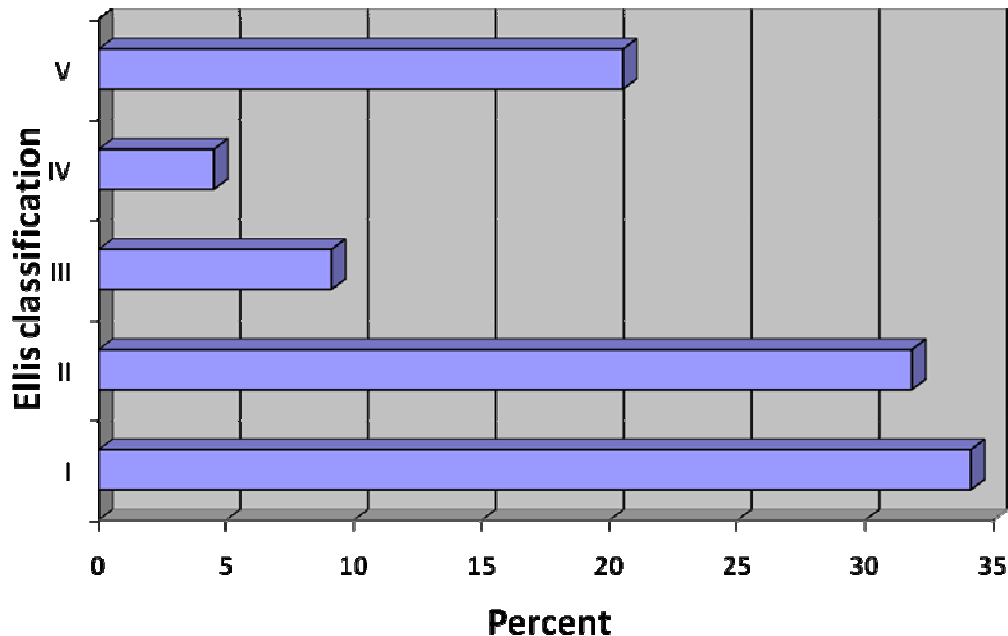


**Figure 1:** Distribution of causes of trauma among inmates



**Figure 2:** Distribution of teeth affected by Trauma

Key		
11	—	Upper right central incisors
21	—	Upper left central incisors
22	—	Upper left lateral incisors
31	—	Lower left central incisors
41	—	Lower right central incisors
42	—	Lower right lateral incisors



**Figure 3:** Distribution of Ellis Classification of Trauma

## Discussion

The prevalence of traumatic dental injuries in Nigeria varies from 11% to 31%<sup>4-9</sup>, while in other part of the world, prevalence as low as 2.4% and high as 43.8% have been reported<sup>(25, 26)</sup>. However these studies focussed on children and adolescents. The prevalence of trauma to anterior teeth recorded in this study was 20.7%, in other words one in every five prisoners had experience traumatic injury to anterior dentition. Naidoo *et al.*, reported a few cases of trauma associated with upper incisors among 340 inmates<sup>(27)</sup>.

The most common cause of trauma was fight, followed by reported trauma from the booth of police gun, while this is not unexpected in this group; it could confirm the suspected violent tendencies of law enforcement agents. This is different from documented causes of trauma in children and adolescents. The most common cause of traumatic dental injuries in this group includes falling onto hard surfaces or object<sup>(3, 12, 17)</sup>. Other causes include accident involving bicycles, sports, fight and non-accidental injuries.

The study showed that maxillary teeth (88.7%) are more frequently traumatised than mandibular teeth (11.3%). This probably relates to the more vulnerable position of maxillary incisors. This finding is similar to the report of other findings<sup>(28, 29)</sup>. The most frequently traumatised teeth are the maxillary central incisors which occur in 77.3% of cases. This is in agreement with other reported studies in the literature<sup>(7-9, 14, 25)</sup>. However, maxillary right central incisor (45.5%) was more traumatised than maxillary left central incisors (31.8%). This was different from other findings which either reported more trauma on the left than the right<sup>(30)</sup> or no significant differences in relation to location of tooth<sup>(28, 29)</sup>. This variation may be due to difference in the cause of the trauma and probably the age of the study population.

Enamel fractures were the most common type of trauma reported (34.1%) and this was closely followed by enamel-dentine fracture (31.8%). Avulsion was seen in 20.5% of inmates. This is similar to findings reported in other studies<sup>(9, 23, 24)</sup>. While these studies reported concussion to be next in frequency to enamel and enamel-dentine fracture, the present study showed avulsion to be next in frequency. Furthermore, these studies were done in children and adolescents

and the present study was done in adults. Therefore, because of the pliability and elasticity of bones children are likely more susceptible to concussion injury. This may probably account for the difference.

The number of teeth injured ranged from one to five and as reported by previous studies <sup>(14, 25)</sup>, majority of observation involved a single tooth. In the whole sample only one inmate injured five teeth. Interestingly, all the inmates who sustained traumatic dental injury did not receive any form of dental treatment indicating high need for dental treatment.

This study showed that the prevalence of traumatic dental injuries among prisoners is high and the concern raised in this study indicate that there is an urgent need for the development of basic oral health package for inmates and oral health should be seen in the context of population health approach and collaboration with other health sectors of the prison sector. Prisons represent an important public health opportunity to improve oral health status of prisoners and there is need for advocated reforms in police treatment of prisoners to guarantee their fundamental human right.

## **Conclusion**

The prevalence of dental injuries among prison inmates showed that enamel and enamel-dentine fracture are the most common types of injury. Fight, followed by reported trauma from the booth of police gun were the commonest cause of these injuries. This could confirm the suspected violent tendencies of law enforcement agents.

Efforts to discourage police brutality may be included in health promotion activities during the police health week and other avenues to address this issue and there is a need to develop educational and promotional programmes designed to empower the inmates to control oral disease.

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## **References**

1. Daly B, Watt R, Batchelor P, Treasure E. *Essential Dental Public Health*. New York: Oxford University Press, 2002.
2. Ahmed TH, Dalia KT. Luxation dental injuries: Review of treatment guidelines and endodontic consideration. *Middle East Journal of Emergency Medicine* 2006; 6: 140 – 146.
3. Andreasen JO, Andreasen FM. *Textbook and Colour atlas of traumatic injuries to the teeth* 1994; Third Edition. Copenhagen: Munksgard.
4. Akpata ES. Traumatized anterior teeth in Lagos School Children. *J Nigerian Med Assoc*. 1969; 6: 340 – 345.
5. Otuyemi OD, Abidoye RO, Dada D. Oral health knowledge, attitude and behaviour of 12 year old suburban and rural school children in Nigeria. *Afr Dent J*. 1994; 8: 205.
6. Otuyemi OO, Segun-Ojo IO, Adegboye AA. Traumatic anterior dental injuries in Nigeria preschool children. *East Afr Med J*. 1996; 73: 604-606.
7. Osuji OO. Traumatized primary teeth in Nigerian children attending University hospital: the consequences of delays in seeking treatment. *Int Dent J*. 1996; 46: 165 – 170.
8. Agbelusi GA, Jeboda SO. Traumatic anterior teeth in 12 year old Nigerian Children. *Odontostomatol Trop*. 2005; 28: 23 – 27.
9. Adekoya – Sofowora CA, Adesina AO, Nasir WO. Traumatic dental injuries in nursery school children Ile-Ife, Nigeria. *Internet J Dent Sci*. 2007; 5: 450 – 461.
10. Kaste LM. Prevalence of incisors trauma in persons 6 to 50 years of age in United States 1988 – 1991. *J Dent Res*. 1996; 75: 696.
11. Stockwell AJ. Incidence of dental trauma in the Western Australian School Dental Service. *Community Dent Oral Epidemiol*. 1988; 16: 294 – 298.
12. Blinkhorn FA. Aetiology of dento-alveolar injuries and factors influencing attendance for emergency care of adolescents in the North West England. *Dent Traumatol*. 2001; 16: 162 – 165.
13. Canha RF, Pugliesi DMC, Vierira AED. Oral trauma in Brazilian Patients ages 0 – 3 years. *Dent Traumatol*. 2001; 17: 206 – 208.
14. Adekoya-Sofowora CA, Sote E, Odusanya S, Fagade O. Traumatic dental injuries of anterior teeth of children in Ile-Ife, Nigeria. *Paediatr Dent J*. 2000; 10: 33 – 39.
15. Garcia – Godoy F, Morban – Lauger F. Traumatic dental injuries in preschool children from Santo Domingo. *Community Dent Oral Epidemiol*. 1983; 11: 127 – 130.

16. Yagot KH, Nazhat NY, Kuder SA. Traumatic dental injuries in nursery school children from Baghdad, Iraq. *Community Dent Oral Epidemiol.* 1988; 16: 292 – 393.
17. Roberts G, Longhurst P. *Oral and Dental trauma in children and adolescents.* Oxford 1996: Oxford University Press.
18. Otuyemi OD. Traumatic anterior dental injuries related to incisor overjet and lip incompetence in 12 year old Nigerian children. *Int J Paediatr Dent.* 1994; 4: 81 – 85.
19. O'Mullane DM. Some factors predisposing to injuries of permanent incisors in school children. *Brit Dent J.* 1973; 134: 328 – 332.
20. O'Brien M. Children's dental health in the United Kingdom 1993. Office of population censuses and surveys 1994. Her majesty's stationery office, London.
21. Garcia – Godoy F, Olivo M. Injuries to primary and permanent teeth treated in private paedodontic practice. *J Can Dent Assoc.* 1979; 45: 281 – 284.
22. Sanchez Z JP, Sanchez R, Garcia – Godoy F. Traumatismos de los diente anteriores en minos pre-escolares. *Acta odontol paediatr.* 1981; 2: 17 – 23.
23. Rodriguez JG. Traumatic anterior dental injuries in Cuban Preschool children. *Dent Traumatol.* 2007; 23: 241 – 242.
24. Olivera LB, Marcenes W, Ardenghi TM, Sheiham A, Bonecker M. Traumatic Dental Injuries and associated Factors among Brazilian Preschool children. *Dent Traumatol.* 2005; 21: 1 – 6.
25. Alonge OK, Narendran S, Williamson DD. Prevalence of fractured incisal teeth among children in Harris County, Texas. *Dent Traumatol.* 2001; 17: 218-221.
26. Marcenes W, Murray S. Changes in prevalence and treatment need for traumatic dental injuries among 14 year-old children in Newham, London: (a deprived area). *Community dental health* 2002; 19:104-108.
27. Naidoo S, Yengopal V, Cohen B. A baseline survey of the oral health status of prisoners in Western Cape. *SADJ.*, 2005; 60: 24-27.
28. Nick-Hussein P. Traumatic injuries to anterior teeth among school children in Malaysia. *Dental Traumatol.* 2001; 17: 149-152.
29. Rocha MJC, Cardoso M. Traumatized permanent teeth in Brazilian children assisted at the Federal University of Santa Catarina, Brazil. *Dent Traumatol.* 2001; 17: 245-249.
30. Saroglu I, Sonmez H. The prevalence of traumatic injuries treated in the Paedodontic Clinic of Ankara University, Turkey, during 18 months. *Dent Traumatol.* 2002; 18: 299-303