Archives of Orofacial Sciences (2010), **5**(2): 31-35

ORIGINAL ARTICLE

Oral habits and tooth wear lesions among rural adult males in Nigeria

Olushola Ibiyemi*, Ifeoluwa Oluwatosin Oketade, Juliana Obontu Taiwo, Gbemisola Aderemi Oke

Department of Periodontology and Community Dentistry, University of Ibadan, PMB 5017 GPO Dugbe Ibadan, Nigeria.

(Revised manuscript accepted 28 October 2010)

Keywords

dental visit,
discomfort,
oral habits,
tooth wear.

Abstract Association between oral habits and tooth wear lesions among adult male population in a rural community in Nigeria was investigated in this cross-sectional study. Participants were 200 consenting males mean aged 35.6 ±11.7 years living in Igbo-Ora community for 5 consecutive years preceding the study. A 15-item semi-structured questionnaire was used to obtain information from the participants. Oral examination to establish the presence of tooth wear lesions was carried out by two examiners who had one day training on the diagnostic criteria for attrition, abrasion and erosion. Frequencies and percentages of relevant variables were reported. Chi-square test was used to test associations between categorical variables at 5% level of significance. Results showed that 53.0% of study subjects had one form of tooth wear lesion. There was a significant association between tooth wear lesions and age, materials used in cleaning the teeth, tooth cleaning techniques, teeth grinding and alcohol consumption (p<0.05). Presence of attrition and multiple tooth wear lesions were significantly associated with discomfort (p<0.05). The study has shown the important relationship between some oral habits and tooth wear lesion in this group of people. This has implication to public health campaigns aimed at reducing the incidence of and progression of tooth wear lesion among the people in the rural community.

Introduction

Tooth wear or tooth surface loss, the pathological loss of tooth tissue by a disease process other than dental caries (Eccles, 1982; Saerah *et al*., 2006) results from the interaction of three processes viz attrition, erosion and abrasion (Murray, 1996; Ibbetson and Eder, 1999) which may occur in isolation or in combination. Loss and excessive wear of hard dental tissues, is a permanent problem of the dentition that affects all age groups and is regarded as an inherent part of aging process and a modern day problem for dentistry (Bartlett and Dugmore, 2008). In some individuals tooth wear could result in severe morphological and functional damages to the teeth which could cause temporomandibular disorder (Oginni *et al*., 2007). Oral habits have been identified to play a significant role in tooth wear (Bishop *et al*., 1994; Bishop *et al*., 1997).

Oral habits are repetitive behaviour in the oral cavity that result in loss of tooth structure and they include dietary habits, brushing techniques, bruxism, parafunctional habits and regurgitation (Christensen, 2000). Their effect is dependent on the nature, onset and duration of habits (Christensen, 2000). It is estimated that on average, tooth wears normally at about 30 μ per year, or about 0.3 mm in 10 years (Christensen, 2000). However, when factors such as diet, oral hygiene and oral fixations, or other detrimental habits compound this normal process, tooth wear becomes far more advanced and affects the oral cavity to a greater extent.

Previous studies (Xhonga, 1977; Bergström and Lavstedt, 1979; Pavone, 1985; Kelleher and Bishop, 1997) have shown association between oral habits and tooth wear. However, out of the few reported studies (Oginni and Olusile, 2002; Oginni *et al*., 2005; Taiwo *et al*., 2005) in

*** Corresponding author:** Dr. Olushola Ibiyemi, Tel: +234 80 3720 1253, e-mail: shola_ibiyemi@yahoo.com

Nigeria, only one reported a relationship between dental erosion and gastro-oesophageal reflux disease. Oginni and Olusile (2002) reported that pathological wear presents as age related and is more severe among Nigerians. Previous studies (Oginni and Olusile, 2002; Saerah *et al*., 2006) have also reported that the prevalence of tooth wear is higher among males than females in environments with similar socio-demographic characteristics as that of the rural community where this present study was carried out. Saerah *et al*. (2006) reported that males had 92% more odds of developing tooth wear and suggested that this may be due to males having a higher bite force than females (Hemmings *et al*., 1995) as well as the different dietary patterns of both sexes (van der Glas *et al*., 1996). This study was carried out to assess the association between some tooth wear lesions with oral habits, discomfort and history of dental visits in a male population in a rural community of Igbo-ora in southwestern, Nigeria. Adult was operationally defined in this study as post teen age individuals.

Materials and methods

The target population for this cross-sectional study was adult males aged 20 years and above who have been living in Igbo-ora community for the 5 consecutive years preceding the time of this study. Igbo-ora, the headquarters of Ibarapa Central Local Government Area is a rural community of about 60,000 people and is situated about 80 km south of Ibadan, the capital city of Oyo State, Southwestern Nigeria and the largest city in West Africa (Olawale and Owoaje, 2007). Majority of the residents are the native Yorubas, the other residents being made up of other nationals. The main occupations are farming and trading (Olawale and Owoaje, 2007).

Invitation to attend an oral health outreach programme was sent to the residents through a town cryer. Among these, 200 people honoured the invitation and reported at the Igbo-ora town hall, the venue of the study. After the oral health campaign they were informed about the study and its benefit. All the 200 residents consented to participate and written informed consent was obtained from them before the commencement of the study. Prior to the outreach programme, permission to conduct the study was obtained from the Local Government Authority and community leaders. The study was carried out in strict compliance with Helsinki Declaration principles on studies involving human subjects.

A 15-item semi-structured questionnaire divided into two sections, section A: biodata and section B: type of oral habits practiced by respondents and feeling of discomfort resulting from tooth wear was researcher administered. The variable on technique of teeth cleaning was assessed by asking respondents whether they make vertical strokes, horizontal strokes or combined vertical and horizontal strokes which were assumed in this study to be circular strokes when using their teeth cleaning devices. The content validity of the instruments was established before using it in this study.

Oral examination was carried out in the town hall using gloved hands, wooden spatulas and dental probes to remove food debris under natural light so as to establish presence of tooth wear lesions by two examiners. To enhance vision in the mouth, the teeth were dried using cotton wool rolls. Teeth with gross accumulation of calculus were excluded. Prior to the oral examination, one day training on the diagnostic criteria for attrition, abrasion and erosion was carried out among the examiners. This was carried out using the guidelines of Kelleher and Bishop (1999) by examining the four surfaces namely cervical (C), buccal (B), occlusal (O) or incisal (I) and palatal (P) or lingual (L) of all permanent teeth. For Attrition, the occlusal and incisal surfaces were examined; Abrasion, the cementoenamel junction was examined and for Erosion, the labial, buccal, palatal and lingual surfaces of the tooth were examined. The teeth with wear were recorded. Subject was seated on a chair, with the examiner seated behind and the research assistant in front of the subject taking records. In order to monitor the inter- and intra-examiner reproducibility in assessing the wear status throughout the study, duplicate examinations were carried out during the study. The reliability was assessed by using the unweighted kappa statistic and gave a value of 0.81 for inter-examiner reproducibility and the values of 0.83 and 0.85 for the intra-examiner agreement of examiners 1 (OI) and 2 (IOO) respectively.

Data was cleaned and entered into Statistical Package for Social Science version 15 (2008). Frequencies and percentages of relevant variables were generated. Chi-square test was used to test

associations between categorical variables at 5% level of significance.

Results

The age range of the 200 participating adult males was between 20 and 64 years with a mean age of 35.6 ±11.7years. A majority, (n= 89, 44.5%) were in the aged 20-30 years, 86 (43.0%) were in the aged 31 – 50 and 25 (12.5%) were in the aged 51 years and above. One hundred and six (53.0%) study subjects had one form of tooth wear lesion or another. Table 1 shows the distribution of study subjects who had tooth wear lesions according to types of wear. Table 2 shows that there was a statistically significant (p<0.05) between age group and tooth wear. There was a significant association (p<0.05) between tooth wear lesion and materials used in cleaning the teeth, tooth cleaning techniques, teeth grinding and alcohol consumption (Table 3). As shown in Table 4, presence of attrition only and multiple tooth wear lesions were significantly associated with feeling of discomfort (p<0.05).

Discussion

Tooth wear, a complex biological process of hard dental tissue loss, can significantly affect the function of chewing, speech and facial appearance. These are the most common complaints when patients present at the clinic (Harnack *et al*., 1999). Sometimes treatment is sought for acute or chronic pain or hypersensitivity to changes in temperature, pressure and chemical stimuli (Harnack *et al*., 1999). It is important to recognize that the aetiology of tooth wear is multifactorial and failure to recognize this fact may lead to failure in restorative care (Kelleher and Bishop, 1997).

In this study, more than half (53.0%) of the participants had one form of tooth wear lesion or the other. This is comparable to the report of Taiwo *et al*. (2005) which showed a prevalence of 58.6% and contrasts with that of Saerah *et al*. (2006) which reported 26.0% incidence and the study by Kovacevic and Belojevic (2006) where 78.1% of the male participants had tooth wear. This disparity might be due to age difference of the male individuals in the various studies and possible dietary differences. Those who participated in the study by Taiwo *et al*. (2005) were aged 69.7±6.2 years and that of Saerah *et al*. (2006) was 16 years and the current study was 35.6±11.7 years. The finding in this study is in agreement with findings from other studies (Oginni and Olusile, 2002; Taiwo *et al*., 2005; Kovacevic and Belojevic, 2006) where increasing age is associated with the prevalence of tooth wear thus showing tooth wear to be an accumulative process.

Table 1 Distribution of study subjects according to types of tooth wear lesion (N=106)

Type of wear	n	%
Attrition only	22	20.7
Abrasion only	17	16.0
Erosion only	11	10.4
Attrition and Abrasion	19	18.0
Attrition and Erosion	16	15.1
Erosion and Abrasion	10	9.4
Attrition, Erosion and Abrasion	11	10.4

Table 2 Relationship between age group and tooth wear

Age group (years)	Tooth wear		*p* value
	Yes n(%)	No n(%)	
20 – 30	25(28.1)	64(71.9)	
31 – 50	57(66.3)	29(33.7)	
≥ 51	24(96.0)	1(4.0)	0.00

Table 3 Relationship between oral habits and tooth wear

Oral habits	Tooth wear		*p* value
	Yes n (%)	No n (%)	
Frequency of cleaning teeth daily			
Once	60(52.2)	55(47.8)	
≥Twice	46(54.1)	39(45.9)	0.78
Materials used in cleaning teeth			
Chewing sticks only	35(72.9)	13(27.1)	
Tooth brushes only	38(43.7)	49(56.3)	
Tooth brushes and Chewing sticks	33(50.8)	32(49.2)	0.00
Tooth cleaning techniques			
Horizontal strokes	23(71.9)	9(28.1)	
Vertical strokes	63(48.1)	68(51.9)	
Vertical and horizontal strokes (Circular strokes)	20(54.1)	17(45.9)	0.05
Chew hard substances (Abrasive diets)			
Yes	72(51.8)	67(48.2)	
No	34(55.7)	27(44.3)	0.60
Teeth grinding			
Yes	19(73.1)	7(26.9)	
No	87(50.0)	87(50.0)	0.02
Alcohol consumption			
Yes	73(58.9)	51(41.1)	
No	33(43.4)	43(56.6)	0.03
Regurgitation			
Yes	9(64.3)	5(35.7)	
No	97(52.2)	89(47.8)	0.38
Hold objects between teeth			
Yes	36(58.1)	26(41.9)	
No	70(50.7)	68(49.3)	0.33

Table 4 Relationship between tooth wear and feeling of discomfort

Tooth wear	Feeling of discomfort		*p* value
	Yes n(%)	No n(%)	
Attrition only			
Yes	13(59.1)	9(40.1)	
No	28(15.7)	150(84.3)	0.00
Abrasion only			
Yes	4(23.5)	13(76.5)	
No	37(20.2)	146(79.8)	0.75*
Erosion only			
Yes	1(9.1)	10(90.9)	
No	40(21.2)	149(78.8)	0.47*
Multiple tooth wear lesions			
Yes	23(41.1)	33(58.9)	
No	18(12.5)	126(87.5)	0.00

* Fisher's exact test

Attrition has been reported to be more important than erosion in the aetiology of tooth wear among Nigerians (Akpata, 1975; Oginni and Olusile, 2002; Taiwo *et al*., 2005). This trend was observed in this study where about one-fourth of the participants had attrition. This is more likely due to rigorous mastication of the more fibrous Nigerian diet especially by people living in rural communities like Igbo-ora, the site of this study. This finding varies with findings from the United Kingdom (Smith *et al*., 1997) where erosion was a major cause of tooth wear. This disparity may be associated with difference in aetiological factors contributing to tooth wear. In this environment crushing bone, a common habit among people and the use of chewing sticks daily for routine oral hygiene care may be contributing factors.

Circumstantial evidence implicates tooth brushing with gingival recession and exposure of dentine and available evidence supports a probable link between tooth brushing with or without toothpaste to tooth wear (Addy, 2005). Oral hygiene practices like brushing teeth last at night, technique of brushing, types of toothbrush used and frequency of brushing were found to have an association with tooth wear lesion (Al-Dlaigan *et al*., 2002). In this study, males who cleaned their teeth with chewing sticks and those who cleaned their teeth horizontally had higher incidence of tooth wear lesions than those who do not. However, the frequency of cleaning was not related to tooth wear in this study. Bergström and Lavstedt (1979) reported that tooth brushing techniques and tooth brushing frequency independently related to increasing tooth wear. The observed relationship between using chewing sticks and tooth wear in this study might be due to improper use such as through the application of too much pressure and toughness of the bristles of the chewing sticks.

Pavone (1985) noted that abnormal clenching and grinding habits produced unusual wear patterns of occlusal surfaces and Xhonga (1977) showed that people who displayed such parafunctional habits could experience up to four times more tooth wear than those without this habit. Teeth grinding habit was also observed among participants in this present study and might be due to the stress that males undergo when carrying out their daily activities since emotional stress was associated with bruxism (Carvalho *et al*., 2008). The kind of diet eaten, chewing of abrasive diets, presence of unglazed enamel and environmental factors like constant exposure to dust and grit in farming activities were related to abrasion (Turner and Missirlian, 1984; Rivera-Morales and Mohl, 1992). However, this was not the case in this study where there was no significant relationship between chewing of hard substances and tooth wear.

Tooth erosion may be caused by drinking citrus juices, cola drinks, vinegar, pickled foods and regurgitation of contents of the stomach (Lewis and Smith, 1973). In this study, regurgitation of gastric contents, the consumption of alcohol and the drinks commonly consumed by adults in rural communities in Southwestern Nigeria were investigated. Statistically significant relationship was observed between alcohol consumption and tooth wear, a trend similar to the finding of Tomasik (2006) who reported association between consumption of acidic drinks and tooth wear. There was however no relationship between regurgitation and eroded tooth surfaces in this present study. Regurgitation was an uncommon practice among the present study group and therefore, no significant association could be established between the habit and tooth wear. Oginni *et al*. (2005) reported significant association between regurgitation and tooth wear pattern. Kelleher and Bishop (1999) also reported an association between chronic alcoholism mostly in combination with chronic gastritis or other digestive disturbances and tooth wear.

Participants in the present study who had attrition and multiple lesions felt discomforted in the form of pain. This observation is at variance with earlier report

by Bishop *et al*. (1997) that despite exposure of extensive areas of dentine, acute sensitivity is rarely a problem and this might be due to the development of sclerosed dentine and smear layers on the surface of the tooth.

In conclusion, this study has provided data on the proportion of the various types of tooth wear lesions among adult males in a Nigerian rural community. In this study, materials used in cleaning teeth, teeth grinding habit and alcohol consumption had a relationship with tooth wear. Attrition and multiple lesions were also related to feeling of discomfort. Knowledge of the aetiology of tooth wear is important for preventing further lesions and halting the progression of lesions already present. In addition, treatment will be ineffective in the long term unless the aetiological factors are eliminated.

Acknowledgements

The authors would like to thank the Ibarapa Central Local Government Authorities and Community leaders for their encouragement and support. We are sincerely grateful to all the study participants for their cooperation. *Authors' contributions:* IOO and OI conceived the study, participated in its design, performed the dental examination and participated in the initial draft. The final write-up of the manuscript was done by OI, JOT and GAO. *Competing interests:* The authors declare that they have no competing interests.

References

Addy M (2005). Toothbrushing, tooth wear and dentine hypersensitivity--are they associated? *Int Dent J*, **55**(4 Suppl 1): 261-267.

Akpata ES (1975). Molar tooth attrition in a selected group of Nigerians**.** *Community Dent Oral Epidemiol*, **3**(3): 132-135.

Al-Dlaigan YH, Shaw L and Smith AJ (2002). Dental erosion in a group of British 14-year-old, school children. Part III: Influence of oral hygiene practises. *Br Dent J*, **192**(9): 526-530.

Bartlett D and Dugmore C (2008). Pathological or physiological erosion--is there a relationship to age? *Clin Oral Investig*, **12**(Suppl 1): S27-S31.

Bergström J and Lavstedt S (1979). An epidemiologic approach to toothbrushing and dental abrasion. *Community Dent Oral Epidemiol*, **7**(1): 57-64.

Bishop K, Briggs P and Kelleher M (1994). The aetiology and management of localized anterior tooth wear in the young adult. *Dent Update*, **21**(4): 153-160.

Bishop K, Kelleher M, Briggs P and Joshi R (1997). Wear now? An update on the etiology of tooth wear. *Quintessence Int*, **28**(5): 305-312.

Carvalho AL, Cury AA and Garcia RC (2008). Prevalence of bruxism and emotional stress and the association between them in Brazilian police officers. *Braz Oral Res*, **22**(1): 31-35.

Christensen GJ (2000). Treating bruxism and clenching. *J Am Dent Assoc*, **131**(2): 233-235.

Eccles JD (1982). Tooth surface loss from abrasion, attrition and erosion. *Dent Update*, **9**(7): 373-381.

Harnack L, Stang J and Story M (1999). Soft drink consumption among US children and adolescents: nutritional consequences. *J Am Diet Assoc*, **99**(4): 436-441.

Hemmings KW, Howlett JA, Woodley NJ and Griffiths BM (1995). Partial dentures for patients with advanced tooth wear. *Dent Update*, **22**(2): 52-59.

Ibbetson R and Eder A (1999). Tooth surface loss: editors' introduction. *Br Dent J*, **186**(2): 60.

Kelleher M and Bishop K (1997). The aetiology and clinical appearance of tooth wear. *Eur J Prosthodont Restor Dent*, **5**(4): 157-160.

Kelleher M and Bishop K (1999). Tooth surface loss: an overview. *Br Dent J*, **186**(2): 61 – 66.

Kovacevic M and Belojevic G (2006). Tooth abrasion in workers exposed to noise in the Montenegrin textile industry. *Ind Health*, **44**(3): 481-485.

Lewis KJ and Smith BG (1973). The relationship of erosion and attrition in extensive tooth tissue loss. Case reports. *Br Dent J*, **135**(9): 400-404.

Murray JJ (1996). The Prevention of Oral Disease. Third Edition. Oxford: Oxford University Press.

Oginni AO, Agbakwuru EA and Ndububa DA (2005). The prevalence of dental erosion in Nigerian patients with gastro-oesophageal reflux disease. *BMC Oral Health*, **5**(1): 1.

Oginni AO, Oginni FO and Adekoya-Sofowora CA (2007). Signs and symptoms of temporomandibular disorders in Nigerian adult patients with and without occlusal tooth wear. *Community Dent Health*, **24**(3): 156-160.

Oginni AO and Olusile AO (2002). The prevalence, aetiology and clinical appearance of tooth wear: the Nigerian experience. *Int Dent J*, **52**(4):268- 272.

Olawale OA and Owoaje ET (2007). Incidence and pattern of injuries among residents of a rural area South-Western Nigeria: a community-based study. *BMC Public Health*, **7**: 246.

Pavone BW (1985). Bruxism and its effect on the natural teeth. *J Prosthet Dent*, **53**(5): 692-696.

Rivera-Morales WC and Mohl ND (1992). Restoration of the vertical dimension of occlusion in the severely worn dentition. *Dent Clin North Am.* **36**(3): 651-664.

Saerah NB, Ismail NM, Naing L and Ismail AR. (2006). Prevalence of tooth wear among 16-year-old secondary school children in Kota Bharu Kelantan. *Arch Orofac Sci*, **1**: 21 – 28.

Smith BG, Bartlett DW and Robb ND (1997). The prevalence, etiology and management of tooth wear in the United Kingdom. *J Prosthet Dent*, **78**(4): 367-372.

SPSS Inc. (Chicago). (2008). SPSS for Windows (Version 15.0). Chicago, USA: SPSS Inc.

Taiwo JO, Ogunyinka A, Onyeaso CO and Dosumu OO (2005). Tooth wear in the elderly population in South East Local Government Area in Ibadan, Nigeria. *Odontostomatol Trop*, **28**(112): 9-14.

Tomasik M (2006). Analysis of etiological factors involved in noncarious cervical lesions. *Ann Acad Med Stetin*, **52**(3): 125-136.

Turner KA and Missirlian DM (1984). Restoration of the extremely worn dentition. *J Prosthet Dent*, **52**(4): 467-474.

van der Glas HW, Lobbezoo F, van der Bilt A and Bosman F (1996). Influence of the thickness of soft tissues overlying human masseter and temporalis muscles on the electromyographic maximal voluntary contraction level. *Eur J Oral Sci*, **104**(2 (Pt 1)): 87-95.

Xhonga FA (1977). Bruxism and its effect on the teeth. *J Oral Rehabil*. **4**(1): 65-76.