ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at:www.ijdsir.com

Volume – 8, Issue – 1, February – 2025, Page No. : 113 - 120

The prevalence of tooth wear and its severity among patients who attended a tertiary healthcare institution in an urban centre in lagos, Nigeria

[1]Dr Awotile, Adenike Ololade, Department of Restorative Dentistry, Lagos State University, College of Medicine, Faculty of Dentistry, Ikeja, Lagos State, Nigeria

[2]Dr. Onigbinde, Olubunmi Omotunde, Department of Preventive Dentistry. Lagos State University, College of Medicine, Faculty of Dentistry, Ikeja, Lagos State, Nigeria

[3]Dr Enone, Lillian Lami, Department of Restorative Dentistry, Lagos State University, College of Medicine, Faculty of Dentistry, Ikeja, Lagos State, Nigeria

[4]Dr. Oburo, Frances Oluchukwu, Consultant in Restorative Dentistry, Federal High Court Clinic, Ikoyi, Lagos

[5]Dr. Adenuga-Taiwo, Olugbenga Adetokunbo, Department of Restorative Dentistry, Lagos State University, College of Medicine, Faculty of Dentistry, Ikeja, Lagos State, Nigeria

[6]Dr. Omosebi, Temitope Olabisi, Consultant in Restorative Dentistry, Faculty of Dentistry, Lagos State University Teaching Hospital, Ikeja, Lagos State, Nigeria

Corresponding Author: Dr. Omosebi, Temitope Olabisi, Consultant in Restorative Dentistry, Faculty of Dentistry, Lagos State University Teaching Hospital, Ikeja, Lagos State, Nigeria

Citation of this Article: Dr Awotile, Adenike Ololade, Dr. Onigbinde, Olubunmi Omotunde, Dr Enone, Lillian Lami, Dr. Oburo, Frances Oluchukwu, Dr. Adenuga-Taiwo, Olugbenga Adetokunbo, Dr. Omosebi, Temitope Olabisi, "The prevalence of tooth wear and its severity among patients who attended a tertiary healthcare institution in an urban centre in lagos, Nigeria", IJDSIR – February – 2025, Volume – 8, Issue – 1, P. No. 113 – 120.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Aim: To assess the prevalence of types of tooth wear and identify the distribution and severity of the disease in the jaws, at the tertiary healthcare institution in an urban centre in Lagos, Nigeria.

Materials and Methods: A cross-sectional study involving 239 consenting participants. Socio-demographic information was collected using validated self-administered questionnaire. Clinical assessment of tooth wear was done using the tooth wear index developed by Smith and Knight. All participants were categorize into mild tooth wear group, moderate tooth wear group and severe tooth wear group, based on individual tooth wear surface scores. All data collected were entered into the Statistical Package for Social Sciences (IBM SPSS Armonk, New York, USA)

spreadsheet Version 26 for analysis. Descriptive statistics of frequency and percentage were used. Chi square test and fisher exact test were used to test for association. The statistical significance was set at P<0.05.

Results: Of the 239 participants, tooth wear occurred more in males 125(52.3%) than females 114 (47.7%). The difference was not statistically significant. Tooth wear occurred in 69.9% (167) of the participants older than 50years old and affected 72(30.1%) of those younger than 50years old. Attrition (48.5%) was the most prevalent of all tooth wear, followed by combined attrition/abrasion (20.5%) and the least was abfraction (3.3%). This occurred more in the maxilla than mandible. With respect to severity of tooth wear on the maxilla, the mild, the moderate and the severe tooth wear scores were highest for molars 166(39.6%), 335(48.8%) and 72(59.0%) respectively. As for the mandible, the mild tooth wear score was the highest for incisors while the moderate and the severe tooth wear scores were highest for molars 314(53.1%) and 34(55.7) respectively.

Conclusion: Attrition was the most prevalent tooth wear, followed by combined attrition/abrasion and the least was abfraction. Molars were the most affected in the maxilla and the least were canines. The moderate tooth wear was the most common in relation to both upper and lower jaws. It occurred more on the maxilla, affecting mostly molars followed by premolars, incisors and canines. The mild tooth wear score occurred more in the mandibular teeth with incisors having the highest score. The severe tooth wear score affected the least number of teeth and it occurred more in maxilla with molar scoring the highest.

Keywords: Prevalence, Tooth Wear Severity, Attrition, Abrasion, Erosion.

Introduction

Early detection and management of tooth wear has not been given due consideration in dental profession. The incidence of tooth wear is increasing across the globe with several cases left untreated.[1] Recent evidences have shown a tremendous decline in occurrence of dental caries therefore a large number of people are interested in keeping healthy dentition for a longer time which eventually would be exposed to wear. It is of utmost importance to have healthy functional teeth for mastication.[1,2 ,3,4]

Tooth wear is a complex, slowly growing, multifactorial disease. It affects enamel and dentine. It endangers tooth survival and quality of life. Reports have it that tooth wear is becoming more frequent and severe affecting growing adults, adults and older adults.[5,6,7]

Tooth wear can be viewed as a normal phase in the process of the tooth ageing process however, when severe, the process can be viewed as pathological. Problems arise when the loss of dental hard tissue is substantial enough to cause sensitivity or aesthetic and functional problems. Early identification and prevention of tooth wear helps to reduce its signs and symptoms in later stages of life.[8-11]

The three most recognized etiologies of tooth wear are erosion, abrasion and attrition while abfraction which is the fourth etiological factor, however, is not generally accepted by researchers.[2] A definitive diagnosis of tooth wear is difficult to derive because it is usually caused by a combination of etiologies. Since it affects aesthetics and function therefore once affected, patients seek for dental care.

Erosion is said to result from chemical breakdown of enamel, dentine, or both, produced by non- bacterial acids from dietary or gastric sources. The earliest stage is characterized by dull" silky glazed" enamel surfaces

and enamel loss. The palatal surfaces of maxillary anterior teeth are affected while the tongue and buccal mucosa protect the other surfaces from exposure to stomach acids in early stages of gastric erosion. Attrition is characterized by a gradual destruction of tooth structure caused by tooth-to-tooth contact in the absence of a foreign object. It is often found on incisal or occlusal surfaces of teeth. Abrasion is the mechanical wear out of tooth structure caused by the presence of foreign objects. Usually found at the cervical regions of teeth. It is generally caused by poor tooth brushing practice that removes acid- weakened enamel and dentine. [8]

Availability of statistically valid prevalence of a disease in a community allows for efficient planning, operation, monitoring and evaluation of health services. This helps to avoid unnecessary expenditure of time and resource. [10,11]

Early detection and management of tooth wear has not been given due consideration in dental profession in our environment hence this study was aimed to assess the prevalence of types of tooth wear in a tertiary institution in an urban centre in Lagos, Nigeria and to identify the distribution and severity of the disease in the jaws.

Materials and Methods

Study design

This was a descriptive cross-sectional study of adult subjects over three months in a tertiary healthcare institution in an urban centre in Lagos, Nigeria.

Study population

These were adult patients between the ages of 18-80 years old visiting the conservative unit of the Dental centre, Lagos State University Teaching Hospital. Lagos, Nigeria.

Inclusion Criteria

Adult patients between the ages of 18 to 80years old, healthy patients with no debilitating diseases or patients on medications. Those willing to consent and comply with study protocols were included.

Exclusion Criteria

Unhealthy patients with diseases such as diabetes, hypertension, Sjorgren syndrome, heart diseases, patients undergoing current orthodontic treatment, patients with TMJ dysfunctional syndrome, others were uncooperative patients who were not ready to give their consents and patients under 18years of age**.**

Ethical approval for this study was obtained from the Health Research Ethics Committee of the Lagos State University Teaching Hospital Ikeja, Lagos, Nigeria. .

Sample Size

Sample size estimation was based on the formula

$$n = \frac{Z^2pq}{d^2}$$

Where

n = the desired sample size

Z = the standard normal deviate, usually set at 1.96 which corresponds to the 95% confidence level (or 5% significant level)

p = the proportion of the target population estimated to have a particular characteristic from previous study using proportion of 0.17 when prevalence is 17%.[12]

q = 1.0 – p

d = degree of accuracy desired set at 0.05

$$n = \frac{(1.96)^2(0.17)\ (0.83)}{(0.050)^2}$$

=216.8

With 10% attrition (21.7), total of 239 subjects would be recruited for the study.[13]

Participants were selected based on selection criteria. All eligible and consenting subjects were asked to fill and sign an informed consent form and an interviewer structured validated questionnaire consisting of two sections was administered.

Data was collected by the use of validated questionnaire consisting of two sections; a section of which consisted of age, gender, and educational status while the other section of the validated questionnaire was for clinical assessment using Tooth Wear Index (TWI) developed by Smith and Knight.[14]

Study subjects were examined on dental chairs with a dental mouth mirror and a blunt probe and good lighting. Dental examination was carried out by two calibrated resident doctors, the teeth were cleaned and dried using a cotton swab to remove plaque and residue.

In this comprehensive system all four visible surfaces (buccal, cervical, lingual and occlusal/incisal) of all teeth present were scored for tooth wear. Study outcomes included tooth wear severity with or without exposure of pulp. This Tooth Wear Index (TWI)[14] was scored on a nominal scale of 0-4: Score 0: Sound tooth no loss of enamel surface characteristics and no change in contour on cervical region; Score 1: loss of enamel surface characteristics and minimal loss of contour on cervical region; Score 2: loss of enamel exposing the dentine for ≤ 1/3 of the surface and defect ≤1mm deep on cervical region; Score 3: loss of enamel exposing the dentine for more than one-third of the surface and defect 1-2mm deep on cervical region and Score 4: Complete loss of enamel or pulp exposure and defect more than 2mm deep on cervical region. Loss of tooth substance on the occlusal or incisal surface was recorded.

All patients were categorized into the following groups based on their individual tooth wear surface scores.

Based on TWI score, Tooth wear was categorized into sound teeth (Score 0), mild Tooth wear (Score 1), moderate Tooth wear (Score 2) and severe tooth wear (Score 3 and Score 4).[15, 16]

Data Analysis

All data collected were entered into the Statistical Package for Social Sciences (IBM SPSS Armonk, New York, USA) spreadsheet Version 26 for analysis. Descriptive statistics of frequency and percentage were used. Chi square test and fisher exact test were used to test for association. A statistical significance was set at $P<0.05$

Results

In this study, a total of two hundred and thirty-nine (239) participants were engaged. 125 were male participants (52.3%), whereas 114 were females (47.7%). Age ranged from 18 to 80years old with a mean age of 50.2± 14.3years old. Of the participants 72(30.1%) were younger than 50 years of age while 167 (69.9%) were above 50years old. (Table 1)

Concerning the type of tooth wear in relation to gender and age, both male and female participants had attrition 57(49.1%), 59(50.8%) respectively as the most common occurring type of tooth wear. However, the overall occurrence of tooth wear is greater in male 125 (52.3%) than in female participants 114 (47.7%) but the difference was not statistically significant. Both groups, had attrition as the most occurring tooth wear with 82 (70.7%) of it in the participants older than 50years old while that of the group younger than 50years of age was 34(29.3%). (Table 1)

The most prevalent/ occurring tooth wear type, among the participants in this study was attrition 116(48.5%), followed by combined attrition/abrasion 49 (20.5%), and the least was abfraction 8 (3.3%) (Table 2)

Concerning the distribution of tooth wear among teeth on the jaws of the participants, in the maxilla, molars 573 (46.7%) were the most affected by toot wear and the least affected were canines 125(10.2%). Same pattern was found in the mandible with molars 493 (44.2%) being the most affected, and the least was canines 114 (10.2%). Overall Tooth wear occurred more on teeth in the maxilla 1228 (55.6%) than those of the mandible 1115(44.4%). (Table 3)

With respect to severity of tooth wear occurring on the maxilla, the mild, the moderate and the severe tooth wear scores were highest for molars with 166(39.6%), 335(48.8%), 72(59.0%) respectively.

As for the mandibular teeth, the mild tooth wear score was highest for the incisors while the moderate and severe tooth wear scores were highest for molars 314(53.1%), 34 (55.7%) respectively. (Table 3)

Discussion

In this study participants over 50years of age had more tooth wear 167(69.9%) than the group younger than 50years old 72(30.1%). This is in agreement with reports of previous studies in which tooth wear was said to increase with age. This was attributed to retention of natural teeth, and the prevalence tooth wear, which has been increasingly seen in the elderly population.[17,18,19] In this study, tooth wear occurred more in males than females. This is consistent with some previous studies.[17, 20,21,22] The reasons attributed to this is that males generate greater forces during functional and parafunctional activities resulting to greater stresses to the teeth.[23]

In this study, attrition was the most prevalent tooth wear followed by combined attrition /abrasion, abrasion, erosion and the least was abfraction. The negative impact of attrition on teeth was reported in a previous study, that this type of tooth wear was promoted by masticatory forces generated from increased fibrous diet, habit of chewing and crushing of bones.[16]

In the current study, tooth wear occurrence was found more on the maxillary teeth than on the mandibular teeth. This is in contrast with previous studies in which tooth wear occurred more on mandibular teeth than on maxillary teeth.[16,20,21,24]

Molars were the most affected followed by incisors, premolars and least were canines on the maxilla and mandible. In contrast Ahuja and Ahuja who performed a cross sectional study among industrial workers in Daman in India reported that incisors and canines were most susceptible to tooth wear. This was due to excessive consumption of hard/ acidic foods during work, exposure to dust/acids and brushing habits particularly horizontal technique of tooth brushing. Other reported causes were use of hard bristle brushes and clenching/bruxism. The variations in the different studies could be attributed to differences in indices, study criteria, diagnostic criteria, bio-geographical differences and variation in habits and lifestyle of the participants.[1,7]

Concerning the distribution of the severity of tooth wear in the present study, the moderate tooth wear score occurred most in the whole mouth. This occurred most on the upper jaw with molars being the most affected followed by premolars, this is similar to previous studies. This was said to be due to the fact that molars and premolars are involved in mastication and receive forces generated during mastication.[16]

Mild tooth wear score occurred more in the mandibular teeth and affecting most incisors followed by molars then premolars and lastly canines. The severe tooth wear score occurred more in maxilla with the molars being the most involved followed by incisors, premolars and canines.

The distribution of the severe tooth wear scores for the mandible in the present study corroborated that of a previous study[15] in which the severe tooth wear score was highest for molars, followed by incisors, premolars and canines. Likewise in this present study the mild tooth wear score pattern for the maxillary teeth was similar to the findings of a similar study.[25]

Conclusion

Attrition (48.5%) was the most prevalent type of tooth wear in this study followed by combined attrition/abrasion (20.5%), and the least was abfraction (3.3%). Tooth wear occurred more in males than females. It occurred more in individuals older than 50years old. The moderate tooth wear score was the most common in relation to both upper and lower jaws. It occurred more on the maxilla, affecting mostly molars followed by premolars, incisors and canines. The mild tooth wear score occurred more in the mandibular teeth with incisors having the highest score then molars, premolars and canines. The severe tooth wear score affected the least number of teeth and it occurred more in the maxilla with molars scoring the highest.

Early diagnosis of type of tooth wear may inform the dentist/specialist as per planning the preventive and therapeutic programs for effective management of the disease.

References

1. Ahuja N, Ahuja N. Prevalence of Tooth wear and its associated risk factors among industrial workers in Daman, India: a cross-sectional study. Int'l Community Med Public Health 2017; 4: 4445-51.
2. Sinha P, Nayak S, Sehga L, Shenoy Kudupi R. The prevalence of tooth wear in patients with diabetes and its impact on the quality of life in Dakshina Kannada population: a cross- sectional study. Open Access Article FI000 Research 2023, 12:1411(https://DOI.ORG/10.12688//F1000research. 140180.1
3. Solanki S, Gupta I, Prasad S, Chinmaya BR. Prevalence and severity of tooth wear in 12 to 15years old school children in the Gurgaon district, Hanjana, India: a cross- sectional study. ArchOral Res 2013; 9(2):193-9.
4. Despande S. Investigation of tooth wear and its associated etiologies in adult patients visiting Dental institute in India. Dentistry 2015; 5: 271-275.
5. Kelleher MG, Bomfim DI. Austin R S. Biologically based restorative management of Tooth wear. Int J Dent 2012; 2012: 742509, Epub 2012, Jan 18.
6. Al-Omiri MK, Lamey PJ, Clifford T: Impact of Tooth wear on daily living. Int J Prosthodont 2006; 2012(6):601-605.
7. Hendi A, Zakerjafari HR, Maleki D, Delroba AA ,Koochaki M. Assessment of different types of dental wear prevalence in patients referred to Prosthodontic department of Guilan University in2019. Journal of Dentomaxilofacial Radiology Pathology and Surgery 2023; 12 (3): 24-27.
8. Khalifa S Al-Khalifah. The prevalence of tooth wear in an adult population from the Eastern Province of Saudi Arabia. Clinical, Cosmetic and Investigational Dentistryy 2020; 12: 525-531.
9. Burke FM, McKenna G. Tooth wear and older patients. Dent Update 2011; 38:165-168 Doi:10.12968/denu.2011.38.3.165.
10. Nama Bibi Saerah Abd Karim, Noorliza, Mastura Ismail, Lin Naing, Abdul Rashid Ismail.Tooth wear prevalence and sample size determination: A pilot study. Malaysian Journal of Medical Sciences 2008; 15(4):35-40.
11. Srisilapanan P, Jindarat M, Roseman J. The prevalence and severity of tooth wear in Type 2

diabetic patients. Int J Dent 2018; 3608158. doi: 10.1155/2018/3608158.

12. Van't Spijker A, Rodrigue IMZ, Kreulen CM, Bronkhorst EM, Bartlett DW, H CN. Prevalence of tooth wear in adults. Int J Prosthodont 2009; 22:35-42.
13. Israel JD. Determining sample size. Inst Food Agric Sci 2003; PEODG:1-5.
14. Smith BG, Knight JK. An index for measuring the wear of teeth. Br Dent J 1984; 156:435-38.
15. Joshi R, Gautam S, Joshi B. Assessment of tooth wear and its associated factors in adult patients visiting a dental hospital in Kathmandu, Nepal. Nepal Med Coll J, 2020; 22(4):266-74.
16. Braimoh OB, Alade GO. Prevalence and distribution of Toothwear in an elderly cohort in Port Harcourt, Nigeria. J Dent Res Rev 2018; 5:80-3
17. Deshpande S. Investigation of tooth wear and its associated etiologies in adult patients visiting Dental Institution in India. Dentistry 2015; 5: 2-5
18. Shrestha D, Rajbhandari P. Prevalence and associated risk factors of tooth wear. J Nepal Med Assoc 2018:56:719-23.
19. Wetselaar P, Vermaire JH, Visscher CM, Lobbezoo F, Schuller AA. The prevalence of Tooth wear in the Dutch adult population. Caries Res 2016; 50:543-50.
20. Liu B, Zhang M, Chen Y, Yao Y. Tooth wear in aging people: an investigation of the prevalence and influential factors of incisal/occlusal tooth wear in northwest China. BMC Oral Health 2014;14:65-9.
21. Taiwo JO, Ogunyinka A, Onyeaso CO, Dosumu OO. Tooth wear in the elderly population in south east local government area in Ibadan, Nigeria. Odontostomatol Trop 2005: 28:9-14.
22. Hugoson A, Bergendal T, Ekfeldt A, Helkimo M. The prevalence and severity of incisal and occlusal wear in an adult Swedish population. Acta Odontol Scand 1988;46:255-65.
23. Donachie MA, Walls AWG. Assessment of Tooth wear in an ageing population. J Dent 1995; 23:157-64.
24. Ahuja N, Ahuja N. Prevalence of Tooth wear and its associated risk factors among industrial workers in Daman, India: a cross-sectional study. Int'l Community Med Public Health 2017; 4: 4445-51.
25. Karabekiroglu, Sener S, Magat GD, Akdemir I, Unlu N. Occlusal and incisal tooth wear in Turkish adult patients. Said Int'l Med Health Res 2017; 3:54-60.

Legend Tables

Table 1: The relation of type of tooth wear with gender and age

Type of wear	Variables	Abfraction No (%)	Abrasion No (%)	Attrition No (%)	Attrition/ Abrasion No (%)	Erosion No (%)	Total
Gender	Male	5 (62.5)	28 (63.6)	57(49.1)	24(48.98)	11(50.0)	125(52.3)
	Female	3 (37.5)	16 (36.4)	59(50.8)	25(51.02)	11(50.0)	114(47.7)
P value	0.510						
Age(yrs)	<50 years	4(50.0)	12(27.3)	34(29.3)	13(26.5)	9 (40.9)	72(30.1)
	>50years	4 (50.0)	32(72.7)	82(70.7)	36 (73.5)	13(59.1)	167(69.9)
P value	0.524						

Table 2: Distribution of different types of tooth wear among participants

Variable	
Type of tooth wear	No (%)
Abfraction	8 (3.3)
Abrasion	44 (18.4)
Attrition	116 (48.5)
Attrition/Abrasion	49 (20.5)
Erosion	22 (9.2)
Total	239 (100)

Table 3: Distribution of participants with tooth wear score in various teeth in the maxilla and mandible

Variables	Tooth wear n (%)	Mild TWS n (%)	Moderate TWS n (%)	Severe TWS n (%)
Maxilla				
Incisors	280 (22.8)	130 (31.0)	124 (18.0)	26 (21.3)
Canines	125 (10.2)	51 (12.2)	66 (9.6)	8 (6.6)
Premolars	250(20.3)	72 (17.2)	162 (23.6)	16 (13.1)
Molars	573 (46.7)	166 (39.6)	335 (48.8)	72 (59.0)
Total	1228(100)	419(34.1)	687(56.0)	122(9.9)
Mandible				
Incisors	264 (23.7)	149 (32.2)	102 (17.3)	13 (21.3)
Canines	114 (10.2)	59 (12.7)	50 (8.5)	5 (8.2)
Premolars	244 (21.9)	110 (23.8)	125 (21.1)	9 (14.8)
Molars	493(44.2)	145 (31.3)	314 (53.1)	34 (55.7)
Total	1115(100)	463 (41.5)	591 (53.0)	61 (5.5)