DOI: https://doi.org/10.53350/pjmhs2115123448

**ORIGINAL ARTICLE**

# Frequency of Tooth Wear amongst Adult Population Suffering from Diabetes Mellitus visiting Dental Teaching Hospital in Mardan

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## ABSTRACT

**Objective:** To conclude the frequency of tooth wear in permanent dentition of adults suffering from diabetes mellitus.
**Study Design:** Cross-Sectional study
**Place and Duration of Study:** Dental OPD of Bacha Khan College of Dentistry from 1st January 2021 to 30th June 2021.
**Methodology:** Three hundred known diabetic patients who gave positive history of diabetes mellitus were randomly selected. Knowledgeable consent was attained from all subjects. Patients were clinically examined for tooth wear: erosion, attrition, abfraction and abrasion.
**Results:** There were 166 (55%) males and 134 (45%) female patients respectively. The prevalence of tooth wear among diabetic individuals was as high as 62%.
**Conclusion:** Diabetes mellitus is common disease in adult population and it cruelly impacts the oral health of an individual. Tooth wear is common finding in diabetic patients due to xerostomia**.** When patient is diagnosed as diabetic, the dentist should instruct the patient about the importance of hygiene care and risk of tooth wear and should carry out screening for tooth surface loss as a part of their routine dental examination in diabetic patients.
**Key Words:** Tooth wear, Diabetes mellitus, Xerostomia, Attrition, Abrasion, Abfraction, Erosion

## INTRODUCTION

Non-carious tooth surface loss (NCTSL) also titled as tooth wear (TW) is a substance of alarm to all dental professionals in current scenario.[1] Tooth wear is a common word that defines "the loss of hard tissues from the surface of teeth caused by factors other than dental caries, trauma or developmental disorders" e.g. dentine dysplasia, dentinogenesis imperfecta and amelogenesis imperfecta.[1,2] It is a physiological progression that happens as the aging progression continues[3] causing an enamel loss of between 28-30 µm/year as verified by Spijker et al[4] but if the rate of this loss is enhanced it exposes the existence of teeth and is measured as pathologic.[5] There are various causes that add to the aetiology of tooth wear. The terms erosion, abfraction, abrasion, and Attrition were used by Grippo in 1991 to classify the tooth wear.[6]

Erosion is caused by chemical degradation of tooth surface normally caused by consumption of acidic foods and drinks or gastroesophageal reflux disease (GERD). The most frequently affected sites are cupping lesions on occlusal surfaces of posterior teeth and palatal features of maxillary anterior teeth.[7] Abfraction occurs at the cervical areas of the teeth but the possible cause of abfraction is premature occlusal contacts and lesions are narrow V-shaped notches.[7] Abrasion is caused by issues like tooth-brush trauma during vigorous brushing. Lesions are usually located at cervical areas of the teeth.[8] Attrition is "the loss of tooth surface caused by tooth surface contact during occlusion or mastication". It presents in the form of wear facets on occlusal or incisal surfaces of teeth[8], abnormal habits like clenching and bruxism is also a well-known aetiology of Attrition.

Among various etiologies, asthma, diabetes mellitus, caffeine addiction, hypertension, gastroesophageal reflux, or other systemic diseases or syndromes that predispose to xerostomia are the most common. Increase frequency of tooth wear in the diabetic patients is due to increased consumption of acid inducing foodstuff, poor lifestyle, and immunocompromised state as well as due to xerostomia.[9] Excessive tooth wear leads to pulp necrosis, hypersensitivity, and pulpitis and can cause serious damage to the oral health of an individual. Many times the degree of tooth wear is so severe that it causes recurrent symptoms or presents a considerable restorative challenge, and then it is deemed "pathological" tooth surface loss[9-11], which is a foremost reason of early tooth loss amongst diabetic patients.

The main purpose of the study is to assess the relationship between the blood sugar levels and tooth wear in diabetic patients, thereby taking precautionary measures and prevent the complications of tooth sensitivity and infection.

## MATERIALS AND METHODS

This study was conducted at Dental OPD of Bacha Khan College of Dentistry (BKCD), after approval from Ethical Review Board. A total numbers of 300 patients were randomly selected from OPD who gave positive history of diabetes mellitus. Verbal consent was taken from all patients, fasting blood sugar (FBS) was acquired from all patients from laboratory of same hospital, and patients were checked for complete dental examination and assessment with laboratory report of FBS. Age range of 35-75 years with at least 6 functional occlusal units present in the oral cavity and patients having various types of tooth wear were included. Patients affected by any developmental dental anomaly like hypodontia, microdontia, amelogenesis imperfecta, and dentinogenesis imperfecta were excluded. Those who suffered from dental fluorosis, having multiple grossly carious teeth, patients with chronic systemic illness other than diabetes like renal failure, tumour patients, and irradiated patients were also not included in this study.

Patient's biodata, medical history of systemic illnesses, history of diabetes along with disease duration, history of parafunctional habits of bruxism, aggressive brushing, habit of carbonated drinks and acidic food intake was acquired. Clinical examination was performed for any signs of Non-Carious Tooth surface loss (tooth wear). Diagnosis of types of tooth wear was made by careful clinical examination. Tooth wear types were documented as erosion, abfraction, abrasion, and attrition. All tooth surfaces buccal, labial, lingual, palatal and cervical margins was cautiously examined bilaterally. History and examination findings were documented for each patient in dedicated pro-forma specifically planned for this study. Fasting blood sugar for every subject was acquired and values in mg/dl were documented.

An investigative criterion for erosion diagnoses was "bilateral concave defects with a smooth and glazed surface that is free from any plaque deposits". Abfraction was diagnosed as "deep V shaped notches on cervical aspect of teeth and in association with premature occlusal contacts". Abrasion was diagnosed as "cervical lesions that are more wide than deep and frequently affects the canine and premolar, with a strong history of vigorous tooth brushing". Attrition was "presence of matching wear facets on occlusal and incisal surfaces, shiny facets on amalgam

restorations or fracture of cusps or restorations". All forms of tooth surface loss were noted in pre designed pro-forma.

Fasting Blood Sugar (FBS) levels up to 130 mg/dl were termed as "good glycemic control", 131 to 200mg/dl as "moderate glycemic control", above 200 mg/dl is mentioned as "poor glycemic control". Tooth wear present/not present were noted, type of tooth wear as erosion and abfraction, attrition, abrasion, were documented, and data collected were analyzed using SPSS-22. Association of tooth wear with degree of diabetic control was analyzed by using Chi square test.

## RESULTS

There were 166 (55%) males and 134 (45%) female patients. The mean age was 54.6 years, which reveals the fact that diabetes is a middle age disease (Table 1). The prevalence of tooth wear among diabetic individuals was as high as 62%. One hundred and eighty six had clinically diagnosed tooth wear and 114 subjects had no tooth wear. Ninety patients had single type of tooth wear present while 96 individuals had multiple types of tooth wear (Table 2). Attrition is most prevalent type of tooth wear, present in 82 subjects, followed by erosion, abrasion and abfraction present in 52, 35 and 17 subjects respectively (Table 3).

Forty eight patients had good glycemic control mean FBS up to 130 mg/dl, 129 had moderate glycemic control with FBS from range of 131 mg/dl to 200 mg/dl, and 123 patients had FBS more than 200 mg/dl i.e. poor glycemic control (Table 4).

Table 1: Demographic information of the patients (n=300)

| Variable | No. | % |
|---|---|---|
| Gender | | |
| Male | 166 | 55.0 |
| Female | 134 | 45.0 |
| Age (years) | 54.7±8.44 | |

Table 2: Prevalence of tooth wear in diabetic patients

| Tooth wear | No. | % |
|---|---|---|
| Present | 186 | 62.0 |
| Single type of tooth wear present | 90 (48%) | |
| Multiple types of tooth wear | 96 (52%) | |
| Not present | 114 | 38.0 |

Table 3: Frequency of tooth wear (n=186)

| Tooth wear | No. | % |
|---|---|---|
| Attrition | 82 | 44.0 |
| Erosion | 52 | 27.9 |
| Abrasion | 35 | 18.8 |
| Abfraction | 17 | 10.0 |

Table 4: Glycemic control and presence of tooth wear (n=300)

| Variable | Tooth Wear | | P value |
|---|---|---|---|
| | Present | Absent | |
| Good | 10 | 38 | 0.001 |
| Moderate | 78 | 51 | |
| Poor | 101 | 22 | |

## DISCUSSION

Out of 123 individuals with poor glycemic control 101 subjects had clinically diagnosed tooth wear while moderate glycemic control group had 78 out of 129 having tooth wear, good glycemic control group had only 10 subjects with tooth wear out of 48 individuals. P value of 0.001 is statistically significant for the relation glycemic control and presence of tooth wear. Thus patients having poor glycemic control has prevalence of tooth wear.

Currently, the association amongst oral and systemic diseases has become a vital subject for research. So far there is no published data which discusses the incidence or prevalence of tooth wear in the diabetic population of Pakistan. Diabetes is one of the most common non-communicable disease found in adults[11] with the prevalence of type 2 diabetes mellitus in Pakistan was 13.50% in 1999, 7.18% in 2002; 9.52% in 2004; 8.74% in 2007, 19.21% in 2009, 10.85% in 2010; 10.95% in 2011.[12] Dental practitioners should be aware of the frequency and severity of tooth wear in diabetic population to prevent the potential problems.[13] It is therefore useful to investigate the prevalence and severity of tooth wear among diabetic patients especially in Pakistan.

In a study conducted in Chennai, India on diabetic patients in 2017, tooth wear was more prevalent in patients with poorly controlled diabetes.[9] The result was similar to our investigation but the previous study makes use of random blood sugar (RBS) levels as compared to FBS in current study.

In another study done in Thailand that included 179 patients with the age between 35–74 years, the most prevalent type of tooth wear in the subjects was attrition (99.4%). The prevalence of erosion, abrasion, and abfraction were 64.8%, 31.3%, and 7.3%, respectively.[10] While in the current study, the prevalence of attrition was 44% erosion was 27.9%, abrasion was 18.8%, and abfraction was 10%.

The data, both from our study as well as from the previous studies, shows that tooth wear is an important dental public health problem in diabetic patients. The reason could be due to the xerostomia, increased quantity of citrus foods consumption, change in dietary patterns, improper brushing techniques, and parafunctional habits[11-14] but the exact cause of the increased intensity of tooth wear in the diabetic patients is still mysterious.

Importance is being rested on educating oral hygiene and routine clinical examination of diabetic patients not only to avoid the possible difficulties such as pulpal pain, sensitivity, loss of occlusal vertical dimension and temporomandibular joint disorders[15,16] but also time consuming and multifaceted recovery procedures can be escaped.[14,17]

## CONCLUSION

There is a high frequency of tooth wear among diabetic patients especially with poor controlled diabetes. Need of the time is to form responsiveness concerning this rising problematic and its preventive and organization strategies in diabetic patients so a healthy dentition can be conserved throughout the lifetime of the population. The role of prevention is vital in keeping the integrity of the teeth and to avoid treating those damaged teeth in diabetic patients.

## REFERENCES


1. Alhilou A, Beddis HP, Mizban L, Seymour DW. Basic Erosive Wear Examination: assessment and prevention. Dent Nursing 2015;11:262-267.
2. Hattab FN, Yassin OM. Etiology and diagnosis of tooth wear: a literature review and presentation of selected cases. Int J Pros 2000;13(2).
3. Haddadin K, Rassas E, Masarweh N, Haddadin KH. Causes for tooth surface loss in a group of Jordanian population. Pak Oral Dent J 2015;35.
4. Spijker AV, Rodriguez JM, Kreulen CM, Bronkhorst EM, Bartlett DW, et al. Prevalence of tooth wear in adults. Int J Prostho 2009;(1).
5. Hobkirk JA. Tooth surface loss: causes and effects. Int J Pros 2006;20:340-41.
6. Grippo JO. Abfractions: a new classification of hard tissue lesions of teeth. J Esthetic Dent 1991;3:14-9.
7. Gandara B, Truelove E. Diagnosis and management of dental erosion. J Contemp Dent Prac 1999;1:1-17.
8. Mehta SB, Banerji S, Millar BJ, Suarez-Feito JM. Current concepts on the management of tooth wear, part 4. An overview of restorative techniques and dental materials commonly applied for the management of tooth wear. Br Dent J 2012; 212:169-77.
9. Venugopal A, Maheswari TN. Occurrence of tooth wear in controlled and uncontrolled diabetic patients - An observational study. J Adv Pharm Edu Res 2017;7(3):316-9.
10. Al-Omiri MK, Lamey PJ, Clifford T. Impact of tooth wear on daily living. Int J Prostho 2006;19: 601-5.
11. Rizvi SSZ, Siddiq M, Rafique A, Uzair M, Zakria N, Mehdi SZ. Prevalence of tooth wear among adult population suffering from diabetes mellitus-presenting in a Tertiary Care Hospital of Taxila Cantt; a descriptive study. Med Forum 2021;32(6):15-8.
12. Meo SA, Zia I, Bukhari IA, Arain SA. Type 2 diabetes mellitus in Pakistan: Current prevalence and future forecast. JPMA 2016; 66(12):1637-42.
13. Burke FJ. Me too 2. Dental update 2011;38(9):585.
14. O'Toole S, Mullan F. The role of the diet in tooth wear. Br Dent J 2018;224(5):379-83.
15. Wazani BE, Dodd MN, Milosevic A. The signs and symptoms of tooth wear in a referred group of patients. Br Dent J 2012;213:E10.
16. Oginni AO, Oginni FO, Adekoya-Sofowora CA. Signs and symptoms of temporomandibular disorders in Nigerian adult patients with and without occlusal tooth wear. Community Dent Health 2007;24:156-60.
17. O"Toole S, Pennington M, Varma S, Bartlett DW. 'e treatment need and associated cost of erosive tooth wear rehabilitation - a service evaluation within an NHS dental hospital. BDJ 2018;224 (12)957-61.