ORIGINAL ARTICLE

TOOTH WEAR AND ITS RELATED FACTORS: FINDINGS FROM A HOSPITAL BASED STUDY

[1]HINA TOUFIQUE, [2]NIGHAT NISAR, [3]SOHAIL SAADAT

ABSTRACT

Tooth wear depicts the non-carious loss of tooth tissue in three ways, which may occur individually or in combination. These are attrition, erosion and abrasion. Attrition depicts loss of tooth tissue by mastication or friction between occluding surface. Erosion however, is the loss of hard dental tissues by chemical processes and bacterial activity. Abrasion, on the other hand is pathological loss of tooth tissue from repetitive mechanical contact apart from tooth to tooth contact. A cross-sectional study was conducted to determine the frequency of tooth wear and its associated factors among patients attending out-patient department at Dow Dental College. The study enrolled 400 patients. A total of 24 teeth of each patient were scored between 0 and 4 according to the severity of tooth wear using tooth wear index. Factors associated with tooth wear were assessed and recorded using questionnaire. Out of 400 patients examined 182 (45%) were male and the overall mean age was 41 years (± 9). Only 10% participants had tooth wear in our study. It is concluded that tooth wear was found to be not common among patients presenting at the out-patient clinic of Dow Dental College. Factors like teeth grinding, jaws clenching, gastric reflux disease, use of Vitamin C supplements, carbonated drinks and citrus fruits were found to be related with tooth wear.

Key Words: *Non Carious Tooth Wear, Attrition, Abrasion, Erosion, Non Carious Cervical Lesion (NCCL).*

INTRODUCTION

The loss of tooth tissues can happen because of carious and non-carious causes. Tooth wear (TW) depicts the non-carious loss of tooth tissue resulting from three procedures, which may occur individually or in combination.[1] These are attrition, erosion and abrasion. Attrition depicts loss of tooth tissue brought about by mastication or friction between occluding surface.[2] Erosion however, is the dynamic loss of hard dental tissues by chemical processes and bacterial activity.[3] Abrasion, on the other hand is pathological loss of tooth tissue resulting from repetitive mechanical contact apart from tooth to tooth contact.[4]

Tooth wear is commonly present in general population however it is usually not treated.[2] Current significant decline in dental caries may make tooth wear more prominent.[2] This could be a direct result of people becoming more careful in taking care of their teeth or dentures which prolongs the life of dentition thus exposing them to more wear[5].

Tooth wear manifests itself as abrasion, attrition and erosion and also, non-caries cervical lesion (NCCL). Many studies have shown that individual tooth wear type are not isolated and are usually present in combination.[1,5,6] Tooth wear regularly brings distress and affectability particularly during eating, drinking or tooth brushing. On the off chance that left untreated, it might prompt torment or the tooth being non-functional.[7,8] At an early phase, patients with tooth wear might not consider it as a health problem rather considers it as an aesthetic issue.

The prevalence and frequency of tooth wear is progressively being reported, especially corrosive disintegration.[9] Tooth wear predominance shifts far and wide. A study in Sabah region[10] demonstrated that out of 148 people inspected, 95 have TW with moderate dentine involvement and 41 have seriously worn dentition. Out of the 126 subjects with TW in a Nigerian study[11]; 81 had weakening, 20 had abrasion, and 9 had erosion while the rest of the 16 had mix of both whittling down and abrasion. Other study[12] that inspected 155 subjects going to a college dental facility in Trinidad, West Indies. Another study from Malaysia reported the prevalence of TW 17.4% of the patients had tooth wear of which 36% had abrasion, 31% attrition and 1.2% erosion.[13]

[1] **Corresponding Author:** Dr Hina Toufique BDS, Lecturer/ MDS Trainee, Department of Community Dentistry, Dow Dental College, Dow University of Health Sciences, Baba-e-Urdu Road, Karachi Email: dr.hina95@yahoo.com
Cell: 0321-8765843

[2] Professor Dr Nighat Nisar, MBBS, MPH, FCPS Professor and Hed of Community Medicine, Dean School of Public Health, Dow University of Health Sciences Email: nisarnighat@hotmail.com
Cell: 0330-2382639

[3] Dr Sohail Saadat, BDS, MDS (Community Dentistry) Assistant Professor, Dow International Dental College, Dow University of Health Sciences Email: drsohailsaadat@gmail.com
Cell: 0321-2284688

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Usually tooth wear is neglected in Pakistan and not considered much of a oral health problem, however, the negligence and concurrent high prevalence of betel nuts and carbonated drinks usage has made it a bigger problem.

METHODOLOGY

This cross-sectional study was conducted among the patients visiting the out-patient department of Dow Dental College, Dow University of Health Sciences Karachi. The sample size was calculated to be 221 teeth using the formula for proportion based on the prevalence tooth wear reported by Daly et al[13] at 95% confidence level. The study enrolled 400 patients from the outpatient department.

The clinical oral examination of the study participants was done using dental probes and dental mirrors. Dental probes and gauzes were used to remove food debris. The examination was done on dental chair (units) under operating light. Tooth wear was assessed using the Smith and Knight Tooth Wear Index (TWI) based on previous studies. The examination was carried out by principal investigator seated behind while an assistant recorded the readings. Records were made for the cervical, buccal, lingual or palatal and incisal or occlusal surfaces. A total of 24 teeth of each patient were used and scored between 0 and 4 were recorded according to the severity of the tooth wear as shown in Table 1. SPSS version 20 was used for data entry and analysis. Mean tooth wear score with standard deviation was calculated and reported for different sub-groups of patient characteristics.

RESULTS

Out of 400 patients examined 182 (45%) were male and the overall mean age of the patients was 41.13 years (± 9). Most of the female patients were house

TABLE 1: SMITH AND KNIGHT TOOTH WEAR INDEX

Score*	Surface	Criterion
0	BLOI	No loss of enamel surface characteristics
	C	No change of contour
1	BLOI	Loss of enamel surface characteristics
	C	Minimal loss of contour
2	BLO	Enamel loss just exposing dentine < 1/3 of the surface
	I	Enamel loss just exposing dentine
	C	Defect less than 1 mm deep
3	BLO	Enamel loss just exposing dentine < 1/3 of the surface
	I	Enamel loss & substantial dentine loss but no pulp exposure
	C	Defect 1-2 mm deep
4	BLO	Complete enamel loss, or pulp exposure, of 2° dentine exposure
	I	Pulp exposure, or 2° dentine exposure
	C	Defect more than 2mm deep, or pulp exposure, or 2° dentine exposure

Each surface of each tooth is given a score between 0 and 4 according to its appearance.

B = buccal or labial L = lingual or palatal O = occlusal I = incisal C = cervical

Upper	6	5	4	3	2	1	1	2	3	4	5	6
B												
L												
O/I												
C												

Lowere	6	5	4	3	2	1	1	2	3	4	5	6
B												
L												
O/I												
C												

TABLE 2: FREQUENCY AND SCORING OF TOOTH WEAR

Total	**Frequency N= 400**
Total teeth	9600
Total tooth surfaces	38400
Total surface with TW	3844
Smith and Knight Score	**Frequency (%) N= 400**
Score 0	34556 (90)
Score 1	2764 (7.1)
Score 2	845 (2.2)
Score 3	230 (0.6)
Score 4	5 (0.1)

TABLE 3: COMPARISON OF MEAN TOOTH WEAR SCORES ACROSS DIFFERENT GROUPS OF PATIENTS AND THEIR BEHAVIOURS

Characteristics	Mean (SD)	P-value
Gender		
Male	14.42 (19.19)	0.486
Female	12.68 (18.48)	
Occupation		
Student	2.33 (2.5)	
House wife	14.08 (20.97	0.241
Employed	19.28 (18.44)	
Unemployed	32.22 (33.94)	
Do you know what tooth wear is?		
Yes	11.70 (17.34)	0.426
No	15.11 (21.57)	
Do you know the causes of tooth wear?		
Yes	16.94 (20.06)	0.428
No	15.05 (20.96)	
Noticed any change in your teeth		
Yes	27.13 (30.73)	<0.001
No	12.98 (17.45)	
Tooth brush used		
Hard bristles	13.53 (9.6)	0.873
Medium bristles	16.01 (20.86)	
Soft bristles	14.93 (22.44)	
Brushing Technique		
Up & Down	22.09 (33.10)	0.015
Forward & Backward	21.19 (22.04)	
Combination	10.40 (12.28)	
How many times you brush?		
Once	16.36 (21.55)	
Twice	15.39 (21.74)	0.883
More than twice	12.28 (13.05)	
None	4.66 (3.21)	
How much pressure do you apply while brushing?		
Mild	16.28 (17.24)	0.545
Moderate	13.82 (19.09)	
Aggressive	22.65 (28.22)	

TABLE 4: COMPARISON OF MEAN TOOTH WEAR SCORES OF FACTORS (HABITS AND FOOD ITEMS) CAUSING TOOTH WEAR

Characteristics	Mean (SD)	P-value
Do you regularly take carbonated drinks?		
Yes	21.76 (23.40)	0.042
No	13.03 (19.46)	
How often do you drink carbonated drinks?		
None	15.85 (17.13)	<0.001
Twice a week	13.25 (04.70)	
Daily	69.50 (30.40)	
Do you take citrus fruits?		
Yes	13.62 (19.86)	0.425
No	17.05 (21.80)	
Do you take vitamin C supplements?		
Yes	26.28 (32.55)	0.011
No	12.88 (16.53)	
Do you participate in water sports?		
Yes	07.40 (9.58)	0.190
No	15.47 (21.02)	
Do you grind your teeth?		
Yes	30.93 (33.69)	<0.001
No	12.26 (15.81)	
Do you have a habit of keeping jaws clenched?		
Yes	32.96 (35.07)	<0.001
No	12.14 (15.36)	
Do you often have stomach ache?		
Yes	20.62 (27.62)	0.138
No	13.47 (17.79)	
Do you wake up with sour taste in mouth?		
Yes	19.00 (26.76)	0.023
No	12.89 (15.67)	
Do you have gastric reflux disease?		
Yes	22.54 (27.72)	0.001
No	12.47 (16.80)	
Do you feel heartburn?		
Yes	17.71 (23.31)	0.080
No	13.80 (19.16)	
Do you have indigestion issues?		
Yes	17.55 (26.99)	0.152
No	14.53 (18.54)	
Do you have any dental problem?		
Yes	14.18 (21.68)	0.425
No	18.69 (17.55)	
Tooth mobility		
Present	31.68 (32.34)	<0.001
absent	11.72 (15.40)	
Traumatic ulcers		
Present	17.43 (23.11)	0.351
Absent	14.82 (20.39)	
Jaw Fatigue		
Present	22.06 (21.54)	0.010
Absent	13.84 (20.46)	

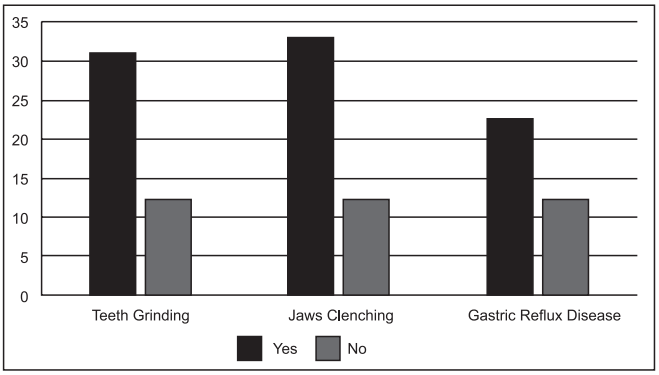

Fig 1: Mean Tooth Wear scores of factors (Habits) causing Tooth Wear

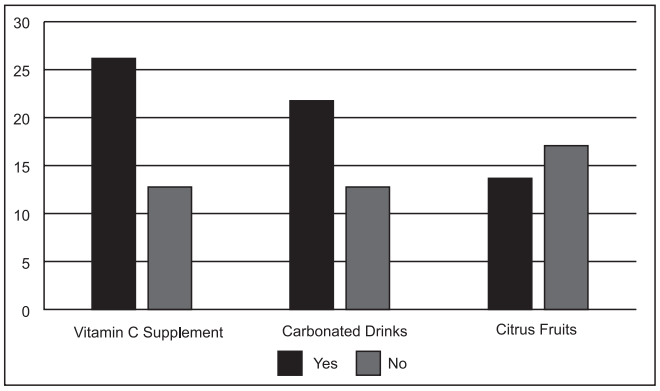

Fig 2: Mean Tooth Wear scores of factors (Food Items) causing Tooth Wear

wives and half of the patients were employed. Only 20% of the patients knew about tooth wear while only 15% knew about the causes of tooth wear. 19% had recently noticed changes in their teeth. Around 47% of the patients used soft bristle tooth brush and 44% used medium bristles tooth brush for brushing. Almost half of the patients (49%) brushed twice a day while 42% brushed once a day. Regarding pressure applied during brushing, 62% admitted that they apply moderate amount of pressure while brushing while 17% said that they apply aggressive amount of pressure.

Table 2 shows the total number of teeth and teeth surfaces in 400 patients and distribution of TWI score. Tooth wear was not found in 90% of the patients. Table 3 shows the comparison of mean TWI scores across different groups of patients and their behaviour while Table 4 shows the Comparison of mean Tooth Wear scores of factors (Habits and Food Items) causing Tooth Wear. Fig 1 represents the Mean Tooth Wear scores of factors (Habits) causing Tooth Wear while Figure 2 represents the Mean Tooth Wear scores of factors (Food Items) causing Tooth Wear.

DISCUSSION

This research study comprised of population representing lower to middle socio-economic class. The general concept of dental and gingival care is not very well understood by this population but the tooth wear was found to be not commonly present among them. Only 10% participants had tooth wear while 90% did not had tooth wear in our study.

Mechanical factors or Habits included grinding of teeth and keeping jaws clenched are found to be associated with tooth wear in our study. Gastric problems including gastric reflux disease and having sour taste in mouth when wake up were also associated with tooth erosion. This is in accordance with the international literature.[6,16,17] One of the common potential cause of tooth wear is the use of carbonated drinks. Its frequency was also associated with tooth wear.[4,9] Common potential food items that causes tooth wear were found to be the use of Vitamin C supplements, carbonated drinks and citrus fruits in our study. Similarly, taking Vitamin C supplements was also associated with more tooth wear similar to the findings of other published studies.[15] One of the common potential cause of tooth wear was found to be the use of carbonated drinks. Its frequency was also associated with tooth wear.[4,9]

One of the possible contributing factors for tooth wear can also be periodontal diseases which can alter tooth mobility therefore changing the interocclusal contacts.[18] Although the exact causative mechanism is not yet known, occlusal trauma resulting in such cases can act as aggravating factors for existing periodontal problems causing a cascade of tooth destructive mechanisms. Studies also show that tooth wear is common among people with generalized bone loss, which is a common problem in our population.

Another factor which contributes to tooth wear is malocclusion which is common in our population. Some studies have shown a positive association between malocclusion and tooth wear among children.[19]

As reported in published literature, people have different levels of risks for developing tooth wear depending on the behavioural factors, dietary habits and medical conditions.[4,5,20-22] Despite the presence of multiple risk factors in our society, the presence of tooth wear was not commonly found among the patients presenting at the outpatient department of Dow Dental College, Dow University of Health Sciences. The reason for this finding needs further understanding through research. However, steps must be taken to create awareness among masses related to tooth wear and factors causing them.

CONCLUSION

Tooth wear was not found to be common among patients presenting at the out-patient department of Dow Dental College compared to other published literature. Factors like teeth grinding, jaws clenching, gastric reflux disease, use of Vitamin C supplements,

carbonated drinks and citrus fruits were found to be related with tooth wear.

LIMITATION

This study enrolled participants from out-patient department hence results from a very selective group of participants are highlighted in this study. These results cannot be generalized to larger population.

RECOMMENDATION

Assessment of dental wear should be made part of regular dental checkups including counselling to prevent this issue among patients attending out-patient department.

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CONTRIBUTIONS BY AUTHORS

1 Hina Toufique:	Conceptualized the study, acquisition, analysis and interpretation of data and developed the draft.
2 Nighat Nisar:	contributed to the design of the study, and reviewed the manuscript.
3 Sohail Saadat:	Contributed in data collection and reviewed the final draft.