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An Investigation of the Prevalence And the Influential Factors Affecting Tooth wear

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Abstract
Background:*tooth wear is common and increases by the age,the aim of this study was to estimate the prevalence of tooth wear in the adult population of Jeddah and to investigate the factors associated with such tooth wear.*
Methods: *Seven hundred and fifty adult patients were examined in the clinic of Batterjee Medical College. Clinical oral examinations of the patients were performed using disposable dental mirror and explorer. The patients gave their information consent for the use of their data and they were willing to answer a questionnaire. The incisal/occlusal surface of all teeth were scored according to the criteria: (0) No loss of enamel surface characteristics (1) loss of enamel surface characteristics (2) Lose of enamel,just exposing dentine (3) Lose of enamel and substantial loss of dentin (4) Pulp exposure or exposure of secondary dentin.*
Results: *In the maxilla, the rate varied from 79.2% ,79.5%,83.9% and 81.4%respectivelly for Incisor, Canine , Premolar and molar groups.*
In the mandible, the rates varied from 78%, 75.3%, 79.2% and 79.5respectivelly for Incisor, Canine , Premolar and molar groups. Among these groups, no significant difference was observed regarding their tooth wear prevalence, either the maxillary groups (p-value 10.9% > 5%) or the mandibular groups (p-value 21.8% > 5%). Canine groups in maxilla and mandible showed more wear than other groups. Additionally, the habitual consumption of hard or acidic foods (40.7%) and clenching or grinding teeth (34.8%) are the factors which may be responsible for tooth wear.
Conclusion:*No difference in teeth wear between male and female, but it is increase by age. The canine exhibit greater wear ,there is a relation between tooth wear and dietary patterns like hard and acidic food.*

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I. Introduction

Wear of tooth and the restorative material is a common phenomenon in dentistry and occurs when two surfaces undergo slipping movement under an applied load. It can be considered being either desirable or undesirable depending on the degree of wear and the situation. Tooth wear is common and increases with age. However, neither review provides sufficient data to give a clear appraisal of which factors increase the risk of tooth wear.

There are three main mechanisms of tooth wear , namely erosion , attrition and abrasion. Attrition is the physiological wearing of dental hard tissues through tooth to tooth contact without intervention of foreign substance , abrasion is the pathological wear of dental hard tissue through abnormal process that involve foreign object or substances that are repeatedly introduced into the mouth, erosion is the loss of dental hard tissues by the chemical dissolution of enamel or dentine through the action of non-bacterial acid from dietary or gastric source. [(3)]The gradual wear of the occlusal surfaces of teeth is a normal process during the lifetime of a patient. However, , excessive occlusal wear can result in pulpal pathology , occlusal disharmony , impaired function , and esthetic disfiguration. Therefore, it is important to identify the factors that contribute to excessive wear and to evaluate the factors that contribute to excessive wear and to evaluate alteration of the vertical dimension of occlusion (VDO) caused by the worn dentition. [(3)] In many cases , VDO is maintained by tooth eruption and alveolar bone growth. As teeth are worn, the alveolar bone undergoes an adaptive process and compensate for the loss of tooth structure to maintain VDO. Therefore, VDO should be conservative and should not be changed without careful approach. [(4)]The severity and distribution of tooth wear is normally measured using indices, which record the change in shape on teeth which is irrespective of the etiology.[(2)]

Tooth erosion prevalence in the younger population has raised concern in the dental community.The nature of tooth erosion is related to the presence of non-bacterial acids in the oral environment. Acids could stem from extrinsic sources – such as food, drinks or gases from the environment – or intrinsic sources – due to gastric acid (hydrochloric acid) presence. Frequencies of consumption, time in contact with the acid and unusual patterns of consumption are also considered relevant factors influencing the erosive effect. Notwithstanding such reports showing an association between erosion and specific dietary habits, other studies have failed to find such a relationship.[5] This information will enable professionals and public health personnel to establish methods and develop preventive strategies for the passive management of tooth wear. [3]

II. Aim of the study

This study was to estimate the prevalence of tooth wear in the adult population of Jeddah and to investigate the factors associated with such tooth wear.

III. Methodology

Seven hundred and fifty adult patients wereexamined in the clinic of Batterjee Medical College by invited them to take this study. Clinical oral examinations of the patients were performed by using a disposable dental diagnostic kit, under standard illumination from dental operating light[6] . The patients gave their information consent for the use of their data and was willing to answer a questionnaire and would gave them educational brochure regarding wear in dentistry.Theincisal/occlusal surface of all teeth was score according to the criteria which were based on TWI tooth wear index: B= buccal: L=lingual O=occlusal: I=incisal[7],this TWI is the comprehensive system in which all four-visible surface (buccal-cervical-lingual-and occlusal/incisal) of all teeth present were scoring for wear. The third molar and restoration or caries teeth excluded from the analysis. All teeth weredivided into four groups: the incisor, canine, premolar and molar groups. The incisor group included the central and lateral incisor of maxilla and mandible; the canine group included the canine of maxilla and mandible; the premolar group included the first and second premolars of maxilla and mandible; the molar group included the first and second molars of maxilla and mandible. Scores of 0-4 were assigned to the teeth, according to the severity of wear. [3]

IV. Questionnaire

Following the clinical examination, a self-administered questionnaire wascompleted, by the patient. In order to complete the questionnaire, the roommates or family members of the patients was asked to help with the questionnaires involving in bruxism, the consumption of hard or acidic foods and others. Six questions (Table:1) according to Liu et al [3], was completedby the patient by chose one from the following answers mostly; 'sometimes' or 'never.

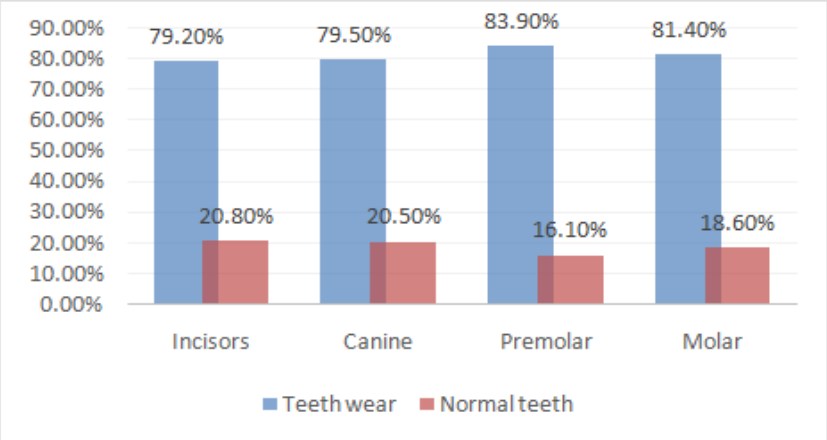
Table 1: Patient Questionnaire

Questions	Mostly	Sometimes	Never
Q1: Do you often make tooth grinding sounds during sleep? Q2: Do you favor the consumption of hard or acidic foods? Q3: Does your work environment involves dust or acid gas? Q4: Do you have parafunctional activity, such as clenching or grinding your teeth? Q5: Do you suffer from the clicking of the temporomandibular joint? Q6: Do you suffer from acid reflux?			

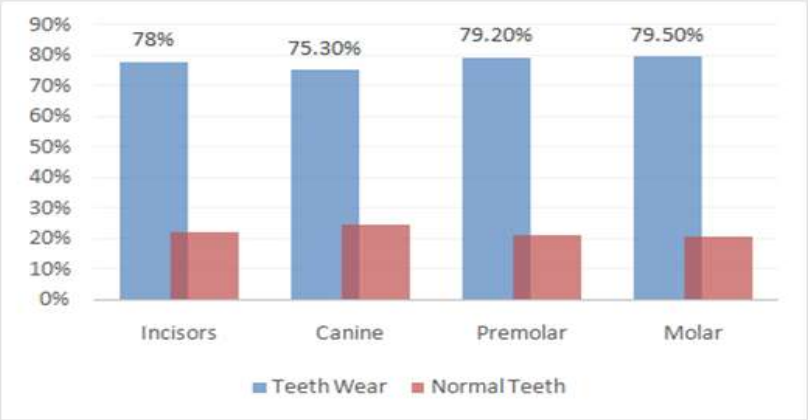
V. Results

This study was done on patients (47.2% males and 52.8% females) with tooth wear, aged 18-69 years (mean 33.1 ± 11.37 SD).There was no significant difference in the severity of tooth wear mean score between males (mean score 1,23) and females (mean score 1.17) (p=0.099 >0.05). according to the age from 35 to 69 years, was found significant increase in the severity of tooth wear than 18 to 34 respectively (mean 1.5± 0.52 SD) and (mean 0.99 ± 0.49 SD), (p= 0.000< 0.05).The prevalence rates of tooth wear were calculated. In the maxilla, the rate varied from 79.2% for incisor group, 79.5% for canine group, 83.9% for premolar group, and 81.4% for molar group (Fig:1) while In the mandible, the rates were 78% for incisor group, 75.3% for canine group, 79.2% for premolar group, and 79.5% for molar group(Fig:2). Among these groups, no significant difference was observed regarding their tooth wear prevalence, either the maxillary (p value 10.9% > 5%) or the mandibular groups (p value 21.8% > 5%).

Figure1: Maxillary Groups Teeth Wear



Figer2: Mandibular Group Teeth Wear



The tooth wear severity was also measured. IN the maxillary, there were significant increases in tooth wear severity between the canine and the incisor group (p= 0.000< 0.05), and also between the premolar and molar (p= 0.000 <0.05) groups. but there was no significant increase in the severity of tooth wear between incisor and premolar (p=0.53 >0.05)) or molar group (p=041 >0.05), also no significant differences were observed between premolar and molar groups (p 0.84 > 0.05). (Table:2) and (Figure:3)

Table2: Tooth wear severity in maxillary group

Groups	Incisors	Canine	Premolar	Molar
Number (%)	712 (94.9%)	713 (95%)	694 (92.5%)	629 (83.9%)
Mean Score	1.19 ± 0.92	1.36 ± 0.97	1.16 ± 0.78	1.15 ± 0.82
Distribution	0-4	0-4	0-4	0-4

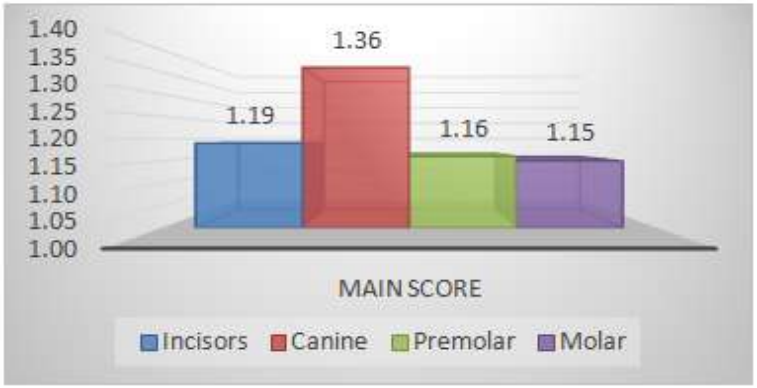


Figure3: Tooth wear severity in maxillary group

In the mandibular the wear severity of the canine group exhibited significant than other groups while the wear severity in premolar (mean 1.02) was equal to molar group (mean 1.05) (p 0.48 > 0.05). (Table:3) (Figure:4)

Table3: Tooth wear severity in mandibular group:-

Groups	Incisors	Canine	Premolar	Molar
Number (%)	731 (97.5%)	720 (96%)	710 (94.6%)	591 (78.8%)
Mean Score	1.20 ± 0.90	1.33 ± 1.08	1.02 ± 0.7	1.05 ± 0.72
Distribution	0-4	0-4	0-3	0-3

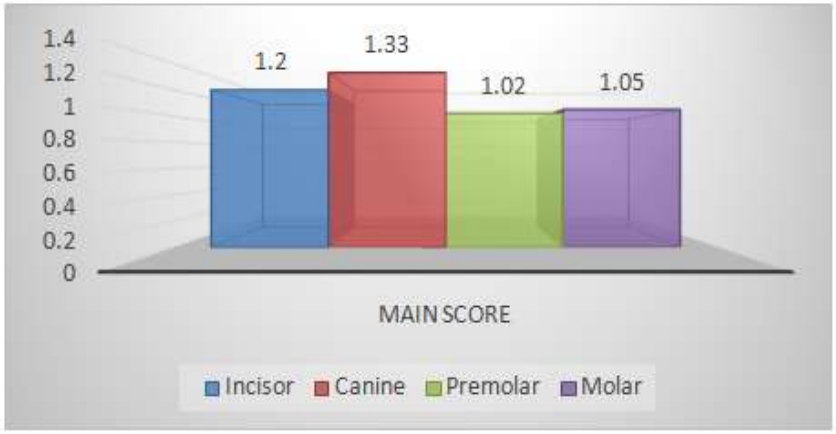


Figure 4 : Tooth wear severity in mandibular group

Regarding patients questionnaire. We noted that consumption of hard or acidic foods (40.7%) and habits of clenching or grinding teeth (34.8%) are the top 2 factors which may be responsible for tooth wear. Table:4

Table:4 Questionnaire results:

No	Questionnaire items	Mostly	Sometimes	Never
1	Do you often make tooth grinding sounds during sleep (confirmed by roommate or family member)?	1.3	2.8	95.9
2	Do you favor the consumption of hard or acidic foods?	33.6	7.1	59.3
3	Does your work environment involve dust or acid gas?	2.1	4	93.9
4	Do you have parafunctional activity such as clenching or grinding your teeth?	29.6	5.2	65.2
5	Do you suffer from clicking of temporomandibular joint?	19.7	7.1	73.2
6	Do you suffer from acid reflux?	5.7	0	94.3

The hard or acidic foods was significantly associated with tooth wear (p = 0.000 < 0.05), the odds ratio was 2.79, which means that consumption of hard or acidic foods increased the chance of tooth wear by 279% (95% confidence intervals 191 – 406%).Also, the parafunctional activity such as clenching or grinding teeth was significantly associated with tooth wear (p = 0.000 < 0.05), the odds ratio is 2.82, which means that the habits of clenching or grinding teeth increased the chance of tooth wear by 282% (95% confidence intervals 189 – 419%).

VI. Discussion

Tooth wear is a clinical problem that is becoming increasingly important in the aging population due to the increase in dental awareness and interest in retaining natural teeth. Tooth wear is multi factorial in developed countries; the prevalence of tooth wear is on the rise, which could be due to changes in dietary patterns, and oral habits.Bruxism is thought to affect 5-20% of the normal population, it is associated with tooth wear. Pavone[(8)] noted that abnormal clenching and grinding habits produced unusual wear patterns of occlusal surfaces. Christensen[(9)] showed that people who displayed bruxism could experience up to four times more tooth wear than those without this habit. The study found wear was affected by eating habits, bruxism, and joint disease than parafunctional activity. It was found that the preference for hard or acidic food had the greatest effect on tooth wear[(3)].The odds ratio was 2.79, which means that consumption of hard or acidic foods were increasing the chance of tooth wear by 279%. Also, the Parafunctionalactivity such as clenching or grinding teeth was significantly associated with tooth wear. The odds ratio was 2.82, which means that the habits of clenching or grinding teeth were increasing the chance of tooth wear by 282%. There was no significant difference in the severity of tooth wear mean score between males and females. Patients below 18 or above 69 were excluded because they may affect the final outcome of the data Van'tSpijker et al [(10)] showed the percentage of adult patients presenting with severe tooth wear increased in elderly.

Regarding patients questionnaire, study noted that the consumption of hard or acidic foods (40.7%) and habits of clenching or grinding teeth (34.8%) are the most two factors which may be responsible for tooth wear This finding may indicate that softened enamel is highly unstable and that it can be easily removed by short and relatively gentle physical action. Therefore, the chewing of acidic foods with a stronger bite force might cause enhanced tooth wear. In this study, incisors and canines showed greater wear than molars. The canine and incisor teeth displayed a stronger increase in the severity of wear than did the molar and premolar teeth, with mean wear scores that indicated a loss of enamel and a substantial loss of dentin on the incisal surfaces of these teeth[(11)].The result was agreement with Haddiadinetal[(6)] and liuetal [(3)]

The reasons for this higher degree of wear observed in the incisors and canines may due to the enamel of incisors is thinner, incisors are smaller and the active role of incisors and canines in both masticatory and excursive jaw movements during function and parafunction, The hard or acidic foods was significantly associated with tooth wear ($p = 0.000 < 0.05$), the odds ratio was 2.79, which means that consumption of hard or acidic foods increased the chance of tooth wear by 279% (95% confidence intervals 191 – 406%). Also, the parafunctional activity such as clenching or grinding teeth was significantly associated with tooth wear ($p = 0.000 < 0.05$), the odds ratio is 2.82, which means that the habits of clenching or grinding teeth increased the chance of tooth wear by 282% (95% confidence intervals 189 – 419%).

VII. Conclusion

With the limitation in this study, No difference in teeth wear between male and female, but it is increase by age. The canine exhibit greater wear, there is a relation between tooth wear and dietary patterns like hard and acidic food.The teeth wear are increase by age. The data support an association between tooth wear and dietary patterns like hard and acidic food.

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