وزارة التعليم العالي والبحث العلمي

جامعة بابل

كلية طب الاسنان

Teeth Wear & Nutrition

إشراف

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بسم الله الرحمن الرحيم

﴿ نَرْفَعُ دَرَجاتٍ مَنْ نَشَاءُ وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ ﴾

صدق الله العلي العظيم

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إهداء

إلى شمعة الدرب، الأصل والسند إلى من تعب لنرتاح أمي وأبي الغاليان.

إلى أساتذتنا الأعزاء الذين لم يدّخروا جهدًا في إيصال رسالتهم.

إلى اخوتي وأخواتي من عائلتي وأصدقائي.

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الباحثون

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Teeth wear and nutrition

Abstract

Objective: The association of acidic foods and drinks to the development of erosive tooth

wear was investigated in children aged 6–15 years.

Method: a sample consist of 170 patient that come to college of dentistry in Babylon city. A tooth wear index was examined who had a mean age of 9.89 years (SD 0.1) and of which 53% were female and 47% males and also asked participant about current and historical dietary habits. Data were analyzed at the tooth level using odds ratio.

Results: Tooth wear was statistically significantly associated to acidic foods and drinks with

high acidity and dietary habits, including drinking from a glass and holding drinks, Prevalence of teeth wear of total sample is 30%. The most tooth effected by teeth wear was maxillary right canine and its percentage was 15 %.

Conclusion: In this sample , tooth wear was associated to a number of acidic dietary products and drinking habits

INTRODUCTION

Data suggest that the prevalence of tooth wear in children is common.[1–5] A previous study, on the prevalence of tooth wear on adults reported that some degree of tooth wear on enamel was universal and that the percentage of surfaces with dentine exposed was 5.3%.[6] A systematic review in adults reported that prevalence of tooth wear increases with age but there was insufficient data to indicate whether this increase was a result of specific factors or if it reflected the ageing process.[7]

The role of acidic foods and drinks is probably important to the progression of tooth wear. There is a considerable body of evidence from laboratory

studies to indicate that low pH acidic foods and drinks cause erosion of enamel and dentine.8–10

However, the clinical evidence is less convincing. Most studies on children and adolescents support the finding that acidic foods and drinks cause erosive tooth wear11,12 but comparatively few have assessed these risk factors in adults.12–14 Other recognized risk factors are reported to be gastric acids presenting as regurgitation or vomiting with one small adult study reporting the relationship on 109 adults.15

There is some disagreement on what term to use for wear on teeth and this varies to some extent upon the interpretation of clinical definitions.16 In only a few patients a specific causative factor can be identified whereas in most the contribution from erosion, attrition or abrasion is combined to some extent to produce the wear. For this reason the term tooth wear is preferred. The most common method of determining dietary behavior in large studies is through validated questionnaires. The aim of this study was to investigate known risk factors in tooth wear in a convenience sample of patient come Babylon dentistry.

Diet analysis and advice for patients with tooth wear is potentially the most logical intervention to arrest attrition, erosion and abrasion. It is saliva that protects the teeth against corrosion by the acids which soften enamel and make it susceptible to wear. Thus the lifestyles and diet of patients at risk need to be analyzed for sources of acid and reasons for lost salivary protection. Medical conditions which put patients at risk of tooth wear are principally: asthma, bulimia nervosa, caffeine addiction, diabetes mellitus, exercise dehydration, functional depression, gastroesophageal reflux in

alcoholism, hypertension and syndromes with salivary hypofunction. The sources of acid are various, but loss of salivary protection is the common theme. In healthy persons, soft drinks are the main source of acid, and exercise dehydration the main reason for loss of salivary protection.

Tooth wear

Tooth wear resulted from interactions between their course, abrasive diet and their robust occlusal movements[1]. Their lesions were wear facets, both occlusal, and approximally[8]. Cervi- cal lesions were rare. The majority of the population retained functioning dentitions into old age despite remarkable degrees of physiological attrition from their diets[9]. Dentinal sclerosis prevented pulp pathology.

In contrast, the anatomical lesions on the teeth clinically termed attrition, erosion and abrasion, result from microscopic interactions between oral acids corroding and softening tooth surfaces least protected by serous saliva[10]. Occlusal lesions are either wear facets at sites of tooth-to-tooth contact (attrition); or cusps hollowed out by the cupped lesions of erosion[11]. a proximal attrition is not found.

Cervical erosions develop in association with either form of occlusal pathology[12]. These are, most commonly, shallow; but grooved and wedge-shaped forms implicate tooth brushing secondarily (abrasion). mear exposures and frank exposures of the pulp are found in 12 per cent of cases of excessive wear in contemporary Australians[13].

Materials and Methods

A convenience sample of adults, aged 6–15 years old, were examined in patient come to college of dentistry in Babylon city. Subjects were asked to participate and then taken to a dental chair which was located in dentistry college to record the prevalence of tooth wear using a modified index (erosion teeth wear). The results of the prevalence and reproducibility of the scoring system have been previously reported and this paper presents a comparison of the prevalence data to the results from a dietary analyzed conducted on the same group. The teeth wear index, wear on the cervical, buccal, incisal/occlusal and palatal/ lingual surfaces of each tooth and each tooth was given a score separately for wear on enamel and then on dentine (Table 2).

The prevalence of wear was 30% of total sample

Three previously trained and calibrated examiners, using index, recorded the tooth wear for all participants under good lighting which followed thorough drying.

During the same visit as the prevalence study participant's completed a previously validated questionnaire containing 50 questions about current and historical dietary habits.3
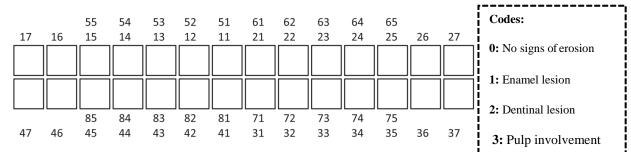
Examples of the questions are shown in Table 2. The questions targeted specific dietary acids and targeted the frequency of consumption. The interviewer asked the participant's to answer each question with the appropriate response to each food and drink and the frequency of any medical factors (over 3 times per day, 2–3 times per day, once a day, less than once a day, less than once a week, never). An additional section of

questions asked participant's to reflect whether their diet had recently changed over the past 2 months. When the participants expressed doubt or needed further information about a particular question the information was explained in more detail by the researcher. In addition, participant's answered questions on frequency and severity of dentine sensitivity measured as an ordinal scale. The questionnaire was designed to be computer readable and all answers from the respondents were collected using this digital system.

Dietary analysis:

Frequency of food/ drink intake						
Type of food or drink/ frequency	Several times a day	Once a day	Several times a week	Once a week	Several times a month	Never
Fresh fruits (apples, oranges, grapes, …)						
Pastries (Cakes, biscuits, …) or food containing sugar						
Cola, lemonade, orangeade, orange juice, lemon juice, fruit juice						
Drinks with sugar						

Table 2 Dental erosion severity:

Codes:

0: No signs of erosion

1: Enamel lesion

2: Dentinal lesion

3: Pulp involvement

Result

Total sample consist from 170 patient at age 6-15. About 112 patient in age 6-10 years old and 58 patient at age 11-15 years old.47% patient were male and 53% patient were female as seen in table 1.

Table 1: distribution of total sample by age and gender

gender	number	percentage	age	number	Percentage
Male	80	47%	6-10	112	65%
female	90	53%	11-15	58	35%
total	170	100%	total	170	100%

Prevalence of teeth wear of total sample is 30%. In male 13% and in female is 17% as seen in table 2.

The number and percentage of teeth wear in each teeth in mandibular arch seen in table 3. The most tooth effected by teeth wear was mandibular left canine and its percentage was 7 %.

The table 4 describe The number and percentage of teeth wear in each teeth in maxillary arch. The most tooth effected by teeth wear was maxillary right canine and its percentage was 15 %.

The table 5 describe percentage of Frequency of food/ drink intake of children after answer the question about frequency and type of food that had ate and drink.

Table 2: prevalence of teeth wear

Teeth wear	Prevalence
male	13%
female	17%
total	30%

Table 3: teeth wear of mandibular teeth

teeth	Number of teeth wear	Percentage
47	0	0%
46	2	1%
85/45	10	5%
84/44	11	6%
83/43	12	7%
82/42	5	2.90%
81/41	4	2.30%
71/31	3	1.70%
72/32	6	3.50%
73/33	12	7%
74/34	10	5%
75/35	10	5%
36	5	2.90%
37	5	2.90%

Table 4: teeth wear of maxillary teeth

teeth	Number of teeth wear	Percentage
17	1	0.50%
16	2	1%
55/15	11	6.40%
54/14	20	11%
53/13	26	15%
52/12	20	11%
51/11	18	10%
61/21	20	11%
62/22	23	13%
63/23	14	8.20%
64/24	18	10%
65/25	11	6.40%
26	3	1.70%
27	0	0%

Table 5: percentage of Frequency of food/ drink intake

Frequency of food/ drink intake						
Type of food or drink/ frequency	Several times a day	Once a day	Several times a week	Once a week	Several times a month	Never
Fresh fruits (apples, oranges, grapes, …)	36%	58%	4%	2%		
Pastries (Cakes, biscuits, …) or food containing sugar	58%	12%	22%	6%		2%
Cola, lemonade, orangeade, orange juice, lemon juice, fruit juice	54%	34%	10%	2%		
Drinks with sugar	50%	38%	2%	2%		8%

Discussion

This study reports the results of a questionnaire conducted on a convenience sample of patient that come to college of dentistry in Babylon city.

Therefore this data presents results from a generalized group of children subjects.

The data were very complex considering the number of subjects and the questions asked. When the data were analyzed there were different patterns of wear observed in enamel and dentine and this complicated the statistical analysis. For enamel, most data were positive and above 1

whereas for dentine most data were zero. Although wear of enamel was universal at grade 1 comparatively few had more severe levels. Most of the associations particularly involving those foods and drinks with a high titratable acidity. These relationships also give some indication of the association between the dietary intake and the surface at which the tooth wear developed. The intake of both apples and other fruit showed a strong association with tooth wear in dentine and as such the results support the clinical suspicion and laboratory findings that dietary foods and drinks with a higher titratable acidity cause tooth wear.19. Other studies, in younger age groups, have also reported 2 and emphasises that dietary advice should be targeted to strong acids rather than some of the commonly consumed beverages.

Questionnaires provide an estimate of dietary behavior.

No method is ideal nor is absolutely accurate but asking subjects to record their diet against objective criteria gives reasonably accurate data. The

questionnaire had been used in another study3 and had been tested on a pilot group to ensure understanding and ease of reading. Therefore, the questionnaire was felt to be reasonably reliable. The present study unlike previous ones questioned in more detail the type of acidic food and drink intake and attempted to investigate any effect on a recent change to their dietary behavior.

58% of children eat Pastries (Cakes, biscuits,…) or food containing sugar and 50% of children had Drinks with sugar and 54% of children drink Cola, lemonade, orangeade, orange juice, lemon juice, fruit juice so lead to 30% prevalence of teeth wear .They suggested that there may be interactions between acidic foods and drinks resulting in a cumulative effect on dental erosion. However, the data were very complex with all enamel surfaces recording above 1 and only a relatively small percentage registered above one in dentine. The data from the questionnaires remained the same.

There is mounting evidence that although the underlying acidic nature of a food or drink is important it is the frequency of consumption that is the most important aspect in the development of tooth wear.20,21 The method used in this study, which assessed erosive potential by using frequency of consumption, adds considerable support to this finding.

 In addition, drinking habits, in particular an admission of swilling drinks prior to swallowing, had particularly high associated with teeth wear. . So drinking methods appeared to influence the development of wear in dentine and enamel and support data from other clinical studies and clinical experience.22

The other major known cause of erosive tooth wear is acid derived from the stomach. Although heartburn is relatively uncommon in young adults it can occur and was the only source of gastric acid seen to have an increased teeth wear.23

However, in common with other conditions it was reliant upon self-reporting. There is robust evidence to suggest that gastric acids can cause erosion and the finding in this group is an important factor in tooth wear.24,25. consumption of apples, fruit based drinks and heartburn , These foods are strongly acidic which might lead to early dentine exposure and is consistent with clinical experience.

However, the distinction used here with daily events limiting the response is a useful one and shows that in this cohort with a number of risks factors showing associations with tooth wear that sensitivity is prevalent.28

In time the reliance on indices to estimate the prevalence of tooth wear in a given community will reduce as scanning techniques become faster and more patient-friendly. Until that happens, the only convenience method to assess tooth wear in large populations is using an index. Although the coding of these indices are challenging most have produced reasonable reproducibility but as new method evolve more quantitative measuring systems using scanner or profilers will supersede index's.29–32

Whether some of the associations observed in this group would be found in a more representative one is not possible to predict but the finding that strong acids, either from the diet or the stomach, have stronger associations with tooth wear is consistent with current clinical thinking. Despite these challenges the numbers of subjects, their selection from children provided a

reasonably representative of all children. The results confirm previous clinical observations and add to our understanding of tooth wear and provide further evidence that drinking behavior and the consumption of foods with strong acidity are important factors in the development of tooth wear.

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