

EFFECT OF DRIED ROASTED SEEDS ON TOOTH SURFACE LOSS

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ABSTRACT

The aim of the study was to evaluate factors involved in tooth surface loss due to consumption of dried-roasted seeds.

Data of tooth surface loss were collected from a group of 141 patients by clinical examination, interview and by getting the questionnaire regarding dietary factors, oral hygiene practices and pregnancy (for women) filled.

No significant differences in tooth surface loss were found for patients with medical conditions. Tooth Surface Loss in all anterior teeth was related to age, vomiting and bruxism. Consumption of dried-roasted seeds resulted in significantly higher scores of Tooth Surface Loss in upper and lower central incisors and canines.

It was concluded that the most important factors in Tooth Surface Loss were age, vomiting bruxism. Watermelon seeds have significant effect on the levels of tooth surface loss in central incisors and canine teeth.

Key words: Dried-roasted seeds, tooth surface loss

INTRODUCTION

Tooth Surface Loss (TSL) (Figure 1) is a complex phenomenon characterized by the loss of hard tooth structure at various locations of the teeth usually due to more than one factor. This term will be used throughout this paper to describe the pathological, non-carious loss of tooth tissue. Although caries and periodontal diseases can be controlled with appropriate education and professional support, the dental profession does not seem to have reached a consensus on the action needed in cases of tooth surface loss.¹ The option of avoiding causes of TSL remain a valid option.

Attritional TSL can be significant in patients consuming coarse, abrasive (vegetarian) diet.² The con-

sumption of dried roasted edible seeds (watermelon, pumpkin and sunflower seeds (Figure 2) is popular in some of the Middle Eastern countries and can be considered perhaps as a parafunctional eating habit that involves predominantly a protrusive mandibular movement.

The most popular of these seeds are watermelon seeds (WMS) (from the plant *Citrullus lanatus*, family Cucurbitaceae). This habit is considered a social habit whereby the seeds are consumed in social gatherings as a time out or to relieve stress. On the other hand, the increasingly demonstrated beneficial health effects³, have contributed to the increasing popularity of this habit within the Arabic populations. The seeds are placed between the incisal edges of upper and lower

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anterior teeth and sufficient biting force is exerted to open the seed so the inside core can be eaten. The splitting (compressive) force of the seed, the hardness and abrasiveness of the seed's shell are directly related to the degree of incisal abrasion.⁴ The placement of seeds between incisor teeth onto the incisal edges results in variable amounts of abrasion in the form of notching of those edges. There have been little work in the literature to describe the adverse dental effects of consumption of dried roasted seeds.⁴⁻⁶ The aim of the current study was to evaluate the prevalence of TSL resulting from the consumption of these seeds.

Tooth Surface Loss indices are a method of measuring and quantifying TSL.⁷ The earliest documented index was suggested as early as 1879.⁸ One of the most popular indices is that of Smith and Knight.⁹ The index was reported to be the first to measure and monitor multifactorial tooth wear. The index enables the measurement of Tooth Surface Loss at all exposed tooth surfaces.

METHODOLOGY

Subjects recruited for this study were patients attending Al-Hussein Medical Complex for various dental and oral complaints such as pain, dental caries, follow up and other reasons.

This study was undertaken by directly interviewing the patient and carrying out a clinical examination. The purpose of this study was explained to each patient and a consent was obtained at the beginning of the interview. A questionnaire was prepared by one clinician (the first author) who interviewed all patients individually. Then the same clinician conducted a thorough clinical examination.

Beside general information of name, age, gender, hobbies (swimming), eating reflux, anorexia, stress and vomiting, the questionnaire collected data regarding dietary factors (fizzy drinks, orange, grape, apple, pickle, lemon coffee and tea consumption), smoking, oral hygiene practices and pregnancies (for women). The frequency of smoking, oral hygiene practices, consumption of each dietary element were also recorded along with the number of pregnancies.

The clinical examination was aimed at assessing the degree of tooth surface loss. Tooth surface loss were registered at each surface of the upper and lower teeth excluding second and third molar teeth. The criteria adopted for scoring tooth surface loss were those proposed by Smith and Knight (1984).⁹ These criteria describe tooth surface loss at each surface of the tooth individually (Table 1). The teeth with highest

scores for a given surface calculated as the sum of the scores for that specific surface of a given tooth for all patients were kept and utilized in this study. On the other hand the lowest scores were not considered.

Statistical Package for Social Sciences (SPSS) was used to apply statistical tests of significance between different groups.

RESULTS

The total number of patients included in this study was 141, with 74 males and 67 females with age range of 15–70 years. Based on cumulative sum for all patients' scores of tooth surface loss, highest tooth surface loss were of incisal surfaces of upper and lower anterior teeth and occlusal surfaces of upper and lower first molar teeth. TSL scores for premolar teeth were the lowest. Moreover, TSL scores of anterior teeth and first molar teeth at the other surfaces were very low in comparison with the incisal and occlusal scores for those teeth. Only TSL scores of incisal edges and tips and occlusal surfaces of teeth were addressed.

Tooth surface loss scores were higher in males, but the differences were not statistically significant ($P=0.4$). Forty six patients reported suffering from at least one systemic disease. The most reported diseases were diabetes and hypertension. Only six patients reported dry mouth, one patient had anorexia, 17 patients gave history of vomiting. Scores of tooth surface loss were not significantly different for patients with or without hypertensin, diabetese, drypnouth ($p>0.05$). Based on the values of tooth surface loss of anteriors and first molar teeth, the following factors did not have any effect on the TSL scores: sex ($p=0.7$), pregnancy ($p=0.86$), fizzy drinks (0.92), orange consumption (0.75), grape eating (0.32), apple consumption (0.096), pickle consumption (0.077), alcohol (0.556), lemon eating (0.12), method of smoking (no smoking, cigarettes smoking, narghile smoking) (0.14). On the other hand, the following factors showed significant influence on TSL scores; vomiting (0.013), brushing (0.013), bruxism (0.000), consumption of dried-roasted seeds (0.21).

17 (12.1%) subjects gave history of vomiting, 120 (85.1%) regularly consumed fizzy drinks, 73 (51.8%) subjects reported regular consumption of orange and/or orange juice, 31 (22%) subjects gave history of regular eating of grapes, 49 (34.8%) were regularly eating apples or drinking apple juice, 60 (42.3%) of regularly eating pickles, 11 (7.8%) were regularly drinking alcohol, 34 (24.1%) reported regular drinking of lemon juice or eating lemon. 120 (85.1%) subjects reported regular tooth brushing at least once daily,

33 (23.4%) subjects gave history of bruxism and 80 (56.7%) subjects reported regular eating of dried-roasted seeds.

TSL scores were compared for subjects in their: teens (n=3), twenties (n=16), thirties (n=38), forties (n=40), fifties (n=25), sixties (n=17) and seventies (n=3). As age increased, mean TSL scores increased. Statistical analysis indicated highly significant differences ($p=0.000$).

When the incisal / occlusal surfaces of anterior teeth and first molar teeth were considered, regression analysis indicated that: age, vomiting and bruxism

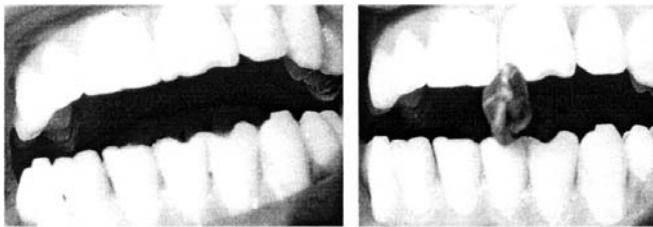


Fig 1: Left: Typical notching of incisor teeth as a result of dried seeds consumption, right: a sunflower seed fits the notches of incisal edges of upper and lower left first incisor teeth.



Fig 2: Examples of dried-roasted seeds. Top row: pumpkin or squash seeds, middle row: examples of watermelon seeds, bottom row: sunflower seeds.

were the most important factors resulting in TSL ($p=0.000$, 0.047 and 0.000 respectively).

Similarly, when only the incisal edges and tips of upper and lower anterior teeth were considered, regression analysis indicated that age, vomiting and bruxism were the most important factors resulting in TSL ($P=0.000$, 0.026 and 0.000 respectively). However, when only occlusal surfaces of first molar teeth were considered, regression analysis indicated that age and lemon were the most important factors resulting in TSL ($p=0.049$ and 0.046 respectively).

Out of 141 patients included in this study, 81 (57.4%) reported they were regular watermelon seeds eaters. When the incisal edges and tips of the individual upper and lower anterior teeth were considered, consumption of dried-roasted seeds showed significant

TABLE 1: CRITERIA FOR THE "TOOTH WEAR INDEX" AS PROPOSED BY SMITH AND KNIGHT

Score	Surface	Criteria
0	B/L/O/1 C	No loss of enamel surface characteristics. No loss of contour
1	B/L/O/1 C	Loss of enamel surface characteristics. Minimal loss of contour
2	B/L/O/1 C	Loss of enamel exposing dentine for less than one third of surface. Loss of enamel just exposing dentine for less than one third of surface. Loss of enamel just exposing dentine. Defect less than 1 mm deep.
3	B/L/O/1 C	Loss of enamel exposing dentine for less than one third of surface. Loss of enamel and substantial loss of dentine. Defect less than 1-2 mm deep.
4	B/L/O/1 C	Complete enamel loss-pulp exposure-secondary dentine exposure. Pulp exposure or exposure of secondary dentine. Defect more than 2 mm deep-pulp exposure-secondary dentine exposure

TABLE 2: EFFECT OF CONSUMPTION OF DRIED-ROASTED SEEDS ON TSL OF ANTERIOR TEETH

	Total upper centrals	Total lower centrals	Total all centrals	Total upper laterals	Total lower laterals	Total all laterals	Total upper canines	Total lower canines	Total all canines
Mann-Whitney U	1875.5	1838.0	1776.5	2149.5	2168.0	2119.5	2045.5	2032.5	1944.5
Wilcoxon W	3766.5	3729.0	3667.5	4040.5	4059.0	4010.5	5285.5	5272.5	5184.5
Z	-2.396	-2.565	-2.786	-1.237	-1.159	-1.344	-1.679	-1.745	-2.083
Asymp. Sig. (2-tailed)	.017	.010	.005	.216	.246	.179	.093	.081	.037

effect on scores of TSL of upper centrals, lower centrals and all canines (Table 2).

Only 3 patients reported dry mouth while 6 patients reported gastric reflux disease. Only one patient reported anorexia. Seventeen gave a history of vomiting. Forty six females reported previous pregnancies.

The value of tooth surface loss for the patient with anorexia was found to be significantly different to the scores of tooth surface loss for all the other patients ($P=0.000$) as determined by the one sample t-test.

DISCUSSION

Many researchers attempted to quantify tooth surface loss⁹⁻¹⁰ using different indices. Some indices focused on enamel loss, while others focused also on the extent of involvement of dentine.¹¹ Smith and Knight introduced an index for the quantification of tooth surface loss. Their method addresses each tooth surface and is widely used.⁹

When average scores of TSL of anteriors and first molar teeth were considered, consumption of dried-roasted seeds did not show significant effect. However, when the TSL scores of individual teeth were considered, the effect was evident. This is perhaps due to the pattern of damage exerted by the consumption of the seeds. Consumption of dried-roasted seeds is widespread in countries of the Middle East. The habit exists in Jordan, Syria, Iraq, Saudi Arabia, Lebanon and Egypt among other countries. In these countries, dried-roasted seeds are sold in the "Nuts shops" that also sell roasted almonds, chickpeas, peanuts, pistachios etc. Dried-roasted seeds are obtained from watermelons, pumpkins, squash and sunflower plant. Usually, salt and / or citric acid are added. Pepper can also be added.

Consumption of dried-roasted seeds is a social habit that takes place at the movies (in much the same way as popcorn is consumed in other countries) or during social house visits of friends. This implies that the consumption and the interaction of the seed with the surfaces of natural teeth takes place over extended periods of time. This comes in excess of the 15-20 minutes of masticatory function dedicated for regular meals. Dried-roasted seeds are usually placed between two opposing incisors or canines and a force is applied to break the seed and the core is then eaten. The placement of the seed between the upper and lower occluding surfaces is done while holding the seed with fingers that apply a force against the involved teeth structures. This force along with the chemical effect

exerted from the citric acid or salt coating of the seed onto the tooth structure results in the pathognomonic pattern of abrasion-erosion lesion that occurs.

The lesion appears as a notch extending over the incisal edge (sometimes the incisal tip) of the anterior tooth. The notch is normally of the same size and shape of the seed (Figure 1) and with time it becomes easier to place the seed between the teeth. The occurrence of the notching is bilateral and is normally restricted to anterior teeth indicating that the patient distributes the seeds' eating in the anterior region.

Association of temporomandibular disorders with eating dried-roasted seeds should be investigated as the eating involves excessive mandibular protrusion.

CONCLUSIONS

Highest TSL scores are encountered on incisal / occlusal surfaces of anteriors and first molar teeth. The most important factors affecting TSL at incisal surfaces of anterior teeth are age, vomiting and bruxism. The most important factor affecting TSL at occlusal surfaces of first molar teeth are age and lemon. Consumption of dried-roasted seed results in significant TSL on incisal edges / tips of central incisors and canines.

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