

THE CLINICAL METHODS TO MEASURE TOOTH WEAR
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ABSTRACT

With a greater number of people living longer and tending to retain many natural teeth, the problems associated with tooth wear are likely to place greater demands upon dental professionals in the future. **The aim of the study:** was measuring tooth wear in the ageing dentition. **Material and method:** was selected the subjects in order to provide approximately 80 subjects over the age of 45-50 years, whose age, sex and social characteristics reflected the socio- demographic constitution. The study design and assessment of the level of tooth surface loss using the Tooth Wear Index. **Results and discussions:** Several indices have been produced in recognition of the need to quantify the amount of wear at both an individual and population level. Several attempts have been made to develop an index to measure tooth wear for use at both the individual and population level. A review of these indices is undertaken .

Key words: wear index, tooth abrasion, tooth erosion

INTRODUCTION

Teeth wear can be defined as a gradual loss of dental tough structure due both to repeated physical contacts or chemical dissolve, being also described taking into account three mechanisms: friction, abrasion and erosion. While friction refers to that loss of substance caused by the contact between theopponent or adjacent teeth which appears during functions and parafunctions, abrasion involves the progressive wear of the mineralized tissue caused by mechanical factors, others than the mere interdental contact (1, 9). Erosion describes chemical dissolving of the dental tough substance as a

result of the agents produced by other sources than bacterial ones. These processes will appear during a normal function, and, thus, a certain amount of wear is considered as physiological, being also described as 'psychologic'.

This study tries to emphasize the degree of dental wear quantified by wear indexes.

MATERIAL AND METHOD

The group of study was represented by a number of 80 patients aged between 25-65 years, divided according to age, studies and sex (figure 1).

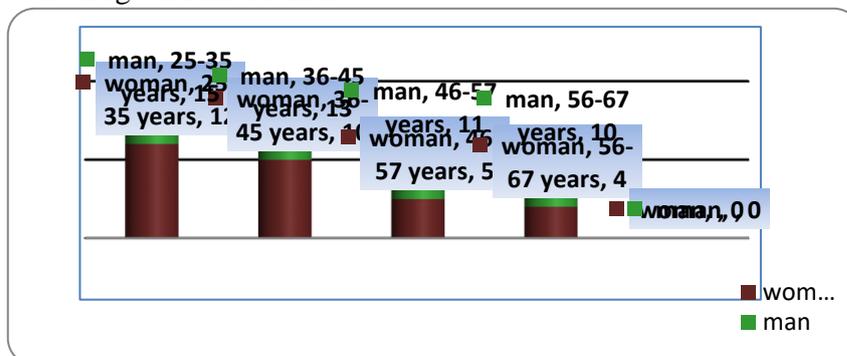


Fig. 1. Distribution of the patients according to age and sex

A medium number of 16 teeth were examined in every patient, so the study has been made on around 1280 teeth, from which almost 385 were healthy.

The local clinical exam, thoroughly made, aimed at detecting different wear lesions, using wear index Smith and Knight (TWI), as well as Richard indexes -0-no attrition, 1-minimal attrition, 2- important flattening, parallel with the occlusion plan, 3-flattening of cusps and fissures, 4- complete loss of the form. For the statistical analysis we used the SPSS program for Windows, variant 15.0, Mann Whitney-U non- parametrical test, the significant level being 0,05.

RESULTS

Analyzing the data, erosion lesions have been identified as having a greater weight, 427 teeth being affected, in comparison with 198 that presented abrasion lesions, 168 with attrition lesions and 102 with abfraction lesions (figure 2)

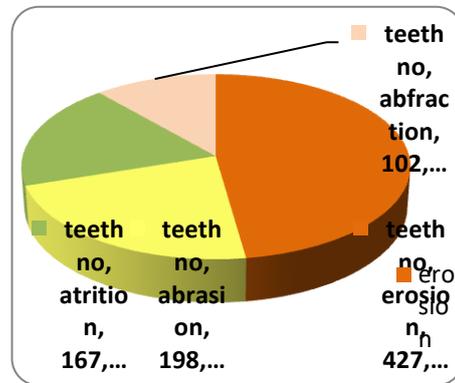


Fig. 2. Distribution of the patients according to wear types

As far as quantifying different types of wear lesions (figure 3), it has been noticed the fact that 337 teeth have a wear index 3 (unlike 167 teeth with index 1, 238 teeth with index 2 and 178 teeth with wear index 4).

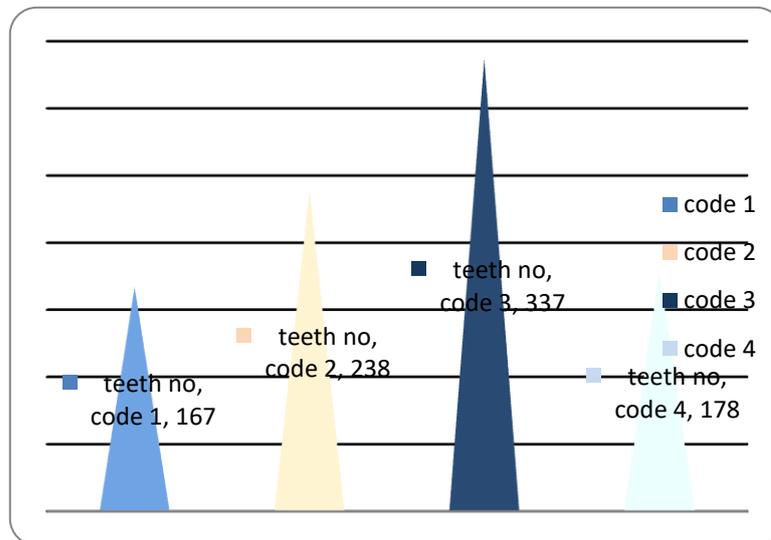


Fig. 2. Distribution of the patients according to wear index (TWI)

Statistically analyzing the frequency of lesions (erosion-abrasion, erosion-attrition, abrasion attrition, using non-parametrical

test Mann Whitney-U, the following results have been obtained (tabel I, tabel II, tabel III):

Table I. Statistically analyzing the frequency of lesions erosion-abrasion

	VAR00001
Mann-Whitney U	38008,500
Wilcoxon W	57709,500
Z	-2,129
Asymp. Sig. (2-tailed)	,033

a. Grupe : Erosion-Abrasion

Ranguri

Lesion type	N	Media rangs	Rank
Erosion	427	322,99	sum 140965,5
Abrasion	198	291,46	57709,5
Total	625		

$P=0,033 < 0,05$ insignificant differences from the statistic point of view

Lesione types	N	Media ranks	Sum ranks
Erosion	427	330,13	140965,50
Attrition	200	279,56	55912,50
Total	627		

Mann-Whitney U	35812,500
Wilcoxon W	55912,500
Z	-3,405
Asymp. Sig. (2-tailed)	,001

Table II. Statistically analyzing the

frequency of lesions erosion-attrition

Statistic test

$P = 0,001 <$ significant differences

Table III. Statistically analyzing the frequency of lesions abrasion- attrition

Ranks			
Lesion type	N	Media ranks	Rank sum
Abrasion	427	255,38	109038,50
Attrition	102	305,38	31148,50
Total	529		

Test Statistics^a

Mann-Whitney U	17660,500
Wilcoxon W	109038,50
Z	-3,130
Asymp. Sig. (2-tailed)	,002

$P=0,002 < 0,05$ significant differences

As long as erosion, attrition and abrasion are difficult to differentiate one from each other in early stages, the lesions having an acid attack are certainly considered and classified over level 1. Therefore, the solutions to

differentiate them are given by their location and morphology. Moreover, for tooth surface the limit between index 1 2 and 3 has been established to 50% dentin affection, as this criterion can be easily evaluated and it is

also safer than smaller assessments. Index 2 from the oral surfaces could be differentiated, in the same way, although especially at the occlusal surface, exact differences are difficult to obtain.

In this study we have tried to find out if there are real differences among certain types of lesions. As $p < 0,05$ confirms the hypothesis that erosion is more frequently met than abrasion, attrition or abfraction-which is induced on one hand by the gastric acid which gets into oral cavity, and, on the other hand as a side effect of administrating of different drugs. The diagnosis is difficult to establish, it has to be as precise as possible, in order to correctly identify the signs of dental wear. Then, using an appropriate evaluation process, an accurate

Some indexes have been also introduced. They allow the investigation of dental-periodontal surfaces and also highlight a series of alterations which support the quantification of dental substance loss. There are indexes which describe morphological alterations as far as to a 7 degree of severity. Even if a scheme of thorough classification will collect minute tissue alterations, at the same time it will diminish the agreement inter and intra-examiner, leading thus to a harder comparison between different studies. Moreover, the use of a certain classification will increase the duration of making a decision for each tooth separately and thus taking a longer time. Therefore, a too deep classification is not the ideal solution for the desired index (5, 6).

However, none of the recent studies highlights statistical data which can establish if the results obtained are valid or not. Many of these presented a variation between the degree and the type of dental wear. In some of the studies the tests were exact while in others the activity and frequency was controlled. Even in these studies the different exogenous and endogenous factors which are often associated with the appearance and the evolution of the dental wear process have altered the results.

Recent studies imply the quantification of dental wear by measuring the weight loss at

understanding of the etiology could be achieved.

DISCUSSIONS

There are a lot of studies that have been done in order to determine the speed, pattern and dental wear degree. They depend, especially, on the quantity of dentin on the occlusal surface (2, 3). An index used to easily evaluate the wear lesions from other abnormalities of the tough dental tissue must :

- distinguish clearly among different levels of strictness;
- to be easily remembered;
- to present a good inter and intra-examine agreement;
- to be precise enough to be able to monitor the alterations on time (4, 7).

the molar level (8, 9). The interpretation of the results is also complex because of the well- defined differences from subject to subject; this occurs as the different characteristics and the composition of saliva and of the enamel can affect the wear process. The PH, the tampon capacity and the phosphate percentage are affected by general diseases (accompanied by gastro-esophagus reflux or by chronical vomiting), also by the type and the ingestion of medicines, by food preferences, etc. Characteristics such as solubility together with the dental morphology are also different and the impact of these characteristics and differences over quality and quantity of tooth wear is not known.

CONCLUSION

Unlike the dental decay or periodontal disease which can be controlled with high rates of success, not the same thing can be said about tooth wear. This is due to the fact that the etiological factor is not clearly defined. This is the one which determines the onset and progress of the lesions. We can suppose that the onset of a lesion due to one factor can induce a susceptibility from a dental structure to the action of other factors (lesion synergism). Theoretically, every type of lesion can be considered a clinical entity with specific characteristics. Clinically however, only one type of lesions cannot be described, because the association of

etiological factors will also determine associations among different types of lesions. The clinical exam offers information regarding the decrease of tough dental

substance which can be responsible for the alteration of the vertical dimension of occlusion as well as of the facial aspect.

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