

## CROSS-SECTIONAL ANALYSIS OF ABRASION IN YOUNG PATIENTS

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**Keywords:** dental wear, young patients

**Abstract:** Objectives: The purpose of the study is to identify the groups, respectively the dental surfaces that are most frequently under the impact of the non-carious and non-traumatic loss of hard substance, as well as its degree in patients 20 to 25 years old. Method: A sample of subjects is selected according to standardized inclusion and exclusion criteria. For each subject, a pair of plaster models is executed; on them, an analysis shall be carried out, according to the Smith-Knight index, relating to the degree of abrasion on the four surfaces; the results shall be summarized in a Microsoft Excel 2007 database. The data obtained are processed through statistical analysis, carried out in a specialized manner with the PASW 18 software. Results: The frequency of wear in young patients is 35.7% and it is present in 33.9% of all the assessed surfaces. One third of the examined surfaces display modifications in the thickness of the enamel tissue or an impact on dentin at various degrees. The most frequent impact is on the maxillary incisors, the canines and the molars; the highest levels of wear are also identified at their level. Conclusions: Increased attention should be paid to the non-carious lack of dental substrate in young patients in order to establish specific rules of prevention.

**Cuvinte cheie:** uzura dentară, pacienți tineri

**Rezumat:** Obiective: Studiul își propune identificarea grupurilor, respectiv a suprafețelor dentare cel mai frecvent afectate de pierderea de substanță dură de etiologie necarioasă și netraumatică, precum și gradul acesteia, la pacienții între 20-25 de ani. Metoda: Se selectează un lot de subiecți după criterii standardizate de includere și excludere. Pentru fiecare subiect se realizează o pereche de modele, pe care se analizează conform indicelui Smith-Night gradul de abraziune pe cele patru suprafețe, rezultatele fiind sintetizate într-o bază de date Microsoft Excel 2007. Datele obținute se prelucrează prin analiză statistică, realizată specializat cu ajutorul programului PASW 18. Rezultate: Frecvența uzurii la pacienții tineri este de 35,7% și apare în 33,9% din totalul suprafețelor evaluate. O treime din suprafețele examinate prezintă modificări în grosimea țesutului enamelar sau interesarea dentinei în grade variabile. Cel mai frecvent sunt afectați incisivii superiori, caninii și molarii, la nivelul lor găsiindu-se și gradele cele mai mari de uzură. Concluzii: Lipsei de substrat dentar de origine necarioasă la pacienții tineri, ar trebui să i se acorde o importanță crescută, în vederea instituirii unor norme de prevenție.

### INTRODUCTION

Given the fact that dental wear is a physiological process that occurs with age, it seems reasonable to accept that, to a certain extent, the structural dental changes on hard dental tissues should be interpreted as a modality of adaptation rather than as pathology. The border between the physiological and the pathological remains, however, roughly sketched, because the etiology of dental deterioration has turned out to be multifactorial, generating polymorphous representations, and the terminology relating to dental wear used in the literature is inconstant.

The process of pathological wear of the teeth is irreversible and it grows more severely on its own, in close interdependence with the occlusal disharmony, with the para-functions, but it may also occur because of incorrect hygiene, with the application of increased force when brushing and with the use of inappropriate toothpaste. The appearance of pathological wear in young adults requires the elaboration of

prevention programs, that should preclude the appearance or hinder the aggravation of the loss of healthy dental structure.

### PURPOSE

The objectives of this study are the identification of the dental groups, of the dental surfaces that are most frequently under the impact of a non-carious loss of hard substance, as well as the analysis of the degree of such a wear in young patients. Furthermore, a comparative analysis of the data obtained in published specialized studies is also taken into account.

### METHODS

- the study of specialized literature in order to identify recent research on this topic – carried out with the End-Note software, in two databases – PubMed and Cochrane, based on the keywords: dental wear, non-carious lesions, prevalence, frequency. From among the results, we chose

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## CLINICAL ASPECTS

the articles published in English, in the last 10 years, approachable in extenso.

for the selected group of patients, a clinical examination is carried out, as well as alginate impressions in standard trays and cast models in type IV gypsum. The degree of wear is measured according to the modified Smith and Knight Index and is assessed on models. Each dental surface is evaluated: vestibular, palatal, occlusal / incisal and cervical on each tooth, assigning a wear code ranging from 0 to 5 and 9. The results are recorded in a Microsoft Excel 2007 database. The interpretation of the data is carried out by a statistician aided by the PAW18 software.

### Patient selection

112 students at the Faculty of Dental Medicine, University of Medicine and Pharmacy "Carol Davila" Bucharest, aged 20 to 24, who reported to the Prosthodontics Clinic in December 2011-March 2012, were examined. For the study, subjects with whole arcades that presented clinical signs of abrasions were selected, the exclusion criteria being represented by the existence at present or in their medical records of an orthodontic treatment or cranial-mandibular disorder.

The group of patients on which the study was carried out included, after the application of the selection criteria, 40 students, 18 female and 22 male.

## RESULTS

From all the existing surfaces, which amounted to 4,726, only 4,610 were evaluated. From among the latter, 1,563 surfaces displayed wear in various degrees ranging from 1 to 3, no surface with wear that could expose the pulp chamber was identified and neither was any surface restored after the loss of dental tissue because of dental wear.

These 1,563 de surfaces mean 33.9% impacted surfaces of the overall assessed surfaces. One third of the surfaces that could be examined show modifications in the thickness of the enamel tissue or an impact on the dentin in various degrees, without exposing the secondary dentin or the pulp chamber.

**Table no. 1. Wear degree frequency in the front teeth**

Surface affected	Maxillary canines (%)			Mandibular canines (%)			Maxillary incisors (%)			Mandibular incisors (%)		
	1	2	3	1	2	3	1	2	3	1	2	3
V	2,81	0	0	5	0	0	5	0,94	0	5,03	0	0
Occ./I	18,13	1,56	0	16,25	1,88	0	13,91	9,53	0	15,57	7,86	0,16
P/L	9,38	0,63	0	1,88	0	0	13,44	4,84	0	2,52	0	0
C	4,69	0	0	5,63	1,25	0	0,78	0,16	0	0,79	0	0

**Table no. 2. Wear degree frequency in lateral teeth**

Surface affected	Maxillary molars (%)			Mandibular molars (%)			Maxillary premolars (%)			Mandibular premolars (%)		
	1	2	3	1	2	3	1	2	3	1	2	3
V	3,93	0,13	0	8,38	0	0	1,89	0	0	3,96	0	0
Occ./I	3,45	4,06	0,63	9,31	10,3	0,8	13,54	3,7	0	15,85	3,96	0,3
P/L	,17	0,3	0	2,13	0	0	1,42	0	0	0,79	0	0
C	,79	0,13	0	1,46	0	0	3,78	1,7	0,31	4,12	1,27	0

## DISCUSSIONS

In our study, from the total number of surfaces assessed, 66% of the surfaces are not at all under the impact of wear. 1,199 displayed incipient lesions in the enamel, which means 26% of the total number of surfaces examined. 348 surfaces, meaning 7.5% of the total surfaces to which scores ranging from 0 to 3 were assigned displayed wear exposing the dentin on less than 1/3. 0.34% displayed severe wear lesions with impact on the dentin on more than 1/3 of its thickness, measures with a wear score of 3.

At the maxillary molars the most affected areas are the occlusal ones with the first two degrees of wear, similar to the mandibular molars, where however the occurrence of dentin islands is even more frequent than the disappearance of the enamel contour. Maxillary premolars show a slight wear degree, most frequently on the occlusal surfaces and at the neck of the tooth. Mandibular premolars are more influenced by wear, both at occlusal and at cervical level, in the enamel like in the dentin tissue as compared to the antagonist group.

Regarding the front group, incisal ridges are the most frequently involved in the wear phenomenon, with an increased weight of the maxillary canines as compared to the mandibular ones, and with a higher involvement of the mandibular incisors as compared to the antagonists. An important impact is also seen in the palatal surfaces of the maxillary canines and incisors. We also emphasize the impact on the vestibular faces of the mandibular incisors in a proportion higher than all the other assessed vestibular faces, but strictly at the level of the enamel. We also note the tooth neck lesions 1% more frequent at the mandibular canines as compared to the maxillary ones.

The wear degree that is assigned a score of 3, as the highest among the patients examined, is most frequently met at the occlusal faces of the maxillary first and second molars, the mandibular premolars and first molars and the lateral incisors.

## CLINICAL ASPECTS

**Table no. 3. Quantitative analysis of the wear surfaces as compared to other studies**

	Surfaces without wear (%)	Incipient wear surfaces(%)	Moderate wear surfaces(%)	Severe wear surfaces/ surfaces restored because of wear(%)	No. of surfaces assessed
Present study	66%	26%	7,5%	0,34%	4.610
Study (1)	73,1%	24,1%	2,46%	0,34%	24.780
Study (2)	66,5%	32,8%	0,7%	-	-
Study (3)	0%	48%	51%	1%	
Study (4)	27%	54%	14%	5 %	68 modele

Wear frequency was identified at 33.9% of the total surfaces evaluated. The 40 patients selected represent 35.7% of the total number of students examined. As compared to other studies, the data on the wear frequency can be classified as below:

**Table no. 4. Comparison of the results of this study with data from equivalent studies**

Study	Wear frequency (%)	No. of subjects (age)	Type of wear studied	The most frequently affected teeth	The most involved surfaces
This study	33.9	40 (22-24 years old)	all	Maxillary incisors Canines Molars	Palatal faces Incisal ridges Occlusal faces
Study (1)	26.9	259 (12 years old)	all	Incisors (53.22%) Canines (50.51%) Molars	Occlusal surfaces Incisal ridges
Study (2)	100(sex M) 20.1%(sex F)	688 (16 years old)	all	Canine group	
Study (3)	32.2% initially 42.8% after 1.5 years	656 (10-12 years old)	all	Mandibular molars Maxillary front	Occlusal surfaces (MV cuspid) Palatal faces
Study (6)	100%	(14 years old)	erosion	Front teeth	Incisal ridges Vestibular faces
Rees (7)			all	Maxillary incisors	Vestibular faces
Sognaes (8)			all	Maxillary incisors	
Radentz et col. (9)		80 subjects aged 17 to 45	abfraction	Maxillary molars Maxillary premolars	Cervical regions

Zipkin and McLure (10)			erosion	Maxillary incisors Maxillary premolars Maxillary first molars	
Pegoraro (11)	52%	48 (16-24 years old)	abfraction		

### CONCLUSIONS

Within the limits of this study, we can conclude that the wear frequency in young patients is 35.7%, most of the surfaces undergoing incipient loss of substance. The teeth most frequently involved are the maxillary incisors, the canines and the molars. Nevertheless, the abrasion of the occlusal surfaces of maxillary first and second molars, of the premolars and of the mandibular first molars, as well as of the lateral incisors (incisal ridges) can have an impact on the enamel, the dentin with the opening of the pulp chamber in young patients. Taking into account these aspects, more attention should be paid to the non-carious absence of dental substrate, in order to institute rules of prevention.

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