

ETIOLOGICAL CORRELATION OF ABRASION AND DENTAL LOCALIZATION IN YOUNG PATIENTS

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Keywords: dental abrasion, risk factors, etiology

Abstract: Objectives: The purpose of the study is to identify dental wear risk factors in the population aged 20 to 25, as well as the possibility to correlate this etiology with the localization of wear mainly at the level of specific dental areas. Method: A standardized sample group of subjects is selected, to whom a questionnaire on the main etiological factors of abrasion included in the literature is administered. 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 statistical analysis, carried out in a specialized manner with the PASW 18 software, shall identify the statistically significant associations between etiology and the occurrence of wear on specific dental groups and surfaces. Results: The etiological factors with statistical significance in the presence of wear on specific dental surfaces are represented by gender, fruit juice, carbonated drinks, vitamin C, iron based preparations, unhealthy habits, excessive teeth brushing, bruxism. Conclusions: The most frequently incriminated factor associated with the occurrence of wear lesions in young patients is represented by the consumption of juice fruit followed by bruxism, but in most of the situations, the subjects display at least 2 risk factors. There are dental surfaces whose wear is associated with specific risk factors.

Cuvinte cheie: abraziune dentară, factori de risc, etiologie

Rezumat: Obiective: Studiul își propune identificarea factorilor de risc ai uzurii dentare la populația cuprinsă între 20-25 de ani și posibilitatea corelării acestei etiologii cu localizarea uzurii, preponderent la nivelul anumitor suprafețe dentare. Material și metodă: Se selectează un lot standardizat de subiecți, cărora li se completează un chestionar, ce conține întrebări referitoare la principalii factori etiologici ai abraziunii, comunicați în literatura de specialitate. 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. Prin analiza statistică, realizată specializat cu ajutorul programului PASW 18, se identifică asocierile statistice semnificative între etiologie și apariția uzurii pe anumite grupe și suprafețe dentare. Rezultate: Factorii etiologici care au prezentat semnificație statistică în manifestarea uzurii pe anumite suprafețe dentare, sunt reprezentați de sex, suc de fructe, băuturi carbogazoase, vitamina C, preparate pe bază de fier, obiceiuri vicioase, periaj excesiv, bruxism. Concluzii: Cel mai frecvent factor incriminat în apariția leziunilor de uzură la pacienții tineri, este reprezentat de consumul de sucuri de fructe, urmat de bruxism, însă în majoritatea cazurilor, subiecții prezintă minim 2 factori de risc. Există suprafețe dentare, a căror uzură se asociază cu anumiți factori de risc.

INTRODUCTION

The etiology of the non-traumatic and non-carious loss of dental tissue described in the literature can be represented by the majority of malfunctions and incorrect practices; at the level of the young population, the development of preventive actions is imperative.

PURPOSE

The purpose of this study is to identify the dental wear risk factors within this segment of population, with a main target on an investigation of the extent to which the frequency and localization of the dental wear areas can be correlated with their etiology.

METHODS

- the study of the specialized literature in order to identify and summarize all the abrasion risk factors described in studies until now, a study to be materialized in the drawing up of a questionnaire filled in by the investigator for each subject selected.

- for each case, the execution of alginate impressions of both arcades, in standard metallic trays; Casting the ultra-hard type IV gypsum models at the level of which the wear degree shall be measured, according to the modified Smith and Knight Index. The assessment of each dental area: vestibular, palatal, occlusal/incisal and cervical, with a wear code ranging from 0 to 5 and 9 assigned to each of them. The results are recorded in a

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Article received on 11.09.2013 and accepted for publication on 06.11.2013
ACTA MEDICA TRANSILVANICA March 2014;2(1):228-230

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Microsoft Excel 2007 database. The statistical interpretation is carried out by a statistician with the PASW 18 software, and the applied test is the Mann-Whitney U test.

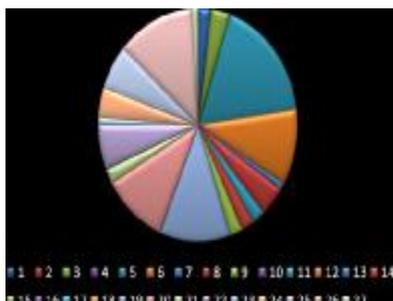
Selection of the patients

We examined 112 students at the Faculty of Dental Medicine who reported to the Clinic of Prosthodontics in the December 2011-March 2012 time interval. The inclusion criteria were represented by: ages between 20 and 30 years (with the wear frequency constantly increasing), the presence of pathological wear at dental level, integral dental arches (integral masticatory field). The exclusion (non-inclusion) criteria were represented by the existence at that time or in their history of any orthodontic treatment and by the presence of a pathology at the level of the temporo-mandibular joint – because we wanted to exclude the etiological overlap of dental wear caused by the occlusal overload generated by the modification of the dental axis or by the antalgic mandibular position. The resulting sample includes 40 subjects – 18 female and 22 male ones.

RESULTS

The questionnaire revealed a weight of each chemical or mechanical etiology that determines wear lesions. The 40 patient included in the study answered affirmatively 96 times, with each of them providing affirmative answers to at least two questions.

Figure no. 1. Number of affirmative answers per question



Relating to the influence of gender on the localization of the wear phenomenon, we identified significant differences of the wear degree among the male population: the incisal ridges of the lateral maxillary incisors ($U=137, z=-2.38, p<0.05$), the incisal ridges of the inferior canines ($U=165, z=-1.96, p<0.05$), the occlusal faces of the maxillary third molars ($occ\ 28\ U=10, z=-2.00, p<0.05$).

Regarding the first question relating to general health disorders, only 2 of the patients suffer from anorexia and 3 gave affirmative answers to the presence of the gastroesophageal reflux disease. Our study did not identify any associated of the wear degree with the presence of any health disorder.

Table no. 1. Statistically significant association between the localization of the abrasion and the consumption of acidic pH drinks

Etiological factor	Most severely worn teeth or group of teeth	Dental area	Statistical indices (U,Z,p)
Consumption of fruit juice	1.1 2.1	Palatal faces	$U=97.5, z=3.03, p<0.05$
Consumption of carbonated drinks	Mandibular first molars Maxillary	Palatal faces Vestibular	$U=84, z=-2.71, p<0.05$

	incisors	faces	U=120, z=-2.48, p<0.05
	Maxillary first premolars	Palatal faces	U=120, z=-2.48, p<0.05

In this study, 42.5% of the subjects admit the frequent consumption of juice fruit and a quarter of these ingest carbonated drinks. Statistically, significant associations were found between the consumption of juice fruit or carbonated drinks and the localization of the lesion.

Table no. 2. Statistically significant association between the localization of the abrasion and the administration of acidic content medication

Etiological factor	Most severely worn teeth or group of teeth	Dental surface	Statistical indices
Ascorbic acid (Vitamin C)	Maxillary central incisors Maxillary first molars Mandibular canines and premolars	Oral faces	$U=10, z=-1.96, p<0.05$ $U=2.5, z=-2.23, p<0.05$ $U=20, z=-2.95, p<0.01$
Iron based preparations	Maxillary incisors	Palatal faces	$U=10, z=-1.96, p<0.05$

The risk factor represented by the consumption of ascorbic acid (vitamin C) was identified at 10 % of the subjects, iron-based preparations are used by 5% of the subjects, the other medications with acidic contents such as the acetylsalicylic acid, the hydrochloric acid, the stimulants of saliva secretion or the calcium chelators were not specified by any of our subjects as long-term treatment.

The pool swimming risk factor was associated with the severity of the lesion at the vestibular faces of the mandibular front teeth ($U=7, z=-2.65, p<0.01$) as well as with the impact on the palatal faces of the maxillary second premolars ($U=21, z=-2.31, p<0.05$) or on the palatal face of the maxillary second molars ($U=18.5, z=-2.12, p<0.05$).

From among the unhealthy habits 27.5% indicated onychophagia (nail biting), 25% pencil biting, 15% eat seeds daily, 15% use excessively the tooth or inter-dental brush. 10% of the subjects used toothpicks or other means of oral hygiene brutally. Only 1 subject has the habit of keeping nails between teeth, while two smoke pipe.

Table no. 3. Association of the abrasion localization with unhealthy habits

Etiological factor	Most severely worn teeth or group of teeth	Dental surface	Statistical indices
Onychophagia	Mandibular premolars and molars Maxillary canines and premolars	Occlusal faces Cervical areas	$U=94.5, z=-2.05, p<0.05$ $U=110, z=-2.40, p<0.05$
Pencil biting	Mandibular premolars and molars Maxillary canines	Occlusal faces Incisal ridges Neck of the tooth	$U=94.5, z=-2.05, p<0.05$ $U=100, z=-2.30, p<0.05$ $U=109, z=-2.24, p<0.05$
Daily eating of seeds	Mandibular front teeth Maxillary front teeth	Incisal ridges Neck of the tooth Vestibular faces Neck of the tooth	$U=47, z=-2.38, p<0.05$ $U=85, z=-2.38, p<0.05$ $U=37.5, z=-3.14, p<0.01$ $U=100, z=-2.38, p<0.05$
Toothpick use	Mandibular first molars	Cervical region	$U=41, z=-2.31, p<0.05$
Excessive tooth brushing	Maxillary central incisors Maxillary premolars Mandibular canines Mandibular premolars	Cervical region	$U=85, z=-2.38, p<0.05$ $U=51.5, z=-2.37, p<0.05$ $U=63.5, z=-2.09, p<0.05$ $U=35, z=-3.24, p<0.01$

From among the subjects evaluated, 30% confirmed a habit of bruxism. We specify that we did not carry out any differentiation between eccentric and centric bruxism or between nocturnal (sleep) and diurnal (awake) bruxism.

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Table no. 4. Association of the abrasion localization with bruxism

Etiological factor	Most severely worn tooth or group of teeth	Dental surface	Statistical indices
Bruxism	Manibular front teeth	Incisal ridges	U=110, z=1,89, p<0.05
		Palatal faces	U=109, z=2.11, p<0.05
	Mandibular front teeth	Vastibular faces	U=132, z=2.04, p<0.05
	Mandibular lateral	Occlusal faces	U=102, z=2.14, p<0.05

DISCUSSIONS

From among the 112 clinically examined patients, only 40 met the inclusion and exclusion criteria of this study, indicating clinical proof of wear occurrence. The 40 patients mean 35.7% of the overall number of students examined.

Regarding the influence of general health disorders, the lack of positive answers relating to the presence of bulimia or of passive regurgitation within chronic alcoholism in relation with abrasion is confirmed by specialized studies that note a diminished prevalence of these disorders among young patients.(1) Nevertheless, there are studies (2,3) that show the gastroesophageal reflux disease and its medication predispose to the occurrence of erosive lesions. Our study did not identify an association of the wear degree with the presence of any of these disorders, perhaps because of the small number of subjects who answered this question affirmatively.

Regarding the carbonated drinks and fruit juice risk factor, the results obtained in the study are in line with those of the previous studies (4-7) but there are also correlations between the consumption of carbonated juice and TWI.(2)

Regarding the ascorbic acid risk factor, the study (4) shows that vitamin C tablets are associated with erosion at the level of the occlusal surfaces of lateral teeth, which is not similar with the results we have identified – they indicate a predominant influence on oral surfaces. We explain this lesion distribution through the application of the vitamin C tablets between the palate and the tongue (for palatal surfaces) or sublingual (for the lingual surfaces of mandibular canines and premolars).

Regarding the pool swimming risk factor, studies show that sommeliers, pool swimmers and those whose occupations expose them to acidic fumes and aerosols display cervical lesions on the vestibular surfaces of the maxillary frontal teeth and of the first premolars.(4) The results we have obtained are different.

Pencil biting is reported as an etiological factor of wear, but mostly at the level of occlusal surfaces: the habit of placing between the arcades objects such as pens, pencils, onychophagia, the use of a miswak (teeth cleaning twig).(8) The literature finds higher frequency of wear at the level of the incisal ridges and of the occlusal faces.(4) Nevertheless, it is confirmed that the variability of para-practices also determines an extremely non-specific and diversified wear in terms of localization and intensity.

According to the studies (3,4), excessive brushing can generate wear frequently at the level of the vestibular faces of the canines and premolars, at times with a sandblasted aspect, with erasure of the anatomic contour. Other studies (9) identifies a correlation between the occurrence of non-cavity cervical lesions and a very good dental hygiene, right-handed people indicate a higher frequency of lesions on the left sides, the teeth at the centre of the dental arcade are the most severely worn. These conclusions are similar to those we found, namely the

impact on the central incisors (arranged at the center of the arcade), as well as the high frequency of cervical lesions explained both by the incorrect hygiene habits and by the distribution of enamel prisms at this level.

From among the assessed subjects, 30% confirmed a habit of bruxism, other studies signal a prevalence of bruxism of only 17.8%.(7) The prevalence of wear at the level of the incisal ridges of the frontal region, as well as of the occlusal surfaces of the molars is in line with the results of the other studies (3,9,10,11) on this topic.

CONCLUSIONS

As suggested by this study, we can conclude that the most frequent factor that influences the occurrence of wear lesions in young patients is represented by the consumption of fruit juice, followed by bruxism, onychophagia, followed by carbonated drinks. The etiological factor determines specific abrasion at specific dental levels, but in most of the cases there are at least two etiological factors that determine it.

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