

TYPES OF DENTAL WEAR AND THEIR ETHIOLOGY

Earar Kamel, Madalina Nicoleta Matei

Department of Dental Medicine, Faculty of Medicine and Pharmacy, "Dunarea de Jos"
University, Galati, Romania

*Corresponding author : Earar Kamel, Professor, Phd
Faculty of Medicine and Pharmacy, "Dunarea de Jos" University, Galati, Romania
e-mail: erar_dr.kamel@yahoo.com

ABSTRACT

Dental wear is a universal experience; it is accepted today that the phenomena of dental wear know a significant increase especially in young people. Although the causes are not well defined, it is supposed to act as a category of "predisposing factors" specific to age and civilization as well as a category of causal factors. **Aim of the study :** Our researches included two aspects: one clinical and one laboratory. The data were recorded in dental records and analyzed in order to identify the various etiological correlations. **Material and methods:** The odontal examination was performed only after the oral cavity was cleaned, the reduction of the gingival inflammation and the professional brushing. I recorded the cavities and cavities, the various abrasive grades and the dental areas interested in cervical erosions, using direct or projected light and the magnifying glass or microcameras. **Results and discussions:** Loss of hard dental substance of a non-causative etiology is a normal physiological process that takes place throughout life. Identifying the causes involved in this process is particularly important in order to predict the long-term behavior of both teeth and restorative treatments. It is difficult to determine the limit to which tissue loss is considered pathological because the notion of normal is still a source of controversy. With regard to the data as a whole we can say that in our study of the type of dental erosion, moderate erosion had a higher frequency: slight erosions - 26.24%, moderate erosions - 50%, severe erosions - 13.76% **Conclusions:** The dental wear term denotes the progressive loss of dental hard tissue due to three processes: abrasion (wear caused by tooth interaction with other materials), attrition (wear due to tooth contact on the tooth) and erosion (dissolution of dental hard tissue due to the acidic substances).

Key words: dental erosion, dental wear, abrasion, attrition.

INTRODUCTION

Dental wear is a universal experience; is a non-carious dental lesion, manifested by the irreversible reduction of dental rigid structures at the level of the crown and tooth root. It appears at the contact area of two dental surfaces[1,2,3].

The consequences of dental wear are tearing of hard tissues, altering the appearance of the tooth, aesthetic discomfort[4,5].

Current statistics highlight an increasing frequency of erosions in the vicinity of the dental pack, erosions that are often correlated with factors in the diet, with chemical, mechanical factors, with fewer factors being considered for the host organism or pathological conditions that result from the evolution of periodontal disease or carious disease[6,7].

Physical dental wear (toothblunting) occurs after contact with the tooth with a second hard, dental or other surface[8,9]. In

case of dental wear we are talking about two situations: attrition - the tooth collapse/blunting due to dental-dental contacts, which occurs naturally during mastication and swallowing, changing the edges of the teeth and the mastication surfaces from the molars and premolars, and the overloading of the teeth due tightening, friction, continuous grinding, dental abrasion - due to friction with an abrasive body, alien to the tooth[10,11].

In case of abrasion, depending on the etiology, the pattern of wear can be diffused or localized[12,13]. Clinical observation has shown a direct relationship between smooth and / or cervical abrasion and excessive oral hygiene, being incriminated as the main etiological factor for dental abrasion. Abrasion is influenced by the following factors:

occlusion - the type of occlusion is the main factor influencing the distribution and

the abrasion mode. Since the variability of the position of the upper and lower teeth is almost infinite, the distribution and occlusion can also be very variable. As a general rule, in the case of an Angle I-class intermolar ratio with normal occlusion at the frontal level in a sagittal and vertical direction, the abrasion will appear on the occlusal-vestibular surfaces of the inferiors and the occluso-oral of the superior, forming an "ad palatum" occlusal slope. The rule is usually valid for premolars and molars 1, but the occlusal slope can be reduced to neutron for molars 2 and ultimately it may be negative for molars 3. This "twist" that occurs on the occlusal surface of the lateral teeth with advancing abrasion is called helical plane[14,15,16].

age-there is a strong correlation between age and dental wear, regardless of the type of population. Obviously, the newly erupted teeth exhibit a lower wear rate than those functional after longer periods, the older the individual is, the more widespread the abrasion, although there are individuals with very low wear[17,18,19].

Oral hygiene technique - use an abrasive toothpaste combined with a vigorous brushing method and a tough brush can result in abrasion, especially in the gingival margin of the vestibular surfaces. When the dentine is exposed by abrasion, the dentinal canals remain sealed by dental stain (smear). In the presence of acids, this layer is lost, the canals are open and pulp inflammation can occur with sensitivity to temperature variations, osmolarity and tooth dry[20,21,22].

The term **attrition** is used to describe dental wear due to food-free dentate contacts, defines the physiological wear of dental tissue as a result of interdental contact without the interposition of a foreign substance. The characteristic feature is the formation of a face that is a flat surface with well-established and circumscribed. The faces of the antagonist teeth fit perfectly with one another and the parallel striations are oriented in the same direction. Such contacts occur during dental contacts in swallowing, speech, lifting of weights, parafunctions being affected by attrition during mastication. Examination of the interproximal wearing of

the teeth with intact alveolar support suggests that the predominant movement is vertical and not vertiblo-oral as considered before. The attrition degree is closely related to age[23,24,25].

The characteristic feature is the formation of a face with a flat surface with well defined and circumscribed edges. The attrition distribution is influenced by the type of occlusion, the geometry of the stomatologic system and the individual patterns of bruxism[26,27].

Children often gnash their teeth, or even rub their gums before the dental eruption.

These observations suggest that bruxism is a universal behavior and not a habit, as habits are patterns learned by behavior[28,29]. It has been suggested that bruxism should be considered as a normal physiological behavior, of central origin; when stress is accentuated, the increase in the intensity of the teeth can lead to adaptive changes of the cranio-facial structures, including the muscles and joints. When these structures adapt too slowly or not, it becomes evident in a variety of forms, such as cranio-mandibular dysfunctions[30,31].

It is logical to admit that gnashing is a behavior of central origin, and only learned habits such as nail or pencils biting must be regarded as parafunctions[32,33]. Occlusal interference can not be totally excluded and must be observed and understood in the context of the treatment plan. These latter factors does not initiate parafunctions but can make conditions such as the direction and intensity of friction forces to affect teeth, muscles, or joints[34,35].

Tegosis - if gnashing of teeth is normal physiological behavior, then it is logical to suggest that there is a reason for this behavior. ``Tegosis`` theory (Everly, 1972) suggests that gnashing of teeth is a phylogenetic behavior that has the function of sharpening teeth for a more effective mastication and for use as a weapon. On the other hand, normal abrasion through food will smooth teeth so will also act as cutting surfaces. On the other hand, rubbing the teeth without food-bruxism will re-bend the edges and increase the effect of cutting blades[36,37].

Interproximal attrition occurs on proximal surfaces in contact with neighboring teeth through mastication or bruxism, by moving one to the other.

Examination of the interproximal tooth wear with intact alveolar support suggests that the predominant movement is vertical or almost vertical and not vestibular-oral as considered before. The result may be a gradual shortening of the length of the arcade but probably insignificant to industrialized populations[38,39].

Erosion. The clinical term of "erosio dentium" is the physical result of a pathological, chronic, localized, painless loss of dental hard tissues removed from the dental surface by acidic, electrolytic action or chelation without bacterial involvement. Acids are not bacterial, come from nutritional, occupational or intrinsic sources. Dental structure erosion is defined as a superficial loss of dental hard tissue due to a chemical process that does not involve bacteria. Clinical appearance may vary. Generalized erosion may affect the entire dental crown with a loss of contour of the glossy, uneven-looking surface without sharp enamel edges as they round out. The surface of the enamel may become concave to the dentine, when the dental reduction process is accelerated due to the low hardness of the dentin. It forms an aspect of excavation[40,41,42].

The abrasion, attrition or both can overlap the erosion process, leading to a sharp reduction and diagnoses difficulties. Any erosion process will be exacerbated if the teeth are brushed when the acid is still present in the buccal environment. Acids that cause erosion may be extrinsic or intrinsic[43,44]. Any medication or oral hygiene product that has a low pH and often comes in or has a dental contact and an increased potential to cause erosion saturation is influenced by food abrasion.

Demastication may be physiological when it is primarily concerned with occlusal and incisal surfaces, pathologically caused by excessive consumption of excessively harsh food. It can be considered a combination of abrasion and attrition.

Resorption is the process of biological

degradation and assimilation of substances or structures: the terms of dental, radicular, dentinal, and cement resorption describe the biological removal of dental hard tissues through cementoclastic, dentinoclastic and ameloclastic activity, the process may be physiological, or pathologically due to traumas, cysts or neoplasms[45,46].

Oral mucosa is an excellent marker for the detection of possible general illnesses that may sometimes manifest itself in the oral cavity.

Salivary flow rate, biochemical composition of saliva also inflates individual susceptibility to dental caries. Antidepressant medication used to treat bulimia or anorexia, has an antisialog effect, significantly increasing the incidence of dental caries, and drugs used to inhibit food appetite have similar effect. Inorganic saliva constituents can indirectly influence oral microbial flora through osmotic pressure, the active or inhibitory role of some enzymes, and the value of redox potential[47,48]. The following organic foreign compounds may also be present in the saliva: mercury and lead salts, radioactive iodine, etc. Some of the organic constituents come from food and others result from metabolism in the oral cavity as well as oral microbial flora. Some organic constituents are transient and others remain in saliva for a time sufficient to influence oral microbial flora (amino acids, carbohydrates and vitamins serve for the nutrition of microbial flora).

The importance of saliva in neutralizing pH variations in the oral cavity in making the acquired pellicle to ensure the lubrication of the oral cavity tissue is known. All this advocates demonstrating that salivary deficiencies allow the direct action of acids and enzymes in the oral cavity on oral surfaces causing a corrosion chemical treatment or favoring the installation of abrasives through mechanical wear during mastication.

In qualitative or quantitative salivary disorders occurring under physiological or pathological conditions, the acquired pellicle is only regenerated or is no longer effective so that the dental surfaces are directly exposed to the acid attack from the external

or oral environment, which will leads to accelerating dental wear. The restoration of these lesions with obturation materials can not be accompanied by success over time if the causal factors have not been identified and their action has not been removed. In clinical research, we identified a number of clinical erosion issues, to which we applied a restorative therapy but which was unsuccessful only after reducing gingival inflammation, correcting salivary or occlusal stress.

MATERIAL AND METHODS

Our researches included two aspects: one clinical and one laboratory. The data were recorded in dental records and analyzed in order to identify the various etiological correlations. The odontal examination was performed only after the oral cavity was cleaned, the reduction of the gingival inflammation and the professional brushing. I recorded the cavities and cavities, the various abrasive grades and the dental areas interested in cervical erosions, using direct or projected light and the magnifying glass or microcameras . For each patient, a clinical examination was performed and a questionnaire on diet and lifestyle was applied. To determine the factors that caused erosive lesions, we performed the main paraclinical tests using the Dentobuff kit, the determination of the salivary flow and the food survey. The pH indicator tester is a method for estimating the buffer capacity that indicates the risk of dental erosion and caries. The Dentobuff test uses a support containing an acid-impregnated pH test strip. A drop of saliva is applied to the tester and the result is read after 5 minutes[49]. The method differentiates saliva stimulated as having a small, intermediate and high buffer capacity . The food survey attempts to determine the risk factors for dental corrosion. I conducted a statistical study on the etiological factors of dental erosion.

RESULTS AND DISCUSSION

The study I group was performed on a lot of 79 patients, 38 male patients (36.70%) and 41 (51, 89%) female.

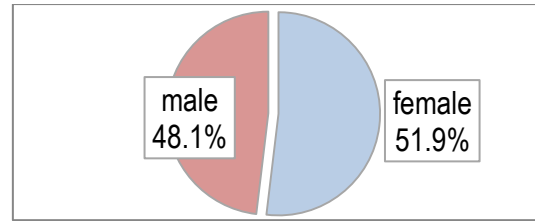


Fig.1 Distribution of subjects according with gender

The 79 subjects ranged from 18-65 years of age, with an average age of 41.50 years. Of the 13 cases (16.45%) with bruxism, 9 cases (11.39%) showed the abrasion(Fig.1).

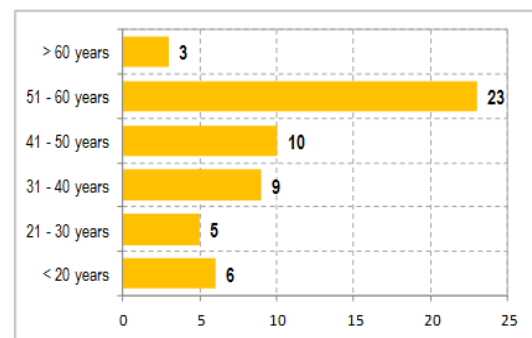


Fig.2 Distribution of subjects according with age

Among the adhesive materials, glazingomers are the closest to the qualities of an ideal filling material to be applied together with a composite in recovering these substance losses. Also the most suitable material for the restoration of non-carious lesions belongs to the new class of compomers because they have a coefficient of thermal expansion and cement and have the potential to release fluoride.

Study group II. We propose to make a statistical study of the factors that determine the occurrence of dental erosions in the population of Galați and the surrounding area. The sample of 56 subjects surveyed was based on well-established criteria, taking into account the rural and urban population aged 15-65 years. In a prior analysis of the research possibilities and the predictable results we could outline the following objectives: knowledge of dental erosion status and risk factors; a comprehensive study on population samples highlighting the frequency of dental erosions with its

distribution by gender, age, occupation and level of training as well as the main causal and risk factors with their contribution to dental erosion. The implementation of the operational plan is carried out having the stages and deadlines, the objectives and the logistical actions based on a questionnaire.

Analysis and interpretation of the data obtained from our study.

Our investigations were carried out on rural and urban territorial collectivities. The study was performed on clinical examinations in patients with dental wear and wear phenomena, erosions, odontal examination only after oral cavity hygiene, reduction of gingival inflammation and professional brushing.

There have been various degrees of erosion using direct or projected light or intraoral chamber.

We have put a special emphasis on anamnesis for the identification of risk factors such as frequent use of acidic beverages, dental hygiene methods, dental brushing frequency, types of toothpastes used, type of brush according to brush hardness and excessive use of interdental hygienic devices. Analyzing the results of the study we can draw the following conclusions:

Concerning the erosion analysis by age groups, as can be seen in the table, we can say that the highest frequency of erosions was found in the age group 51-60 years, frequency due to the high degree of teeth wear.

By analyzing the interviewed subjects by sex, we can say that dental erosions are found in a higher percentage in males than in women. Following the study, 45 men (80.33%) showed erosions to only 11 women (19.77%)(Fig.3).

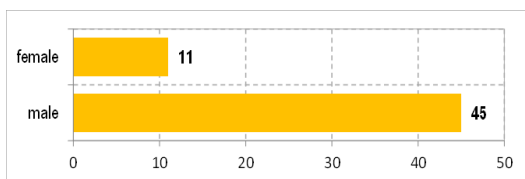


Fig.3 Distribution of the interviewed subjects by sex

Based on the analysis of the risk factors,

we found that most of the men put an intense physical effort (either because of the work done or because of a practiced sport), which implies a consumption of sports drinks, oral hygiene methods, they put a considerably higher force when practicing dental brushing.

□ As regards the analysis of erosion frequency at the territorial level, we found a higher rate of erosion at the urban level compared to the rural one. This is explained by the fact that hygiene in the rural environment is deficient, the degree of health education is low, so that the teeth come out early due to the carious process, and sometimes we meet people at 40 years with a total edentation, which leads us to the failure to find dental erosions.

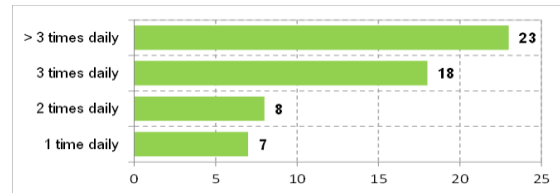


Fig.4 Analysis of the data on the frequency of dental brushing

Of the analysis of the data on the frequency of dental brushing, we concluded that people who performed a dental brush more than 3 times a day involved more cases of dental erosions, once / day-7 cases; twice / day-8 cases, 3 times / day-18 cases and > 3 times / day 23 cases. It has been noticed that the brushing frequency, the brush method used, the type of toothbrush and brushing immediately after eating acidic food all these also accelerate the loss of substance because the enamel is already demineralized(Fig.4).

With regard to the data provided by the questionnaire on the frequency of consumption of acidic beverages, we have found that persons consuming a larger quantity of acidic beverages at regular intervals were eroded by a much higher percentage than those who occasionally consumed them. Acid erosion, by definition, is caused by the action of alimentary or gastric acids dissolving dental surfaces, which also results from our analysis-1 time / day-31 cases; 1 / wk. 17 cases, once / month-8 cases.

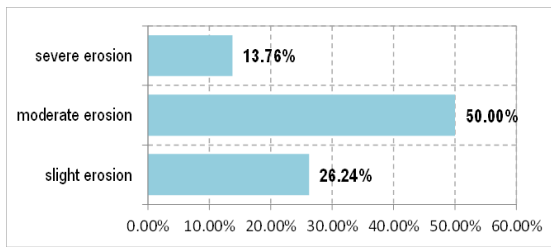


Fig.5 Distribution of type of dental erosion

With regard to the data as a whole we can say that in our study of the type of dental erosion, moderate erosion had a higher frequency: slight erosions - 26.24%, moderate erosions - 50%, severe erosions - 13.76% (Fig.5).

CONCLUSION

The dental wear term denotes the progressive loss of dental hard tissue due to three processes: abrasion (wear caused by tooth interaction with other materials), attrition (wear due to tooth contact on the tooth) and erosion (dissolution of dental hard tissue due to the acidic substances).

The pathological wear progresses slowly and the continuous eruption of the teeth

compensates for this wear, keeping the vertical dimension of the occlusion. Analyzing the current epidemiological studies and according to our observations we can conclude that non-cariogenic odontal lesions, especially erosions in the vicinity of the dental pack, are increasing as frequency in current populations. Erosions are frequently correlated with some of the factors in the diet, with chemical and mechanical factors.

Advanced forms of cervical erosions occur in people with multiple factors in action: occlusal stress on hypermineralized teeth, excessive consumption of acidic foods, acid reflux in the oral environment, reduced salivation neutralization of acids in the oral environment, incorrect puncture with abrasive pastes. The prophylaxis and treatment of these lesions strive to identify the etiological factors and the removal of their action. The restoration of these erosive lesions benefits from materials adherent to the dental structure that allow a maximum preservation of the healthy tissues.

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