

UNIVERSITY OF MEDICINE AND PHARMACY FROM TIRGU MURES

## **Wear non carious lesions in dentistry**

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TIRGU MURES  
2013

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## **Wear non carious lesions in dentistry**

Dental wear, a growing problem in industrialized countries, is an insidious and multifactorial cumulative process that causes enamel and dentin destruction, which can affect teeth vitality and oral health quality of each individual. Despite data indicating decreased incidence of dental caries, in recent decades epidemiological studies suggest an increased prevalence and severity of dental wear not only among the aging population, but also among young adults and children.

**Objectives of the research:** Analysis of dental wear according to certain etiologic factors; determination of the potential erosion of the enamel by three chlorinated waters and evaluation of the protective effect of dental materials using the spectrophotometry method of molecular absorption and electronic scanning microscopy; clinical analysis of non-carious cervical lesions; Analysis of morphological characteristics by computed tomography of non-carious cervical lesions.

### **Clinical study of forms of dental wear and association with certain etiological factors**

**Aim:** to assess the distribution of non-carious dental lesions and their association with certain etiological factors, on a group of adult population in a private dental office. **Objectives:** wear analysis by age, sex, Smith and Knight Indicators, form, methods of dental hygiene, diet, oral vicious habits.

**Results:** Of the 150 patients investigated 84 experienced various forms of attrition, the most common being combined lesions, 51.19%. After we performed the analysis by age we found out that in the 18-30 age group erosions are 100% present; in the 31-50 age group forms with greater frequency are the abfraction ones, 63% and over 50 years the most common are attritions, 57.9%. We found no significant differences by gender. The more common encountered forms of wear are those with 2 and 3 Smith and Knight Indicators. Vertical and horizontal brushing methods and the type of brush used has a positive association in terms of the statistical occurrence of wear,  $p = 0.0091$ ,  $p = 0.004$ .

**Conclusions:** 1. Dental wear is a cumulative process that occurs and increases with age, representing a major problem not only for diagnosis but only for treatment; 2. The most common are abfractions in people aged between 31-50 years; 3. We found no significant differences in appearance of lesions between the two sexes in erosions that are more common (77%) in men than in women; 5. All patients who were exposed to acid environment developed erosions and those with abrasive diet, abrasions; 6. Most commonly encountered brushing techniques are the vertical and the horizontal ones, patients preferring to use harsher or medium toothbrushes, only a few calling additional dental hygiene. Special training programs related to choosing oral hygiene methods are needed; 7. Daily stress, manifested by teeth gritting or food nervous ingestion, followed by regurgitation or vomiting, makes these events to become more frequent at a young age too.

### **Quantitative and qualitative study of the erosive potential of three chlorinated waters on dental enamel and evaluation of preventive effect of dental materials**

**Aim:** Highlighting with the absorption spectrophotometry and scanning electronic microscopy the erosive effect of chlorinated pool water and the protective effect of two toothpastes with remineralizing effect and a protective lacquer. **Objectives:** Evaluation of the erosive capacity of three chlorinated water used for swimming pools; Quantitative determination of calcium and phosphate absorbed by these waters; Qualitative determination of erosive changes in the structure of enamel from water samples with different pH; qualitative and quantitative determination of the remineralization and protection capacity of dental materials on enamel exposed to chlorinated water. The two waters prepared in the laboratory have the same buffering capacity compared with that collected from the pool.

**Results:** The pH we measured for the three chlorinated waters falls within the recommended range, 7.46, for water prepared in the laboratory and under these limits, 7.11 for the water collected from the swimming pools and 5.06 for the prepared laboratory by chlorine addition. The two waters prepared in the laboratory have the same buffering capacity compared with that collected from the pool. After

spectrophotometric analysis of calcium and phosphate absorption from enamel fragments found in the three waters, we found out that pool water with lower buffering capacity extracted the greatest amount of calcium, but a smaller amount of phosphate and the water with 5.06 pH extracted the largest amount of phosphates. By spectrophotometric comparison of calcium and phosphorus concentration extracted from enamel fragments immersed in the three waters with demineralized effect, treated with the pastes were found no significant differences between the values. Their effect was best observed by electronic microscopy examination. The fragments treated with Sensodyne Repair and Protect were revealed larger areas of minimum demineralization due to chlorinated waters compared to those treated with ReminPro which have presented isolated minimum demineralization areas. In both cases the interprismatic enamel structure was preserved, even in water with a pH of 5.06.

**Conclusions:** 1. Swimming pools waters improperly chlorinated present a risk factor for performance and casual swimmers; 2. Tested waters have the ability to demineralize in vitro tooth enamel, demineralization severity being influenced by pH; 3. Water prepared with modified pH caused great changes in the structure of the enamel; 4. The three waters are able to extract varying amounts of calcium and phosphate from tooth enamel structure, the majority being extracted from fragments treated with fluorinated lacquer; 5. The three materials used to protect have the ability to remineralize tooth enamel, the best protection is given by fluoride lacquer application; 6. Molecular spectroscopy absorption is an efficient quantitative testing method of demineralization and by chemical measurement of demineralization appeared after the erosive attack, small amounts of extracted minerals can be detected; 7. Scanning electronic microscopy is a qualitative investigation method of changes encountered in dental structures

#### **Clinical study of the morphological characteristics of non-carious cervical lesions**

**Aim:** To evaluate clinical characteristics of non-carious cervical lesions. **Objectives:** analysis by age and sex, occlusion analysis; location on the areas: maxilla / mandible; anterior / posterior, incisors, premolars, molars, analysis of the shape, size, sclerosis, sensitivity.

**Results:** Age: 56.25% between 31-50 years, Sex: male 60.94%; Occlusion: Angle class I, 18.75%; attrition facets present on them in a rate of 75%, 43.75% canine guidance; Location: on the mandible, 66.67% in the posterior, 70.83%; 32.81% were located on the first premolars, 25% on the first molars, 22.92% in canines, 13.02% on the second premolars, 4.17% on central incisors and 2.08% on lateral incisors; Shape: 55.73% were concave shape and 44.27% were letter "V" shape; Sensitivity and sclerosis: 75% sclerosis and grades 1 and 2 sensitivity, and 15.10% moderate and 9.90% advanced; Dimensions: measured in vertical and occlusal-gingival direction are of 1-2mm, 52.08%; 29.17% of 2 mm, 13.02% of 3 mm and 5.73% of 4mm.

**Conclusions:** 1. Non-carious cervical lesions were found in high percentage in patients aged between 31-50 years, with predominance in males; 2. Location of non-carious cervical lesions was predominantly in the mandible, in the posterior. Premolars had most injuries of this type and central incisors the fewest; 3. Lesions were predominantly concave shaped, showing sclerosis and moderate sensitivity; 4. Dimensions in cervico-occlusal direction and depth were generally low, between 1-2mm, but increasing with age, by aggregating etiologic factors; 5. Investigated patients had normal occlusion, Angle class I, with canine guidance. Non carious cervical lesions were mostly accompanied by wear facets.

#### **Analysis of the morphological characteristics of lesions not edging cervical computed tomography method**

**Aim:** To examine the morphological characteristics of non-carious cervical lesions, highlighting the loss of dental hard tissue from the cement-enamel junction using computed tomography. **Objectives:** lesion localization observation; measuring dimensions in cervical-occlusal and vertical direction; observing their shape from different angles and sections; association of these features with etiological factors.

**Results:** After analyzing the 27 non-carious cervical lesions we found that 37% had a depth below 1mm and 44.4% cervico-occlusal dimension over 2mm. Location was predominant 18.5%, both for sharp and concave lesions, 33.3%. Depending on the position to the cement-enamel limit, we noticed that the majority, 44.4% were found at this level.

**Conclusions:** 1. Computed tomography examination shows that non-carious cervical lesions are located at the cement-enamel boundary and in very advanced cases exceeding this limit with progression to the root; 2. The size is varied, ranging in most of the cases between 1-2mm; 3. Non-carious cervical lesions may be associated with incisal or occlusal wear facets; 4. There was no enamel fractures at the cavities edges; 5. Abfraction theory can be considered as a triggering mechanism for non-carious injuries in the cervix; 6. Different morphology demonstrates association with various etiological factors; 7. Computed tomography is a method of investigation which may provide necessary information for the complete analysis of the emergence and development of these lesions; 8. It is necessary to observe the morphological changes occurring over time and association with etiological factors to facilitate the correct diagnosis, prevention and treatment of non-carious cervical lesions.

**Keywords:** tooth wear, erosion, abfraction, non-carious cervical lesions, tooth surface loss.