

Summary of the PhD. Thesis

Studies on erosive wear of teeth and of restorative dental materials

Drd. Birta Orsolya-Beáta

Department of Removable Prosthetic Dentistry, Faculty of Dental Medicine, University of Medicine and Pharmacy, Târgu Mureş

Scientific coordinator: Prof. Dr. Székely Melinda

In this thesis I have studied the dental erosive wear from different perspectives: etiological, epidemiological and prophylactic, because the majority of the Romanian population presents numerous lesions of erosive wear, mostly in an advanced stage, sometimes modifying the coronary morphology of the tooth, consequently requiring dentures.

Our goal was to evaluate the impact of phosphoric acid on the calcium content of dental enamel, to evaluate the effects of citric acid on the roughness of restorative materials and the epidemiological study of different types of dental wear.

The purpose of the first study was to evaluate the impact of phosphoric acid on the calcium content of dental enamel, and how calcium dissolution evolved during the time after the acid attack. We used 31 human enamel preparations that were subjected to a protocol that followed the erosive action of the acids. The dissolved Ca^{2+} concentration was measured using the ion-selective electrode method. The erosive process has progressed in time but has not shown a linear correlation. Solubility showed high values on the first day, after which the values gradually declined.

The second study of the thesis aimed at assessing the effects of citric acid on the roughness of eight direct restorative materials and comparing the depth of the rates of degradation produced by the acid. The hypothesis of this in vitro study was that there were significant differences between the erosive wear rates of different groups of restorative materials under acidic conditions. We prepared 80 samples of eight restorative dental materials (4 composites, 2 compomers and 2 glass ionomers). Throughout the protocol, the samples were exposed to 1% citric acid attack for 60 minutes to simulate the frequent use of citric fruits and acidic beverages. Changes of the surface area of the

tested materials were determined before and after exposure to the acid solution by measuring the roughness surface with a profile meter. The study revealed that under acidic experimental conditions, all restorative dental materials showed degradation. The greatest loss in depth of the material as a consequence of the erosive erosion was observed in a compomer, and the smallest in a resin-modified glass ionomer cement. The results suggest that resistance to erosive wear of restorative materials should be considered prior to the application of dental restoration materials to patients with an acidic diet and / or with erosive dental lesions.

The purpose of the last study of this thesis was to evaluate the occurrence and frequency of wear of different origins in an adult population, covering different age groups, examining all possible correlations between wear and daily activities, daily consumed food and drinks, and other phenomena causing conditionally different types of wear. In the epidemiological study we used a questionnaire, elaborated by the Department of Morphology of Teeth and Dental Arches, Technology of Dentures and Dental Materials of the Faculty of Dental Medicine. The questionnaire completion was preceded by a clinical examination performed in a private clinic. We have noticed that there is a close link between the types of dental erosion and the daily diet, the patients' diseases of mental origin, respectively the patients who wear dentures. We need to be aware that not toothbrush itself causes dental abrasion, but incorrect use of it through inappropriate techniques, such as frequent cleaning and its aggressive use, are the ones that represent a risk.

Based on the experimental data and the data obtained from the questionnaires, we can state that among those who need dental treatment, the ratio of subjects with erosive wear is significant, which is why increased attention should be paid to this aspect in the daily dental practice. Dental erosion of multifactorial origin, an irreversible process, can be prevented or slowed down among both young and old people.