

Remineralisation of enamel surface by biomimetic Zn-carbonate containing toothpaste

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Consumption of acid foods and drinks and other factors causing enamel wear are responsible of the daily enamel loss and degradation. In order to contrast these effects, some toothpastes have been showed to possess different properties of remineralisation and/or repair of the enamel surface. The aim of the study was to evaluate whether the use of a toothpaste containing Zn-carbonate hydroxyapatite (CHA) microcrystals may exert remineralisation/repair effects of the enamel surface.

Two groups of patients, aged between 18 and 75 years, used for 8 weeks a Zn-CHA nanocrystals toothpaste (experimental group) and a potassium nitrate/sodium fluoride toothpaste (active control group). At the end of this period, scheduled extractions were performed in five subjects for each group. Negative controls consisted on two subjects treated with non-specified fluoride toothpaste. Teeth were processed for morphological and chemical-physic superficial characterizations by means of Scanning Electronic Microscopy with Elementary analysis, X-Ray Diffraction analysis and Infrared analysis.

The results showed that use of a Zn-CHA nanocrystals toothpaste may lead to a remineralization/repair of the enamel surface, by depositing a hydroxyapatite-rich coating. On the other hand, the use of both a nitrate potassium/sodium fluoride and non-specified fluoride toothpastes do not appreciably change the enamel surface.

In conclusion, this study demonstrates that the toothpaste containing Zn-CHA nanostructured microcrystals, differently from nitrate potassium/sodium fluoride and non-specified fluoride toothpastes, may promote enamel superficial repair by means of the formation of a protective biomimetic CHA coating.

References

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Keywords

Toothpaste, enamel, hydroxyapatite, nanocrystals, morphology.