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Silver Nanoparticles Versus Chitosan Nanoparticles Effects on Demineralized Enamel

Abstract: Enamel is an exclusively epithelial-derived dental tissue that possesses a unique microstructure and outstanding physicochemical properties. To combat the challenge of cariogenic diseases that cause enamel demineralization, a number of approaches have been applied. The purpose of this study was to compare the impacts of different remineralizing agents on demineralized enamel, we focused on chitosan nanoparticles (ChiNPs) and silver nanoparticles (AgNPs). This study was conducted on 40 extracted human premolars with artificially induced demineralization using demineralizing solution. Prior to the beginning of the experimental procedures, the samples were preserved in artificial saliva solution. The nanoparticles were characterized by transmission electron microscopy (TEM) and teeth were divided into four equal groups: Group A was utilized as a control group (no demineralization) and received no treatment. Group B was subjected to demineralization with no treatment. Group C was subjected to demineralization and then treated with ChiNPs. Group D was subjected to demineralization and then treated with AgNPs. The teeth were evaluated for microhardness. The enamel surfaces of all the samples were analysed by scanning electron microscopy (SEM) for morphological changes and energy dispersive X-ray analysis (EDX) for elemental analysis. The third and fourth groups had the highest mean microhardness and calcium (Ca) and phosphorous (P) contents. SEM of these two groups revealed relative restoration of homogenous remineralized enamel surface architecture with minimal micropores. Chitosan nanoparticles (NPs) and silver NPs help restore the enamel surface architecture and mineral content. Therefore, chitosan NPs and AgNPs would be beneficial for remineralizing enamel and for its regeneration.

Biography: Mariam has completed her PhD at the age of 31 years from Alexandria University. She is the director of Oral Biology and Dental Anatomy. She is interested in the field of nanodentistry she has published more than one paper in the field of nanotechnology. She is working also as a lecturer in Alamein University and in Manchester program in Alexandria University.