

**Republic of Iraq
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University of Baghdad
College of Dentistry**



The Effect of Chicken Eggshell Extract on Artificially Induced Dental Erosion in Permanent Teeth (In Vitro Study)

A Thesis

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Abstract

Background: Chicken eggshell mainly comprises of calcium and phosphorous along with other minerals as trace elements, so it had been considered as a natural source of calcium for enamel remineralization. Recently, numbers of studies had shown that chicken eggshell powder had the potential to remineralize artificial erosive lesions and carious lesions, so it had supposed to be one of the most promising new practical modalities for the treatment of dental diseases.

Aims of the study: To test the effect of chicken eggshell powder solution on the microhardness of artificially induced dental erosion of outer enamel surface of permanent teeth at different application intervals, in comparison to sodium fluoride and de-ionized water and to investigate the microscopic changes of the enamel surface before and after treatment with the selected solutions under scanning electron microscope.

Materials and methods: The samples consisted of 32 sound maxillary first premolars, two teeth (randomly selected one with normal enamel and the other with artificially induced enamel erosion) were subjected to microscopical examination, the rest were randomly divided to five groups after they were subjected to demineralization by Pepsi cola drink. The erosive enamel lesion was induced by placing the samples separately in 6ml of cola drink for two minutes at room temperature, this cycle was repeated four time at 6 hours interval. Each group was consisted of 5 teeth for microhardness test and a tooth for microscopical examination. **Group A:** untreated (demineralization followed by immersion in deionized water as control group negative), **Group B:** demineralization followed by immersion in chicken eggshell powder solution for 7 consecutive days, **Group C:** demineralization followed by immersion in chicken eggshell powder solution 5 minutes twice daily for 7 days, **Group D:**

demineralization followed by immersion in chicken eggshell powder solution 30 minutes twice daily for 7 days and **Group E:** demineralization followed by immersion in 0.05% sodium fluoride solution 4 minutes daily for 7 days, as control positive. Enamel microhardness measurement was performed for normal enamel, after demineralization and following treatment with different solutions. Scanning electron microscope was used for demonstration of the morphological changes occurred in enamel structure.

Results: For all groups, there was a significant reduction in enamel microhardness after demineralization as compared to sound teeth. Following treatment with the selected solutions, a statistically significant increase in microhardness for all the treated groups was found (p -value=0.001), the maximum increase was in group B (54.13%), while group E showed the lowest value (22.3%). Scanning electron microscope examination revealed changes occurred starting with loss of normal enamel structure after demineralization. After treatment with chicken eggshell powder solution, most of micro-pores were sealed and defects of enamel surface were restored.

Conclusion: Regarding microhardness, all the groups treated with chicken eggshell powder solution revealed an increase in the enamel microhardness, however, the best result was for teeth treated with chicken eggshell powder solution for 7 consecutive days, this was supported by microscopical examination.