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Effect of different scaling methods and materials on the enamel surface Topography: An *In Vitro* SEM study

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Aim: Scaling is important for maintenance of <u>gingival and periodontal</u> conditions. These procedures have a harmful effect on the <u>dental hard tissues</u>. The aim of this study was to investigate the effects of hand and ultrasonic instruments made of stainless and titanium on the surface properties of enamel.

Materials and Methods: Forty extracted premolars were used in this in vitro study and were randomly divided into four groups (n = 10). Group I received ultrasonic scaling with stainless steel tip, group II received ultrasonic scaling with titanium tip, group III hand scaling with stainless steel tip, and group IV hand scaling with titanium tip. Scanning electron microscopy (SEM) was used to examine the <u>enamel surface morphology</u>. Surface roughness of enamel was measured at baseline and after the scaling simulation using atomic force microscopy (AFM). Differences between initial and final measurements of surface roughness (Δ Ra) were analyzed using two-way analysis of variance (ANOVA) followed by post hoc pairwise comparisons between groups.

Results: SEM revealed deeper scratches and more destructive changes on enamel surface in group IV, whereas other groups revealed less change. AFM revealed that a mean surface roughness difference (Δ Ra) had the highest value with hand instruments using titanium curettes, whereas the lowest difference was found with ultrasonic tips using stainless-steel tips. Hand titanium curettes showed a statistically significant increase in Δ Ra when compared to hand stainless steel curettes (P = 0.02) and ultrasonic titanium tips (P = 0.01). Hand stainless steel tips showed a statistically significant increase in Δ Ra when compared to ultrasonic stainless steel tips (P = 0.02) and hand titanium curettes (P = 0.02).

Conclusion: Scaling using ultrasonic stainless steel tips produce the least amount of surface roughness and damage to the tooth surface.

Keywords: Atomic Force Microscopy, Electron Microscopy, Enamel, Scaling, Surface Roughness

Biography

Prof. Mahmoud Al Ankily is a Lecturer of Oral Biology, Faculty of Dentistry, The British University in Egypt, 2016-present, He is working as a Lecturer of Dental Photography, Faculty of Dentistry, The British University in Egypt, 2017-present.He is a Certified Dental Photographer, University of Birmingham, 2016-present.He completed M.Sc. – Mater Degree of Oral Biology, Faculty of Oral and Dental Medicine, Cairo University, 2010.and also B.D.S - Bachelor's Degree of Dental science, Faculty of Oral and Dental Medicine, from Cairo University, 2004.

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