

**Ministry of Higher Education
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College of Dentistry**



**Evaluation of the effect of Nano-Hydroxy apatite to
re-mineralize white spot lesions prior to orthodontic
adhesive removal by different techniques.
(An in vitro comparative study)**

A thesis

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By

Dr. Saja Sami Malik

B.D.S

Supervised by

Prof. Dr. Nidhal H. Ghaib

B.D.S., MSc. (Orthodontics)

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Abstract

White-spot lesion (WSL) might be liable to mechanical damage during removal of orthodontic adhesive, this in-vitro study were aimed to examine the depth of enamel damage on adhesive removal when the adhesive were surrounded by sound, demineralized or re-mineralized enamel before removal of adhesive by using 10% Nano hydroxy-apatite, to confirm the effect of three different adhesive removal techniques and measuring the time required for adhesive removal.

Composite resin adhesive was bonded to 60 human upper premolars teeth which were randomly divided in to three groups with each consisting of ten sound teeth and ten teeth with demineralized and re-mineralized lesions adjacent to the adhesive. A window of 2 mm was prepared on the buccal surface of the tooth. It was painted with an acid resistant nail varnish except for the window. The demineralized enamel created by immersion of teeth in demineralization buffer for 12 days. Half of the demineralized window was painted with acid –resistant nail varnish, and the samples were then exposed to re-mineralization with 10% of Nano hydroxy apatite and the adhesive was removed with either :(1) fiber reinforced composite bur in slow speed hand piece (SS); (2)12 fluted long flame carbide bur in high speed hand piece (HS); (3) ultrasonic scaler (US).The time required for adhesive removal was calculated by digital stop watch and the enamel damage was evaluated by using stereomicroscope with grid eye piece.

Re-mineralization before the adhesive removal highly significant decreased the damage formed by all techniques when compared with demineralized enamel. The present study had shown that using three different adhesive removal techniques, the mean depth of damage from largest to least in sound enamel was **HS> US >SS** and to demineralized and re-mineralized enamel were **SS >US> HS**. Sound enamel had the least amount of damage. The fastest method for adhesive removal was the HS technique.

In conclusions, when the demineralized enamel was present 12 fluted long flame carbide bur were found to be the least damage in adhesive removal technique and re-mineralization before adhesive removal further reduced the amount of enamel damage.