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The Effects of Enamel Protective Agents on Shear Bond Strength after Rebonding of Stainless Steel Orthodontic Brackets (An *in vitro* Study)

A Thesis

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ABSTRACT

One of the common problems that face the orthodontists is the development of white spot lesions (WSL) around the orthodontic brackets during and following orthodontic treatment. On the other hand bracket bond failure is another issue that frequently occurs during the course of orthodontic treatment which necessitates the need for rebonding

The aim of this study was to evaluate the effects of two enamel protective agents (EPA) on shear bond strength (SBS) of stainless steel orthodontic brackets after rebonding using conventional orthodontic adhesive.

Fifty sound extracted human upper first premolar teeth were selected and randomly divided into two groups to test the shear bond strength before and after rebonding procedure. Each group was subdivided into three equal subgroups which are the control negative (Heliosit), ProSeal and Icon subgroups. The brackets were debonded using a Tinius-Olsen Universal testing machine to measure the shear bond strength. The samples were then prepared for rebonding procedure using tungsten carbide bur at low speed (30,000 rpm). The new brackets were then rebonded using similar group category (control negative, Icon, ProSeal subgroups) and debonded using the same testing machine to calculate the SBS of the rebonding group.

After each debonding, each bracket base and its corresponding tooth surface were examined under a Stereomicroscope and the Adhesive Remnant Index (ARI) was assessed.

The results showed that there was no significant difference in shear bond strength between the control, Icon and ProSeal subgroups in either group. ProSeal showed slight increase in SBS in rebonded group. However,

the difference between the corresponding subgroups was not significant. Regarding the ARI, the predominant failure site of the control and Icon groups were near the enamel surface (scores 0 and I) regardless of the bonding sequence. On the other hand, the ProSeal groups showed that 40% of the samples exhibited a failure sites away from the enamel i.e. scores II and IV. However, the differences were not significant between bonding and rebonding groups or their subgroups.

In conclusion the application of Icon and ProSeal did not compromise the Shear bond strength and can be routinely used during rebonding procedure, additionally; the application of the ProSeal may protect the enamel surface from trauma during bracket removal.