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Effect of Different Surface Treatments on the Shear Bond Strength of Resin Composite to Biodentine™

(An *in-vitro* study)

A Thesis

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Abstract

The success of tooth colored restoration bonded to Biodentine™ depend to a large extend on the strength and durability of bonding system between Biodentine™ and composite **(Hashem *et al*., 2014)**.

This in vitro study was performed to assess the effect of different surface treatments (self-etch, and total etch bonding system) on the shear bond strength of composite restorative material to Biodentine™ at different aging period (two days and two weeks period).

Eighty Biodentine™ samples with 4mm diameter and 2mm height was prepared by using acrylic blocks containing a central hole with a 4mm diameter and a 2mm height. A glass slab was placed on top of the mold so that all the materials set against a smooth surface to ensure standardization of the sample surface **(Hashem *et al*., 2014).**

Surface treatment was performed on the flat surface of Biodenine™ samples after being randomly divided into 2 main groups; Group (A) and Group (B) according to the aging periods of Biodentine™. Group (A) 2-days storage period and group (B) 2-weeks storage period. Each group was further subdivided into 4 subgroups depending on the type of surface treatment; first subgroups received no surface treatment, second subgroups treated by acid etch only, third subgroups treated with self-etch adhesive system and finally the fourth subgroups treated with total-etch adhesive system.

Composite resin (Z250 XT) from (3M ESPE) was placed on the Biodentine™ surface by custom made Teflon mold specially designed for this study, then 200mg load was applied on the composite through the glass slide for one minute in order to have standardization during composite packing **(Rabee, 2014).** All specimens were then stored in distilled water until the time of testing of each group. The specimens were subjected to shear bond strength test at the

end of the storage period (two-days or two-weeks period) by universal testing machine until the failure was occurred.

Data obtained were analyzed statistically using one way ANOVA test and student t-test. ANOVA test and LSD test results showed that, except between self-etch (third) and total-etch (fourth) subgroups, there is statistically highly significant differences among the different surface treated subgroups.

Student t-test results showed that the aging period (whether 2-days or 2-weeks) has no statistical effect on the mean shear bond strength of the different surface treated subgroups except for subgroups 2 (acid-etch only) which are statistically significant difference.

Concerning the fracture mode, by using the magnifying lens (10X), subgroups without surface treatment showed 100% adhesive mode of failure, subgroups treated with acid etch only showed mostly mixed type of failure, no sample treated with either self-etch or total-etch adhesive system showed an adhesive mode of failure. In addition, the results showed that more cohesive failure was recorded in the two days period for both self-etched and total etched subgroups compared to their corresponding subgroups in the two weeks period.