

**Early and Delayed Effect of 2% Chlorhexidine on
the Shear Bond Strength of Composite Restorative
Material to Dentin Using a Total Etch Adhesive
(An in-vitro study)**

A Thesis

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Abstract

Lack of durability of the bond of the dental adhesive systems to tooth structure is one of the most important problems in tooth colored restorative work.

This in vitro study was performed to evaluate the effect of 2% chlorhexidine gluconate (CHX) on dentin composite bond strength by using total etch adhesive system after twenty-four hours and three months water storage.

Forty sound human maxillary premolars were included in the study. These teeth have been polished, cleaned carefully, and embedded in acrylic block exposing the crown surface. A flat dentin surface was prepared and acid etched with 36% phosphoric acid gel, after being randomly divided into four groups of ten teeth each according to the time of storage and CHX application:

Group I: 10 teeth treated with 2% CHX for 60 seconds prior to adhesive application and was tested after 24hours,

Group II: 10 teeth treated with distilled water for 60 seconds prior to adhesive application and was tested after 24hours,

Group III: 10 teeth treated with 2% CHX for 60 seconds prior to adhesive application and was tested after 3 months,

Group IV: 10 teeth treated with distilled water for 60 seconds prior to adhesive application and was tested after 3 months.

Composite resin (Ceram X mono from Dentsply) was placed on the dentin 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. Then all specimens were stored in distilled water at a temperature of 37 °C until the time of testing of each group. The specimens were subjected to shear bond strength test at the end of the storage period (24 hours or 3 months) by Laryee universal testing machine until the fracture was occurred.

Data obtained were analyzed statistically using one way ANOVA test and student t-test. ANOVA test results revealed statistically highly significant differences among the groups.

Further analysis using student t-test showed statistically no significant differences in shear bond strength between groups I and II in 24 hours ($P > 0.05$). After 3 months water storage, there was statistically high significant differences between the groups III and IV ($P < 0.01$).

Results showed that shear bond strength decreased with time. In non chlorhexidine groups, the drop in the shear bond strength after 3 months (group IV) showed statistically high significant difference ($p < 0.01$) compared to 24 hours group (II). However, in the chlorhexidine groups, no statistical significant difference was found between 24 hours and 3 months groups ($p > 0.05$).

Concerning the fracture mode, by using the magnifying lens (10X), the twenty-four hours groups showed mostly mixed mode of failure with high percentage. Group III treated with CHX the adhesive failure slightly increased compared with group I and group II, on the other hand the group VI treated with distilled water showed high percentage of adhesive failure.

In conclusion, the use of 2 % CHX gloconate solution after acid etching and before application of composite restoration to dentin have no effect on immediate bond strength (24 hours storage), and was effective in reducing degradation of resin-dentin bond interface after three months of water storage.