

***The influence of adhesive systems on  
bond strength between FRP post and  
packable composite resin***

***(A comparative Study)***

***A thesis***

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# *Abstract*

This in vitro study was conducted to evaluate and compare the bond strength between the packable composite core (Filtek P60) and the fiber reinforced plastic (FRP) posts (Postec Plus, Ivoclar) which were treated with different adhesive system by using pull out test.

Sixty FRP posts were seated on the custom made aluminum mold leaving 3mm of post exposed, the post specimens were then randomly divided into six groups (n=10), according to materials used as post surface treatments:

**Group: (A)** 37% wt phosphoric acid etching gel only.

**Group: (B)** 37% wt phosphoric acid etching gel + Silane coupling agents (Monobond- S).

**Group: (C)** 37% wt phosphoric acid etching gel+ Silane coupling agents (Monobond- S) + Total etch adhesives bonding agent (ExciTE).

**Group: (D)** 37% wt phosphoric acid etching gel+ Total etch adhesives bonding agent (ExciTE).

**Group: (E)** 37% wt phosphoric acid etching gel+ Silane coupling agents (Monobond- S) + Self-etching adhesives bonding agent (AdheSE).

**Group: (F)** 37% wt phosphoric acid etching gel+ Self-etching adhesives bonding agent (AdheSE).

A cylindrical shaped transparent plastic matrix was then used as a mold for Core build ups that was fitted on the elevation of aluminum mold, so that the composite, Filtek P60, can be packed into the matrix in one increment (bulk technique). After curing and removing the cylinder

plastic matrix from the mold, a further irradiation of 60 seconds of composite was carried out from all sides. The specimen was stored in an incubator at 37C° for one week, at 100% relative humidity.

Testing was done by the Universal testing machine (WP 300) applying pulling out force until the core was separated from the post.

The mode of failure of the bond surfaces were examined carefully by using 20X magnification power.

The data were statistically analyzed using Analysis of variance test (ANOVA) and student-t test.

The results revealed that there was no chemical bond between the packable composite core and the FRP posts, it consist only of a combination between micromechanical interlocking and sliding friction.

Also this result revealed that treating the post surfaces with phosphoric acid etching gel + Self-etching adhesive system, produce the highest bond strength values between the packable composite core material and the FRP posts followed by combination of phosphoric acid etching gel +silane solution + self-etching adhesive system, combination of phosphoric acid etching gel +silane solution + total etch adhesives bonding agent, phosphoric acid etching gel +total etch adhesives bonding agent, phosphoric acid etching gel +silane coupling agents in a decreasing manner.

While, the post surfaces which were treated with phosphoric acid etching gel only produce the lowest bond strength values between the packable composite core material and the FRP posts with high significant difference.

The post surfaces which were treated with a combination of phosphoric acid etching gel +silane solution + total etch adhesives bonding agent showed no significant difference as compared with the post surfaces which were treated with phosphoric acid etching gel +total etch adhesives bonding agent.

The examination of the bond surfaces by lens with 20X magnification power showed that only adhesive bond failures occurred between FRP post and packable composite core indicating that there was no chemical bond between composites core and fiber reinforced plastic posts.