

Effect of Pulpal Pressure and Immediate or Delayed Dentin Sealing Technique on Microtensile Bond Strength of an Adhesive Resin Cement to Dentin: An *In Vitro* Study

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Abstract

Objectives: To evaluate the effect of pulpal pressure and immediate (IDS) or delayed dentin sealing (DDS) technique on microtensile bond strength (μ TBS) of an adhesive resin cement to exposed human dentin.

Methods: Fifty extracted human third molars were divided into 2 groups: pulpal and non-pulpal pressure (PP, NP), which represented vital and non-vital tooth. Each group was divided into 5 subgroups: direct restoration (control), DDS technique and 3 IDS techniques, [etch-and-rinse (TE), self-etching (SE) and universal adhesive (U)]. The hydrostatic pressure of 20 cmH₂O was applied prior to adhesive application in PP groups during the experiment. The self-adhesive resin cement was used to bond a composite disc onto dentin for all groups. Ten small square beams from each group were fabricated and collected for μ TBS testing and mode of failure monitoring.

Results: All three IDS groups yielded a significantly higher μ TBS than control and DDS groups in both pulpal conditions. DDS groups yielded the lowest μ TBS. The presence of pulpal pressure caused a significant reduction of μ TBS in TE and DDS groups.

Conclusions: The IDS technique could produce higher μ TBS than the DDS and direct restoration technique in both pulpal conditions.

Keywords: pulpal pressure, dental adhesives, immediate dentin sealing