



# Adhesion of resin cement to dentin: effects of adhesive promoters, immediate dentin sealing strategies, and surface conditioning

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## Abstract

**Purpose:** This study evaluated the shear bond strength (SBS) of resin cement to dentin after applying two adhesive (A) systems with a combination of four different immediate dentin sealing (IDS) strategies, and two surface conditioning (SC) methods.

**Material and methods:** Human third molars ( $n = 140$ ) were collected and randomly split ( $n = 70$  each) between the two A systems (Clearfil SE Bond; Kuraray [AC] and Optibond FL; Kerr [AO]). The A groups were further divided into four IDS strategies (2 x one adhesive layer [IDS-1L]; 2 x two adhesive layers [IDS-2L]; 2 x one adhesive layer and one flowable layer [IDS-F]; 2 x no adhesive layer [delayed dentin sealing [DDS]). Finally, each strategy group was categorized into one of the two SC methods (only pumice [SC-P] or pumice and silica coating [SC-PS]), except the DDS group, where only SC-P was used. This resulted in 14 groups of 10 specimens each. The occlusal coronal third was removed from each molar crown with a diamond saw (Isomet 1000), and IDS was applied, followed by temporary restorations. These were removed after 2 weeks of water storage, and the IDS surfaces were subsequently conditioned. The standard

adhesive procedure (Syntac Primer and Adhesive, Heliobond; Ivoclar Vivadent) was executed, followed by the application of a resin cement (Variolink II; Ivoclar Vivadent) and photopolymerization. All specimens were subjected to thermocyclic aging (10,000 cycles, 5°C to 55°C). Shear force was applied to the adhesive interface in a universal testing machine (1 mm/min). Fracture types and locations after loading were classified. The data were analyzed using analysis of variance (ANOVA) and independent samples  $t$  tests.

**Results:** AO groups exhibited higher mean SBS values ( $14.4 \pm 6.43$ ) than AC groups ( $12.85 \pm 4.97$ ) ( $P = 0.03$ ). ANOVA showed the main effect of the applications on the SBS in the different groups ( $P = 0.00$ ). Both DDS groups showed significantly lower SBS values compared with all the IDS groups (IDS-1L, IDS-2L, IDS-F). No significant differences in SBS results were found between the IDS groups ( $P = 0.43$ ) and between the SC methods ( $P = 0.76$ ). Dentin-cement interface failures diminished with the application of IDS.

**Conclusion:** IDS improves the SBS compared with DDS. No significant differences were found between the tested conditioning methods.

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