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Measurement of shear bond strength to intact dentin

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Abstract:
Previously, we reported that the integrity of a resin composite restoration deteriorated when the dentin cavity wall was decalcified by conditioning. In this study, to evaluate the bonding between dentin adhesive and non-decalcified dentin surface, we experimented with a novel method of using a high-pressure water spray device to prepare smear layer-free dentin surfaces. When the smear layer was removed, shear bond strength significantly increased regardless of the removal method employed. Further, with glyceryl monomethacrylate (GM) priming, no significant differences in bond strength were observed among these smear layer removal methods: ethylenediamine tetraacetic acid (EDTA) conditioning, phosphoric acid conditioning, and removal by water spray. It was also found that GM priming was key to achieving marginal integrity, whereas contraction gap width increased with phosphoric acid conditioning. It was thus concluded that the efficacy of a dentin adhesive should be evaluated by consistently observing the contraction gap in three-dimensional cavities rather than by mere measurement of bond strength to a flat dentin surface.

Key words:
Dentin adhesive, GM priming, Shear bond strength

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