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Micro-tensile bond strength of solely self-cured composite cement onto dentin

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To evaluate bonding effectiveness of a new experimental composite cement to dentin in terms of micro-tensile bond strength (μTBS) after 1-week ('immediate') and 6-month ('aged') artificial aging. Flat ground dentin of 32 human molars was prepared using 600-grit SiC paper. Self-made composite blocks (Clearfil AP-X, Kuraray Noritake) were bonded to flat dentin surfaces using 4 composite cements: Exp. HPC-100 (Kuraray Noritake), Multilink (Ivoclar Vivadent), RelyX Unicem 2 and RelyX Ultimate (both 3M). The composite cements were not light-cured but solely allowed to self-cure. The μTBS was measured using a LRX testing device (LRX, Lloyd) after 1-week and 6-month water storage. Bond strength data were analyzed by a Kruskal-Wallis test, followed by a post-hoc Nemenyi multiple comparisons analysis ($p<0.05$). The failure mode of representative fractured specimens was analyzed using scanning electron microscopy. The significantly highest μTBS was measured for the exp. HPC-100 composite cement, both after 1-week and 6-month water storage. No difference in μTBS was found between RelyX Unicem and RelyX Ultimate for both storage periods. The 'immediate' and 'aged' μTBS was lowest for Multilink.

As compared to the commercially available composite cements tested, the bonding effectiveness to dentin of the new exp. HPC-100 composite cement, being the experimental pre-cursor of Panavia V5 that was recently launched by Kuraray Noritake, was significantly higher and appeared resistant against 6-month water storage aging, this when all composite cements were solely self-cured.