

Dentin Bond Strength of Two Recent CAD/CAM-Materials After Storage

Simon Flury, Stefanie Z. Schmidt, Anne Peutzfeldt, Adrian Lussi

Department of Preventive, Restorative and Pediatric Dentistry, School of Dental Medicine, University of Bern, Switzerland

Purpose

To investigate the bond strength to dentin of two recent resin-ceramic materials for computer-aided design/computer-aided manufacturing (CAD/CAM) after 24 hours and after six months storage.

Methods and Materials

Ninety cylinders were milled out of Lava Ultimate (3M ESPE) and 90 cylinders out of VITA ENAMIC (VITA Zahnfabrik) (dimension of cylinders: $\varnothing = 3.6$ mm, $h = 2$ mm). All Lava Ultimate cylinders were sandblasted (aluminium oxide, grain size: 27 μ m) and cleaned with ethanol, whereas all VITA ENAMIC cylinders were acid-etched (5% hydrofluoric acid) and cleaned with water-spray. According to the three groups of cements used, the cylinders ($n = 30$ /resin-ceramic material) were further pretreated with 1) Scotchbond Universal for RelyX Ultimate (3M ESPE), 2) CLEARFIL Ceramic Primer for PANA VIA F2.0 (Kuraray), or 3) no further pretreatment for Ketac Cem Plus (3M ESPE). The cylinders were then bonded to ground human

dentin specimens with 1) Scotchbond Universal and RelyX Ultimate (light-cured), 2) ED PRIMER II and PANA VIA F2.0 (light-cured), or 3) no adhesive system; Ketac Cem Plus (self-cured). Shear bond strength (SBS) was measured after 24 hours for 15 specimens/group and after six months (37°C, 100% humidity) for the other 15 specimens/group. SBS-values were statistically analysed with non-parametric ANOVA followed by exact Wilcoxon rank sum tests ($\alpha = 0.05$).

Results

SBS of the two resin-ceramic materials and the three cements after 24 hours and after six months storage are shown in Fig. 1. The statistical analysis showed that the duration of storage had a significant effect on SBS of Lava Ultimate for all three cements but had no significant effect on SBS of VITA ENAMIC. For Lava Ultimate SBS-values were (MPa; medians after 24 hours/six months): 13.5/22.5 ($p = 0.04$) for RelyX Ultimate, 11.4/5.8 ($p = 0.0006$) for PANA VIA F2.0, and 0.34/0.09 ($p = 0.04$) for Ketac Cem Plus (Fig. 1). For VITA

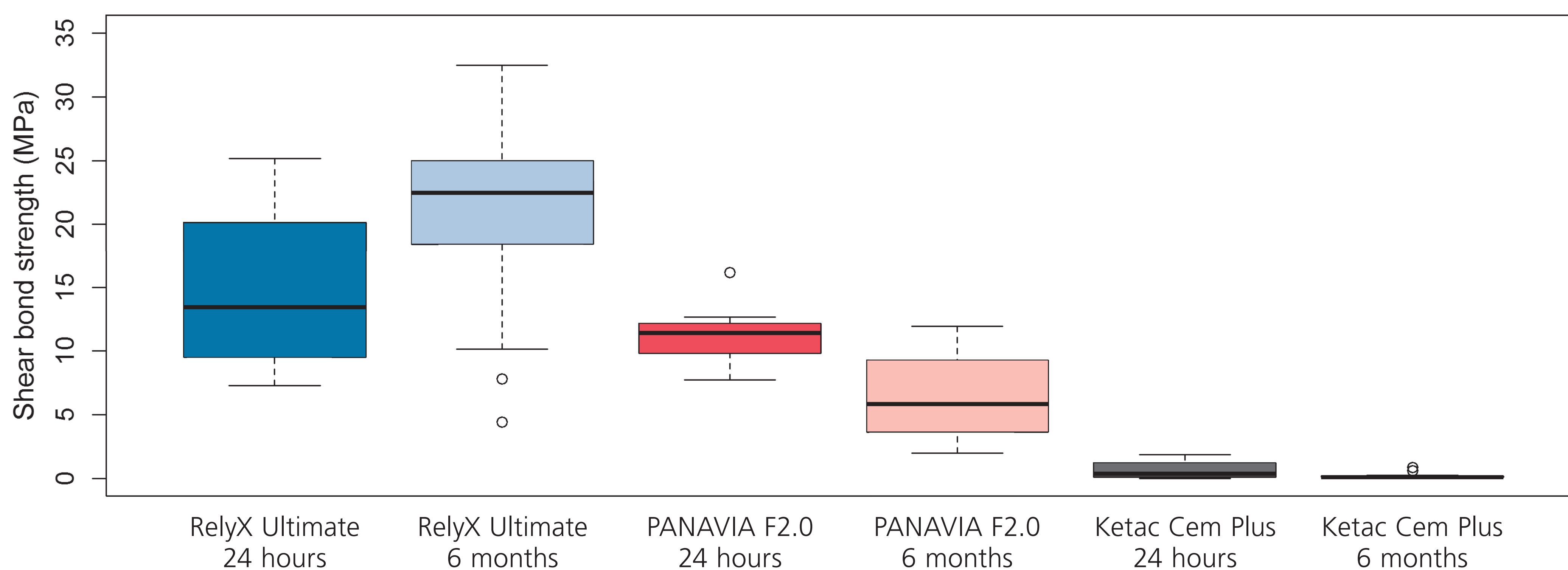
ENAMIC SBS-values were (MPa; medians after 24 hours/six months): 16.0/21.2 ($p = 0.10$) for RelyX Ultimate, 11.4/14.4 ($p = 0.06$) for PANA VIA F2.0, and 0.43/0.41 ($p = 0.32$) for Ketac Cem Plus (Fig. 1). After 24 hours, there was no significant difference in SBS between Lava Ultimate and VITA ENAMIC for all three cements ($p \geq 0.37$). After six months, there was no significant difference in SBS between Lava Ultimate and VITA ENAMIC for RelyX Ultimate and Ketac Cem Plus ($p \geq 0.07$) whereas for PANA VIA F2.0, SBS was significantly lower for Lava Ultimate than for VITA ENAMIC ($p < 0.0001$).

Conclusion

SBS of Lava Ultimate was more affected by six months storage and by the cement used than was VITA ENAMIC.

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Lava Ultimate



VITA ENAMIC

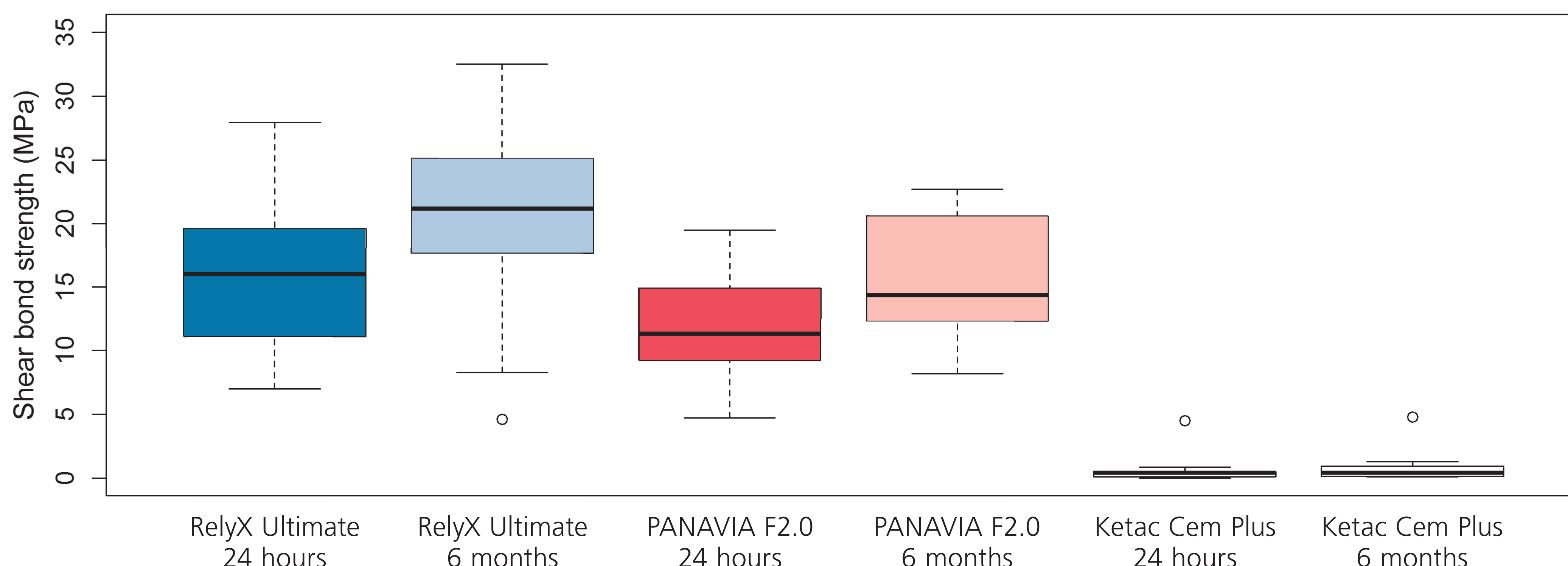


Fig. 1: Shear bond strength of the two resin-ceramic materials and the three cements after 24 hours and after six months storage.