COMMENTARY

Dentin Bond Strengths of Four Adhesion Strategies after Thermal Fatigue and 6-Month Water Storage[1]

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This paper measured the dentin microtensile bond strength of four adhesives after 24 hours of water storage, thermocycling for 20,000 cycles, and 6 months of water storage.[1] By comparing total etch one- and two-bottle bonding agents to one- and two-bottle self-etching bonding agents, the range of popular bonding agents currently available was tested. OptiBond FL (Kerr Corporation, Orange, CA, USA), a two-bottle total etch system, is one of the most successful, most clinically validated bonding agents used today. It was surprising that self-etching materials produced similar bond strengths to a total etch, clinically proven adhesive like OptiBond FL.

There are limits to this study. The first being that only normal cut dentin bond strength was measured. Normally, bonding with self-etching adhesives are decreased when the enamel is the substrate. Normal dentin was used which is the least mineralized tooth tissue with enamel and sclerotic dentin being the most mineralized. It is within the limits of this testing that the results should be applied to clinical practice.

Thermocycling is a well-established accelerated aging test. Clinical studies have measured temperatures present in the oral cavity using thermocouples to record temperatures at various locations while subjects ate and drank hot and cold foods and liquids. The temperature duration produced while eating is a very short 3 to 5 seconds before the food bolus moves.[2] Therefore, the dwell time should be shortened for most in vitro testing, or the testing labeled as an accelerated aging test. Since this in vitro study thermocycled 5 to 55°C, with a 30-second dwell time, it is not typical of intraoral cavity temperature changes.

The solvents used in these adhesives vary from ethanol in OptiBond FL and OptiBond SOLO (Kerr Corporation), to acetone only in the XTR primer (Kerr Corporation), to acetone and ethanol containing primer in OptiBond All-in-One (Kerr Corporation). The acetone solvent could affect the penetration coefficient of the XTR primer, and one would expect that the bond strength might be affected by the ability of the acetone to penetrate very effectively.

Self-etching bonding agents continue to improve, especially one-bottle self-etch systems. However, only clinical testing will truly evaluate the final effectiveness of any adhesive.

REFERENCES

1. Sezinando A, Perdigão J, Regalheiro R, Sezinando A. Dentin bond strengths of four adhesion strategies after thermal fatigue and 6-month water storage. J Esthet Restor Dent DOI 10.1111/j.1708-8240.2012.00531.x.
2. Bradford VP, Burgess JO, Hermesch C, et al. *In vivo* thermal measurements. J Dent Res 1994;73:406 [Special Issue (IADR Abstracts)]: Abstract 2436.

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This commentary is accompanied by article, "Dentin Bond Strengths of Four Adhesion Strategies after Thermal Fatigue and 6-Month Water Storage" Ana Sezinando, DMD, MS, Jorge Perdigão, DMD, MS, PhD, Rita Regalheiro, DMD, DOI: 10.1111/j.1708-8240.2012.00531.x.

 DOI 10.1111/j.1708-8240.2012.00532.x