COMMENTARY

The Effects of Different Desensitizing Agents on the Shear Bond Strength of Adhesive Resin Cement to Dentin

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In the in vitro study by Külünk and colleagues, the authors evaluated the effects of five different desensitizing agents on the shear bond strength of Panavia F 2.0 (Kuraray Co. Ltd., Osaka, Japan), a self-etching primer, resin cement. They reported that only one of the desensitizing agents that contained a mixture of 1% sodium and 1% calcium fluoride mixed with cellulose dissolved in ethyl acetate, lowered shear bond strength. The other four desensitizers significantly increased bond strength. Three of those four desensitizers contained high concentrations of hydroxyethyl methacrylate (HEMA), a superior wetting agent.[1] The fourth desensitizer, a light-cured resin, that increased bond strength contained proprietary hydrophilic monomers that can act as wetting agents. Panavia F is a relatively hydrophobic resin cement that does not wet moist dentin very well.[2] This is why the manufacturer includes a self-etching primer. However, if a desensitizing product produces a significant film on the dentin that would act as a barrier to cement penetration, then it is unlikely that the self-etching primer (ED Primer, Kuraray Co. Ltd., Osaka, Japan) could demineralize the underlying dentin enough for the Panavia F to interact with anything more than the top of the smear layer.

The results of this study are limited because they evaluated only one resin cement, Panavia F 2.0. It is clear that that time has come for a critical review article on the effects of desensitizing agents on the bond strength of luting cements because there are too many luting agents and desensitizers to include in a single study.

Too many authors concentrate on the wrong ingredients of products just because they are familiar with them. For instance, in the desensitizing product, Thermoline (Voco, Cuxhaven, Germany), that was evaluated by Külünk and colleagues, although the product contained 1% sodium and 1% calcium fluoride, the highest concentration of ingredients was due to cellulose, a polymer that left a thick surface coating similar to that produced by Copalite.[3] In such cases, neither ED Primer or Panavia F resin cement would have the opportunity to bond to dentin.

Another example of investigators concentrating on the wrong ingredient, is the desensitizing agent that contains HEMA and benzalkonium chloride (BAC), PrepEze (Pentron, Wallingford, CT, USA) that was also evaluated by Külünk and colleagues. The strong detergent action of BAC probably increases the wetting ability of resin cements even more than does HEMA. Hydrophobic resin cements like Panavia F may benefit from the use of desensitizing agents that contain BAC and HEMA more than would more hydrophilic cements. However, desensitizing agents that contains adhesive monomers like Gluma Desensitizer (Heraeus Kulzer, Hanau, Germany) or polymerizable resins will likely lower the bond strength of glass ionomer cements that need to chelate to dentin calcium. They would also tend to lower the bond strength of $ZnPO_4$ cements by filling in the irregular surface irregularities of smear layer-covered dentin.[4]

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