COMMENTARY

Influence of Adhesive Application Methods and Rebonding Agent Application on Sealing Effectiveness of All-in-One Self-Etching Adhesives[1]

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Although it is unreasonable to directly draw conclusions about how materials will perform clinically through evaluation of microleakage, it is one of the few tests we have to quickly compare materials in an in vitro setting and also one of the most used methods to rapidly obtain data on new materials. Despite the vague clinical significance of the test, I feel that several important conclusions in this study can benefit the clinician.[1] I must admit a slight bias against this category of "all-in-one" adhesives. I personally feel the one-step self-etch adhesive is the "Jack-of-all-trades master of none," in that they bond less effectively to dentin than two-step self-etch adhesives, and they bond less effectively to enamel than etch-and-rinse adhesives. Furthermore, they lack the real long-term clinical research of other categories of adhesives, and while they are getting better, I feel that more research is needed before I can recommend them. One issue that is very important and although exceptions exist, one-step self-etch adhesives are often incompatible with the autocure component of dual cure materials. The overly acidic oxygen inhibited layer protonates the tertiary amine in the redox initiator system rendering it inactive. Additionally, but not without exception, they are overly hydrophilic, undergo phase separation during storage, succumb to hydrolytic degradation, have high water-tree nanoleakage formation, have high microleakage, activate endogenous matrix metalloproteinases (MMPs), have lower long-term dentin and enamel bond strengths, and may actually be more time-consuming when used properly.

However, it is really not fair to generalize this category of adhesive like I have done earlier because the chemical bonding component, the ability to form stable covalent and ionic bonds with hydroxyapatite, seems to be directly related to the success of the adhesive. Each company has very different and often proprietary chemical components, and as a result, generalizing this category is near impossible. Therefore, the variability in data between specific brands of one-step self-etch adhesives in this present study confirms that the bonding agent must be considered independently of its category. Therefore, just as it is important not to generalize all adhesives in this category as inferior, it is equally important not assume what works for one to decrease microleakage will work for them all. For example, one can conclude that for the bonding agents tested, prior etching of enamel with phosphoric acid is a good option that will decrease microleakage, but this is not universally the case. Also, I have always been against etching dentin with phosphoric acid prior to applying a self-etch adhesive because this seems counterproductive, as this will remove all the mineral phase from the dentin and therefore crippling the ability for the chemical and covalent bonding to occur between the adhesive and the hydroxyapatite. Although this is generally true, the present study would recommend dentin phosphoric acid-etching when using the self-etch adhesive G-Aenial Bond (GC Corporation, Tokyo, Japan). In conclusion, it is important to know that we are not dealing with a homogenous category of adhesives when we talk about "all-in-one" adhesives. Therefore, we must pay attention to the fine details in the literature and push for new research dealing with this often-fickle group of adhesives.

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REFERENCE

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