A New Self-Etching, Light-Cured Bonding System

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Conventional acid etching creates microporosities in the enamel surface, thus promoting micromechanical retention and increasing the bondable surface area.[1-15] It also removes the organic film from the tooth surface, so that a more direct contact is established at the tooth-adhesive interface.

Although phosphoric acid has been the most common etchant since its introduction by Buonocore,[16-18] recent studies have shown that it may contribute to decalcification, development of white spot lesions around bonded orthodontic appliances, and enamel fracture, particularly when debonding ceramic brackets.[19-22]

Alternative etchants such as maleic acid have been found to produce clinically reliable bond strengths while reducing the depth of enamel dissolution. With any acid etchant, however, the risk of contamination by water and saliva is increased, especially in children, by waiting 30-60 seconds for the acid to penetrate the enamel. The patient also experiences the unpleasant taste of acid when it is rinsed off the tooth.

New products known as self-etching primers (SEPs) have recently been introduced to make bonding simpler and more effective. These systems combine the etching and priming agents into a single acidic primer solution,[23,24] eliminating the acid-rinse step and thus saving chairtime.

Several authors have described the clinical use of SEPs for orthodontic bonding,[25,26] and a recent survey showed that more than 20% of U.S. orthodontists now use them routinely.[27] Because the new primers do not penetrate or dissolve the enamel surface to the same depth as phosphoric acid,[28] they are increasingly being used in conservative dentistry for composite resin restorations. Several in vitro investigations have indicated that SEPs may also be less sensitive to water and saliva contamination.[29-32]

Current reports suggest that the new SEPs produce bond strengths comparable to those of conventional systems. Aljubouri and colleagues found that bonding 30 premolars in the laboratory using a SEP took 59 seconds less than with conventional acid etching.[33] The clean-up time after debonding was not significantly different between the two systems. If the primer and the bracket adhesive could be light-cured simultaneously, the bonding time could be reduced even further, amounting to a savings of several minutes per patient.

This article describes such a one-step technique.

Bonding Procedure

Bräjen Unibond* is a self-etching, light-cured bonding system that does not require acid etching, rinsing, or drying. Because of its structure, it creates an etching pattern similar to that produced by phosphoric acid. The acid is neutralized by the calcium hydroxyapatite of the enamel, but special compounds are able to penetrate to the mineral components of the enamel tissue. Thus, the SEP creates a microretentive bond, both by etching of the enamel and penetration of the fillers.

Bräjen Unibond provides strong adhesion, measured by independent testing for the manufacturer at an average bond strength of 22MPa, which allows immediate archwire placement. The adhesive is designed to release fluoride in an amount between that of glass ionomer cements and compomer materials. Its viscosity prevents bracket flotation, and it has good resistance to discoloration.

The bonding procedure is as follows:

1. Mix the clear Primer A with the yellow Primer B. The mixed primer turns pink for ease of identification during bracket positioning.
2. After isolating the teeth (Fig. 1), paint the

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enamel surfaces with the pink self-etching primer (Fig. 2).
3. Apply a small quantity of the composite paste to the bracket bases. Place the brackets—I use .022" Integra* ceramic brackets with a Roth prescription—and light-cure for about 10 seconds per tooth (Fig. 3). After polymerization, the chromatic agent in the primer turns invisible (Fig. 4).
4. Gently remove the colored bracket-identification spots from the brackets (Fig. 5).
5. Immediately insert the initial archwire—I use .016" round Orthocharger* coated nickel titani-

Fig. 3 Brackets light-cured for 10 seconds per tooth.

Fig. 1 Teeth isolated for bonding.

Fig. 4 Primer turns invisible after polymerization.

Fig. 2 Pink mixture of self-etching primers A and B applied, and ceramic brackets positioned on teeth.

Fig. 5 Colored identification spots removed from brackets.

um (Fig. 6).

This self-etching system is reliable enough for use even in situations where access is difficult and bonding has to be fast to avoid saliva contamination, such as fixed lingual retainers (Fig. 7) and lingual bracket replacement (Fig. 8).

Conclusion

The Bräjen Unibond system is currently used for all bonding procedures in my office. Combining acid etching and priming into a single

Fig. 6 Coated nickel titanium archwire in place.

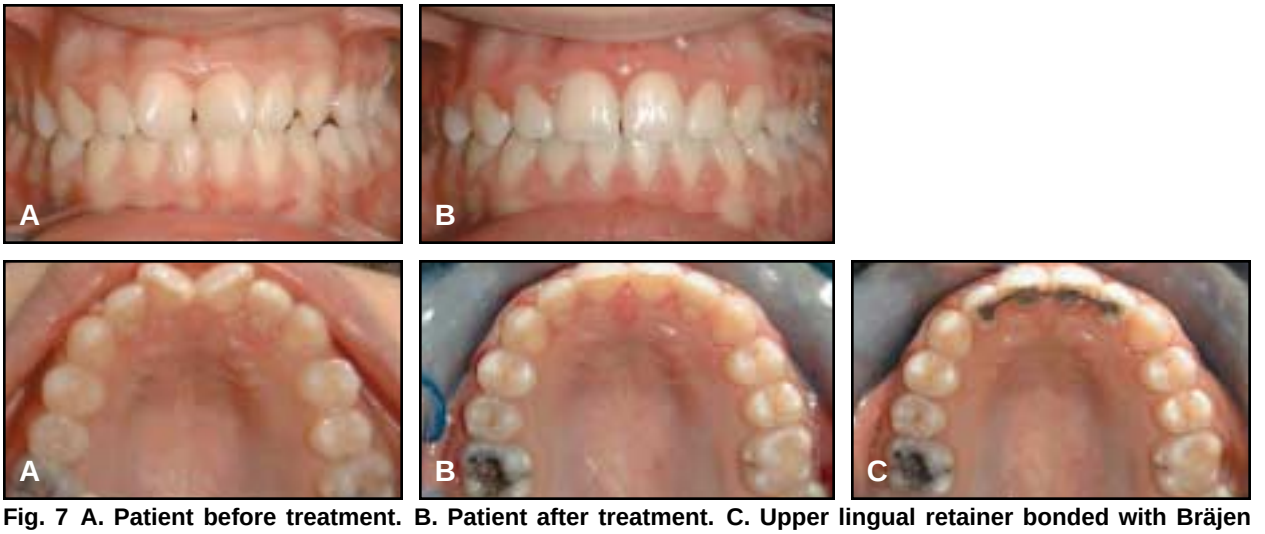

Fig. 7 A. Patient before treatment. B. Patient after treatment. C. Upper lingual retainer bonded with Bräjen Unibond.

Fig. 8 Upper left canine bracket rebonded with Bräjen Unibond.

step has substantially reduced chairtime and thus improved cost-effectiveness.

My results indicate that the one-step light-curing does not affect clinical bond strength. Long-term studies are needed to prove the reliability of this method.

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