Updated Patient Care Through Research

Bonding agents for direct and indirect restorations continue to evolve. Sixth- and seventh-generation bonding agents eliminate the need for etching with phosphoric acid by the use of an acidic primer. The 6th-generation – Type I bonding agents have self-etching primer and adhesive components that are applied separately to the tooth. The 6th-generation – Type II self-etching adhesives are first mixed and then applied. The 7th-generation bonding agents are self-etching adhesives that require no mixing. These self-etching bonding agents dissolve the smear layer of tooth structure when applied and do not require rinsing.

**Characteristics**

**6th-generation – Type I (Self-etching Primer and Adhesive)**
- Two bottles, Liquid 1 – acidic primer, Liquid 2 – adhesive; acidic primer applied to tooth, followed by adhesive
- Unprepared enamel may require etching with phosphoric acid
- Light-cured formulation
- Solvent is water
- Four products have separate catalyst for dual curing capabilities (Clearfil LINER BOND 2V, Contax, NANO-BOND, OptiBond Solo Plus Self-etch Adhesive System)

**6th-generation – Type II (Self-etching Adhesive)**
- AdheSE
- Clearfil LINER BOND 2V
- Clearfil PROTECT BOND
- Clearfil SE BOND
- Contax
- FL-Bond
- GC UniFil Bond
- NANO-BOND
- OneCoat Self-Etching Bond
- ONE-STEP PLUS with TYRIAN SPE
- OptiBond Solo Plus Self-etch Adhesive System
- Prelude

**7th-generation (No Mix, Self-etching Adhesive)**
- 3M ESPE Adper Prompt L-Pop
- Brush&Bond
- One-Up Bond F Plus
- Tenure Uni-Bond with Gloss-n-Seal
- Touch&Bond
- Xeno III
- G-BOND
- iBOND

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**Update: Self-etching Bonding Agents**

The October 2004 issue of THE DENTAL ADVISOR evaluates and rates dental products and equipment by objective clinical and laboratory protocols. The publication consists of clinical evaluations, comprehensive long-term evaluations, product comparisons and specialty reports. To subscribe, please call 734-665-2020.

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6th-generation – Type II (Self-etching Adhesive)
- Two bottles or unit dose containing acidic primer and adhesive; a drop of each liquid is mixed and applied to the tooth
- Unprepared enamel may require etching with phosphoric acid
- Light-cured formulation
- Solvent is water

7th-generation (No-mix, Self-etching Adhesive)
- Single bottle containing acidic adhesive
- Unprepared enamel may require etching with phosphoric acid
- Light-cured formulation
- Solvent is water

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Clinical Hints

- Teeth can be moist or dry – avoid pools of water or over-drying.
- Hemostatic agents and caries detectors – If contamination of the etched tooth occurs, rinse profusely with water and reapply the self-etching bonding agent.
- Drying the primer – Follow manufacturer’s recommendations for evaporating the solvent. Water does not evaporate quickly, so apply air more vigorously.
- Eugenol-based temporary restorations – Avoid eugenol-based provisional materials. Use a non-eugenol material.
- Bleaching agents – Residual oxygen from home or office bleaching inhibits polymerization of bonding agents. Wait one week after bleaching before a bonding procedure. Color of bleached tooth may rebound during this time as well.
- LED light-curing unit – Be sure the bonding agent is compatible with your light-curing unit (see product’s compatibility sheet). Bonding agents with initiators other than CQ (camphorquinone) may not be adequately cured by LED lights.
- Post-operative sensitivity – self-etching bonding agents dissolve the smear layer without exposing dentinal tubules, thereby minimizing post-operative sensitivity.

Use of Phosphoric Acid

Most manufacturers of self-etching bonding agents recommend the use of phosphoric acid to etch uncut enamel before application of the self-etching primer or self-etching adhesive. Even so, the improvement in bond strength may not be large. If the phosphoric acid also etches dentin, the bond strength of the self-etching adhesive to dentin may be reduced. This reduction may occur if the self-etching adhesive fails to completely penetrate the additional demineralized dentin produced by the phosphoric acid etch.

Compatibility with Self-cured Composites

6th-generation – Type I bonding agents are generally compatible with self-cured composite cores or resin cements. A compatible adhesive is applied to the primed tooth before the composite is applied. 6th-generation – Type II and 7th-generation bonding agents are generally not compatible with self-cured composite cores or resin cements. The acidity of the bonding agent can interfere with the setting of the composite.

Other Featured Products

- GC Unifil Bond (GC America)
- OneCoat Self-Etching Bond (Coltene/Whaledent)
- One-Up Bond F Plus (Tokuyama Dental Corp./J. Morita USA)
- Tenure Uni-Bond with Gloss-n-Seal (Den-Mat)
- G-BOND (GC Corp.)