

Adhesive Bonding of a Novel Dual-Cure Composite Core Material: IntegraBond™ and CompCore™ AF Dual-Cure

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[QA: The Case Presentation section was created because the figures were not cited in the text. Please review that section. Because the captions were long, I used them to create the Case Presentation section.]

Dentists face a complex array of products and materials for restoring teeth. Function and esthetics can be achieved with many of them, so the dentist frequently chooses products based on its ease-of-use and the product's ability to produce consistent successful restorative outcomes. Similarly techniques or therapeutic approaches recommend themselves by the number of years of clinical success and predictable results. The total-etch technique for adhesive bonding to dentin and enamel is well established. Fifth generation, single-bottle bonding agents using a total-etch technique now have a consistent track record of clinical success. While newer generations of bonding agents that incorporate the acid-etch or conditioning step in a single or double component system show great promise, many dentists view these products as experimental.

IntegraBond™ from Premier® Dental Products Company is a single-bottle 5th generation adhesive. It can be light-cured for conventional composite and resin-luted restorations or dual-cured with a separate activator component for chemical-cure and dual-cure composites, or when dark-curing is required. IntegraBond™ is easy to use when using a wet-bonding, total-etch technique. The proven acetone-based formula ensures complete integration with the collagen matrix to

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form a contiguous hybrid zone. Dentin tubules are occluded to eliminate the conditions that cause sensitivity. IntegraBond™ has a low film thickness and viscosity that allows dentists to coat the preparation without pooling. An optimal combination of photo initiators ensures complete polymerization with all types of lights. IntegraBond™ features an advanced nanofill to provide strength, better adhesion, and long-term stability.

Composite core materials offer distinct advantages over amalgam and glass-ionomer for fabri-

ating build-ups in vital and nonvital teeth. Composite materials generally demonstrate superior physical properties in compressive strength and elastic modulus, as well as easier handling and improved esthetics. Composite core materials require adhesive bonding, and there has been some compatibility issues between self-cure and dual-cure core materials, and single-bottle bonding agents. Premier® Dental Products Company and other manufacturers have introduced

cule. This booster molecule creates greater opportunities for cross-linking monomers, thereby promoting more complete polymerization. The end result is a superior compressive strength and significantly reduced composite shrinkage. CompCore™ AF Dual-Cure contains many additional product features like true fluoride release and a time-saving, automix dispensing system. The material has good flow, is stackable, and creates a dense void-free core that cuts like dentin.

IntegraBond™ and the activator component are included in the CompCore™ AF Introduction Kit and are also available together in Premier's IntegraBond™ Adhesive Kit with Premier® Etch. They are also available separately in economical 7-mL bottles. Used in tandem, IntegraBond™ and the Auto-Cure Activator™ produce optimum shear bond strength to CompCore™ AF Dual-Cure, when the instructions are executed. The application of multiple coats of bond/activator is critical to good adhesion.

CLINICAL PROTOCOL FOR ADHESIVE BONDING OF DUAL-CURE COMPOSITE CORE MATERIAL AND CORE FABRICATION

Isolate the tooth from all oral fluids. A rubber dam is recommended. Any contamination will compromise adhesive bonding.

self-curing or activating components to combine with the single-bottle adhesives like Premier's IntegraBond™. These additional activator components have increased bond strengths with dual-cure composites, however, they do require slight modifications in application techniques for optimal results.

MATERIAL CHARACTERISTICS

CompCore™ AF Dual-Cure is a unique composite core build-up material that incorporates conventional Bis-GMA with a patented, hyperbranched mole-

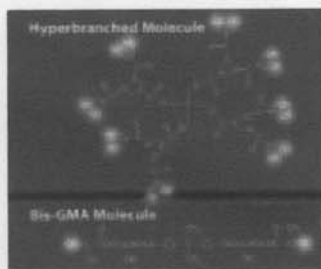


Figure 1—Conventional composite core Bis-GMA material polymerizes in a linear chain with significantly less cross-linking.



Figure 2—CompCore™ AF Dual-Cure Introduction Kit contains a 50-g automix-cartridge of composite core material, 4-mL bottles of IntegraBond™, and Auto-Cure Activator™ system compatible adhesives.

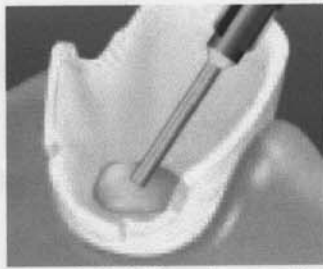


Figure 3—Etch the entire cavosurface with a 32% to 40% phosphoric acid for 15 seconds (for postpreparation, the canal and cavosurface can be etched at the same time).

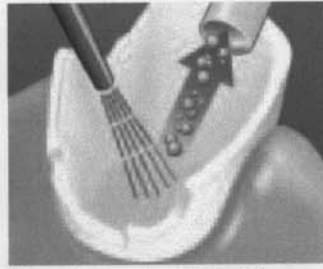


Figure 4—Rinse the etchant off by spraying water on it for 15 seconds. Etched enamel should appear frosted.

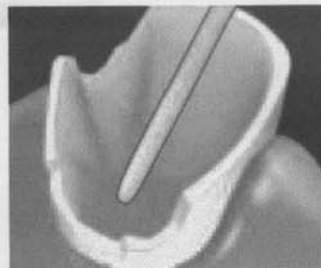


Figure 5—Blot dry the etched enamel and rinsed surfaces with paper points.



Figure 6—Mix 1 drop each of Auto-Cure Activator™ with IntegraBond™ in a clean mix-well for 2 seconds.

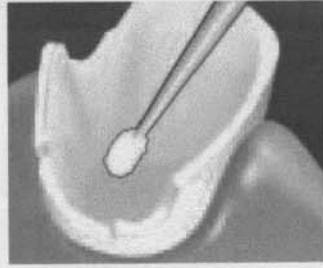


Figure 7—Apply the first coat over the entire cavosurface.

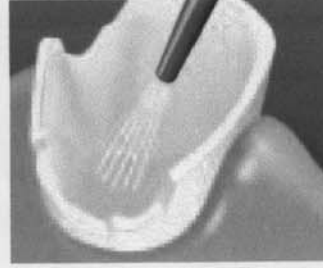


Figure 8—Allow IntegraBond™ mixture to sit for 15 seconds. Remove the solvents with a blast of air.

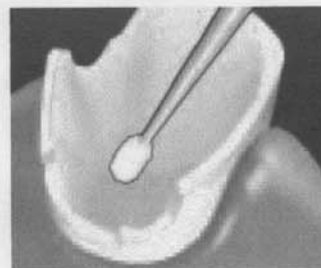


Figure 9—Apply the second coat and immediately blow the solvents off. Apply subsequent coats and continue to blow the solvents off after each coat.

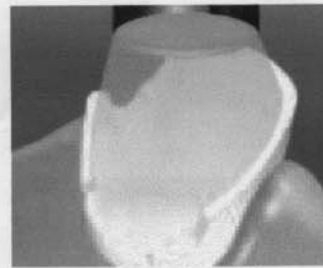


Figure 10—After the final application of bonding agent/activator, light-cure the prepared surface for 20 seconds.

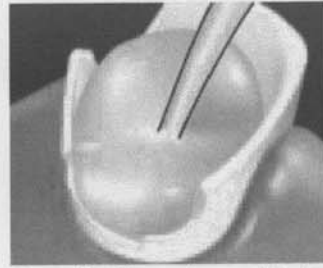


Figure 11—Place an intraoral tip into the base of the prepared tooth and dispense an adequate amount of material to complete build-up. This should take about 2½ minutes.

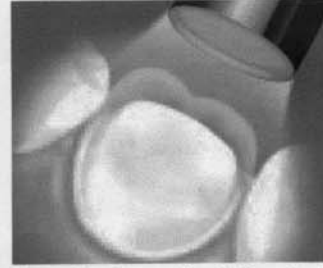


Figure 12—Do not disturb CompCore™ AF after syringe placement. Light-cure CompCore™ AF for 40 to 50 seconds. Chemical-cure should take almost 3½ minutes.

Bonding to dual-cure or chemical-cure composites with a single-bottle bonding agent like Premier® IntegraBond™ requires the use of an activator component like Premier® Auto-Cure Activator™. Multiple coats of bond/activator mix are necessary. One drop of each in a clean mix-well is sufficient material for four to five coats. IntegraBond™ is very fluid and will not pool. The mixing of bonding agent and activator has a diluting effect. Multiple coats of the mixed system adequately compensate for this effect. On selection of the shade for the core material, it is necessary to bleed an automix-

cartridge before first use and it is recommended to bleed the syringe mix-tip before each use to ensure an even mixture of base and catalyst.

CASE PRESENTATION

CompCore™ AF Dual-Cure's incorporation of a patented, spherical booster molecule creates multiple contact sites for more complete free-radical poly-

merization. Conventional composite core Bis-GMA material polymerizes in a linear chain with significantly less cross-linking (Figure 1). CompCore™ AF Dual-Cure Introduction Kit contains a 50-g automix-cartridge of composite core material, 4-mL bottles of IntegraBond™, and Auto-Cure Activator™ system compatible adhesives (Figure 2). Etch the entire cavosurface

with a 32% to 40% phosphoric acid for 15 seconds (for postpreparation, the canal and cavosurface can be etched at the same time) (Figure 3). Premier® Etch is 37% phosphoric acid. Rinse the etchant by spraying water on it for 15 seconds. Etched enamel should appear frosted (Figure 4). Blot dry the etched enamel and rinsed surfaces with paper points (Figure 5). Mix 1 drop each of Auto-Cure Activator™ with IntegraBond™ in a clean mix-well for 2 seconds (Figure 6). The mixed components increase bond strength to dual-cured composites like CompCore™ AF. Apply the first coat over the

On selection of the shade for the core material, it is necessary to bleed an automix-cartridge before first use and it is recommended to bleed the syringe mix-tip before each use.

entire cavosurface (Figure 7). Allow IntegraBond™ mixture to sit for 15 seconds. Remove the solvents with a blast of air (Figure 8). Apply the second coat and immediately blow off the solvents. Apply subsequent coats and continue to blow the solvents off after each coat (Figure 9). Look for light reflec-

tivity (a shiny surface) for a cue to sufficient coating (multiple coats are necessary because the activator dilutes the adhesive). After the final application of bonding agent/activator, light-cure the prepared surface for 20 seconds (Figure 10). This step is important for adhesive compatibility with the self-cure initiators

in dual-cure composite core materials.

Place an intraoral tip into the base of the prepared tooth and dispense an adequate amount of material to complete build-up. This should take almost 2½ minutes (Figure 11). Express the material while withdrawing the tip to eliminate air bubbles.

Product choice depends on a combination of factors: price, manufacturer's reputation for quality, clinical research, recommendation from a colleague or peer review journal, and ease-of-use.

Premier® ACCOR® (Premier® Dental Products Company) crown forms included in the CompCore™ AF Introduction Kit can be used as a matrix for the build-up. Do not disturb CompCore™ AF after syringe placement. Light-cure CompCore™ AF for 40 to 50 seconds. Chemical-cure should take almost 3½ minutes (Figure 12). Check for hardness and finish the preparations with a Two Stripper® (Premier® Dental Products Company) diamond.

CONCLUSION

Many products available to dentists today work equally well. Product choice depends on a combination of factors: price, manufacturer's reputation for quality, clinical research, recommendation from a colleague or peer review journal, and ease-of-use. Its ease-to-use does not necessarily mean less application steps. It indicates a comfort level with the technique that is based on an understanding of materials and processes. Product choice should be based on the quality of care it allows. With CompCore™ AF Dual-Cure and IntegraBond™, Premier® Dental Products Company offers a system compatible bonding agent and unique composite core material that can provide consistent and successful restorative outcomes.

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