OptiBond XTR

INTRODUCTION/MANUFACTURER’S CLAIMS
The OptiBond franchise continues to grow with the introduction of XTR, which is a two component, self-etching adhesive that claims to be as effective as its etch and rinse siblings, even on unprepared enamel. In other words, it is being promoted as a universal bonding agent for virtually all procedures.

USES
Direct and indirect light-cured, dual-cured, and self-cured restorations.

COMPOSITION
Primer
GPDm (glycerophosphate dimethacrylate), which is a monomer that has formed the backbone of the OptiBond family since its inception in 1993 and seems to be one of the primary reasons it continues to be a major player in the adhesive category. In addition, the primer has hydrophilic co-monomers including mono and di-functional methacrylate monomers, along with camphorquinone (CQ) as the photo-initiator, all in a solvent of water, ethanol, and acetone. This so-called ternary (3 part) solvent is stated to enhance its self-etching capability and facilitates its penetration into the tooth, which should lead to high bond strengths. Note that the CQ in the primer is supposed to enhance the light curing propensity of the adhesive.

Adhesive
Hydrophobic, structural, and cross-linking monomers, the identification of which is proprietary. It also contains CQ, along with fillers composed of 0.4 micron barium glass and nano-silica, plus sodium hexafluorosilicate in ethanol. This makes it 15% filled by weight.

PH
Component | pH
--- | ---
Primer | 2.4
Adhesive | 3.3*

* Increases to 6.5-7.0 (neutral) after applying and light curing

VISCOITY
Primer
All evaluators considered it acceptable.

Adhesive
All evaluators considered it acceptable.

ODOR
Primer
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Adhesive
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While one evaluator stated that most patients commented on the odor being very strong, another evaluator noted it has the usual smell of ethanol/acetone products and another evaluator stated the odor was on par with other bonding agents.
WHAT IS THE MOST EFFECTIVE APPLICATION TECHNIQUE FOR ALL RESTORATIONS?

1. Leave preparation DRY, but not desiccated. Most (78%) evaluators used dry, while the remaining 22% stayed with moist.

2. Apply the Primer for 20s using SCRUNBALLING technique. Note that “scrubbing” is a relative term, since the applicator included in the kit is quite flexible and only permits a moderate amount of pressure during this scrubbing phase. Most (78%) evaluators used 20s, while 11% thought 10s was enough and 11% felt 30s provided a higher confidence level. The scrubbing technique, however, was a tougher sell, with less than half (44%) of the evaluators using it compared to 56% using gentle agitation. We continue to recommend scrubbing, but we acknowledge that it is not always easy to perform intraorally, especially with the supplied applicator tips.

3. Apply GENTLE AIR initially followed by MEDIUM AIR to evaporate the solvents. Most (56%) evaluators used medium air, while 44% used gentle air, with at least two evaluators finishing with medium air.

4. Apply Adhesive for 15s using GENTLE AGITATION, followed by gentle to medium air to thin the layer and evaporate the solvent. If you are applying it for an indirect restoration, your air pressure needs to be strong enough to prevent the adhesive from pooling. If the adhesive layer pools or you have wrinkles, it could prevent complete seating of your restoration.

5. Light-cure for 10s.

Using this technique, the bond strengths (MPa) with light-cured composite were:

<table>
<thead>
<tr>
<th>SUBSTRATE</th>
<th>IMMEDIATE</th>
<th>24 HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enamel (unprepared)</td>
<td>19.2</td>
<td>33.1³</td>
</tr>
<tr>
<td>Enamel (prepared)</td>
<td>17.4¹</td>
<td>28.2⁴</td>
</tr>
<tr>
<td>Dentin</td>
<td>23.6²</td>
<td>34.1⁵</td>
</tr>
</tbody>
</table>

1 Enamel fractured in two specimens
2 Dentin fractured in two specimens
3 Enamel fractured in four specimens
4 Enamel fractured in three specimens
5 Dentin fractured in six specimens

Interestingly, the bond strength to unprepared enamel actually appears to be higher than to prepared enamel. However, when the enamel fractures are taken into consideration (bond strength exceeded the cohesive strength of the substrate), there was very little difference between them. And, at 24 hours, all three substrates produced impressive results.

With self-cured composite, bond strengths in MPa to dentin were:

<table>
<thead>
<tr>
<th>TIME</th>
<th>BOND STRENGTH (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 min</td>
<td>11.7</td>
</tr>
<tr>
<td>24 hrs</td>
<td>22.4</td>
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</tbody>
</table>

INSIDE SURFACE OF INDIRECT RESTORATION

Adhesive, but do not cure. If you are using a low viscosity resin cement, applying the Adhesive as a wetting agent may not be necessary.

POST-OPERATIVE SENSITIVITY

Most (78%) evaluators had no patients complain of sensitivity, while the other 22% stated it occurred very infrequently. One evaluator stated that patients with histories of post-op sensitivity cited noticeable improvement.

PACKAGING

Bottles

Very basic, easy to stack, small footprint cardboard box with product identification on three sides and on top. Expiration date is on a label on the back. Plastic shrink-wrapped and taped for security. The color-coded labels and caps on the Primer (green) and Adhesive (gray) in addition to the encircled 1 and 2 (referring to which one goes 1st and 2nd) keep you from mixing them up. They also contain the expiration date, which resists removal during disinfection procedures reasonably well.

Unidose

Easy to stack cardboard box with product identification on three sides and on top. Expiration date is on a label on one side. Taped for security. There is a drop-down door on the bottom of the front side to allow reasonably easy retrieval of the unidose vessels that are identical (except for color) to those used for its sibling, OptiBond All-In-One.

The unidose vessel has a relatively broad, round base that allows it to stand on its own or it can be used by the assistant as a handle. The cylindrical receptacle for the primer or adhesive sits directly on this base and is flanked by bilateral wings that help stabilize it when the assistant holds it. The top section is a rounded triangle but flat in cross section. To remove the top, merely twist it in either direction using moderate pressure.

Once removed, the top cannot be used to protect the exposed adhesive from ambient light. If you want to use it for multiple preparations but not all at the same time, you’ll need to place the bottom section in a light-protected box to keep it from prematurely polymerizing. The unidose is only identified by the same color-coding and nomenclature for each component, but not the product name, although it is also imprinted with the expiration date.

Most (78%) evaluators liked both types of packaging, commenting that they were neatly organized and compact.

DIRECTIONS

Multi-language, plain paper booklet and a plastic-laminted foldout card with realistic color illustrations described in English. All evaluators surprisingly thought both versions were simple, clear, thorough, and easy to follow.

REALITY

OPTIBOND XTR

Strengths

Can handle virtually all adhesive tasks. Easy to use with really good directions. Only two components. Most evaluators reported no sensitivity. No dislodgements reported during evaluation period. Thin film thickness facilitates complete seating of indirect restorations. Two dispensing options.

Weaknesses

Strong odor of both primer and adhesive. Scrubbing directive is difficult to accomplish clinically. Still some cautions using it with veneers.

BOTTOM LINE

OptiBond pedigree, nearly universal use, and easy application move XTR to the top of the category despite the smell.

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