**Microtensile bond strength of self-etching adhesives with different application procedures**

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**Introduction**

Etching enamel and dentin has been a standard clinical procedure since 1979 to achieve adhesion on tooth structure. The materials used for bond restorations have been improved to simplify the application process. The more recent ones are sixth and seventh generation dentin bonding agents and referred as self-etching adhesives. These materials etch, prime and bond simultaneously; eliminating the separate applications of an etchant; priming and bonding agents. The smear layer is not completely removed; therefore; the material is contaminated due to the contact with dissolved smear layer. Due to this reason this research investigated the effects of the self-contamination with a modified method on bond strength of two commercially available self-etching systems. The hypothesis of this study is that the self-contaminants during repetitive application of self-etching systems will lead a significant decrease in the tensile bond strength.

**Purpose**

The purpose of this study was to evaluate the effects of two different application techniques (as recommended by the manufacturer and a modified technique) of self-etching adhesives on the bond strength to dentin by means of in vitro testing.

**Materials**

<table>
<thead>
<tr>
<th>Material</th>
<th>Product</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-etching adhesive system</td>
<td>Brush &amp; Bond</td>
<td>PARKELL</td>
</tr>
<tr>
<td>Self-etching adhesive system</td>
<td>Adper Prompt L-Pop</td>
<td>3M ESPE</td>
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<tr>
<td>Direct resin composite</td>
<td>Z100</td>
<td>3M ESPE</td>
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<tr>
<td>Core build-up composite</td>
<td>BisFil Core</td>
<td>BISCO</td>
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</tbody>
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**Methods**

- **Specimen Preparation**
  - Flat surfaces were prepared on mid coronal dentin with ISOMET.
  - **Bonding Procedure**
    - **Experimental Group**
      - Non-contaminated
      - Modified application technique (Fresh drop of material for each applied layer).
    - **Control Group**
      - Contaminated
      - Manufacturer’s recommended technique

- **Evaluations**
  - Failed interfaces were evaluated using SEM for typical specimens.
  - The results were statistically analyzed by a two-sample t-test (α = 0.05).
  - Cohesive failures were not included in the statistical analysis.
  - First layer of composite build-up ~1mm
  - Build-up is finished with a bulk of composite ~4-6mm
  - **Specimen preparation for µTBS testing**
    - Preparation of slabs ~1mm
    - Preparation of beams ~1mm, using ISOMET
  - Beams were positioned parallel and glued onto the fixture
  - Tensile force was applied until failure occurred

**Results**

- **Brush & Bond Results (MPa)**
- **Adper Prompt L-Pop Results (MPa)**

  - No significant differences were found between two groups for either of the materials (p=0.47, p=0.42)

**Discussion**

**Conclusions**

- Within the limitations of this study, the modified dentin bonding technique had no significant effect on the microtensile bond strengths of the self-etching adhesives tested.
- The hypothesis, the self-contaminants during repetitive application of self-etching systems will lead a significant decrease in the tensile bond strength was rejected.