

The influence of salivary contamination on dentin shear bond strength of two dentin adhesive systems

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I. Objectives

During bonding procedure of composite resin, the prepared cavity can be contaminated by saliva. This study evaluated the influence of salivary contamination during dentin bonding procedure on shear bond strength, and to investigate the effect of contaminant-removing treatments on the recovery of bond strength of two dentin bonding agents.

II. Material and Method

110 human molars were embedded in cylindrical molds with self-curing acrylic resin. The occlusal dentin surface was exposed and grinding up to #800 silicon carbide abrasive paper. Then they were divided into 5 groups for One-step® (OS) (Bisco, Inc., Schaumburg, U.S.A) and 6 groups for Clearfil SE Bond® (SE) (Kuraray Co., Ltd., Osaka, Japan). In OS group, the grinding surface was treated with 32% phosphoric acid (Bisco Inc., Schaumburg, U.S.A) and divided into 5 groups: OS control group (uncontaminated), OS I (salivary contamination, blot dried), OS II (salivary contamination, completely dried), OS III (salivary contamination, wash and blot dried), and OS IV (salivary contamination, re-etching for 10 seconds, wash and blot dried). In SE group following surface treatment was done: SE control group (primer was applied to the fresh dentin surface), SE I (after salivary contamination, primer applied), SE II (primer, salivary contamination, dried), SE III (primer, salivary contamination, wash and dried), SE IV (after procedure of SE II, re-application of primer), SE V (after procedure of SE III, re-application of primer).

Then, each bonding agent was applied and light cured for 10 seconds. Clearfil AP-X® (Kuraray Co., Ltd., Osaka, Japan) composite resin was packed into the Ultradent mount jig mold and light cured for 40 seconds. The bonded specimens were stored for 24 hours 37°C water bath, shear bond strengths were measured using Instron testing machine (Type 4411, Instron Corp., Canton, Massachusetts, U. S. A).

The data for each group were subjected to one-way ANOVAs followed by the Duncan's multiple range test to make comparison among the groups.

III. Results

1. In One-step groups, OS II group showed statistically significant lower shear bond strength ($p < 0.05$). OS I group showed lower bond strength but it is not statistical difference ($p > 0.05$).
2. In One-step groups, washing or etching (OS III and OS IV) of salivary contaminated dentin surface after acid etching can recover the bond strength.
3. In Clearfil SE Bond groups, SE II and SE III groups, saliva contamination after priming, resulted in much decrease in shear bond strength than control and SE I, SE IV, and SE V groups ($p < 0.05$).
4. In Clearfil SE Bond groups, re-priming treatment (SE IV and SE V) resulted in recovery of shear bond strength in the specimens contaminated after priming.

IV. Conclusion

In OS group, to recover the bond strength washing or etching the contaminated surface is recommended. If it is not impossible, the complete drying of salivary contaminated surface should be avoided.

In SE group, if the bonding surface is salivary contamination after acidic primer application, the re-priming treatment can recover the bond strength up to control.