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Influence of application time of self-etching primer on bonding to dentin

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I. Objectives

Self-etching primer adhesive system is affected to dentin surface conditioning and priming. Especially application time of self-etching primer is very important factor of clinical procedure which has direct influence on smear layer, etching reaction and primer penetration to dentin.

This study evaluated the influence of application time of self-etching primers on microtensile bond strength (μTBS) to dentin using three self-etching primer adhesive systems.

II. Materials and Methods

Forty-eight human molars were sectioned to exposed the dentin surfaces, and the dentin surface were conditioned with different self-etching primers (Clearfil SE Bond [SE], Unifil Bond [UF], Tyrian SPE+ONE Step Plus [TY]) for 10 s, 20 s, 30 s, 40 s. After conditioning, same manufacturer's resin composite "crown" of at least 4mm in height was formed in 2 mm increments. Each sample was sectioned to produce a beam or stick (adhesive area: 1.0 ㎟) and positioned to testing apparatus. And free end of samples were bonded with cyanoacrylate adhesive. Microtensile bond strength was determined in EZ test until dentin-composite interface failures at crosshead speed 1.0 ㎜/min.

The mean bond strength (n=80 for each group) were statistically compared using by one-way ANOVA and Tukey's Test at the 0.05 probability level.

III. Results

1. The μTBS was high in order of priming time for 20 s> 40 s> 30s> 10s in SE group, priming time for 30 s> 40 s> 20 s> 10 s in UF group, and priming time for 20 s> 10 s> 30 s> 40 s> in TY group.
2. For SE and UF groups, priming time for 10 s was significantly lower bond strength than that for 20 s, 30 s and 40 s ($p<0.05$). For TY group, priming time for 30 s and 40 s was significantly lower bond strength than that for 10 s and 20 s ($p<0.05$).
3. Priming time for 10 s in TY group was significantly greater bond strength than that in SE and UF groups ($p<0.05$), and priming time for 20 s, 30 s and 40 s in SE group were significantly greater bond strength than those in UF group and TY group ($p<0.05$).
4. The μTBS was high in order of priming time for 20 s> 30 s> 40 s> 10 s with no relation to adhesives.

IV. Conclusions

The data suggest that μTBS of employed self-etching primer adhesive systems was greatly influenced by the application time of primers; Bond strength was greatly decreased in priming timer for 10 s in SE and UF groups, and in priming time for 30 s and 40 s in TY group.