Originals Article

The Effect of Silanization and Thermocycling on the Microshear Bond Strength of Silane-containing Universal Adhesive to Aged Resin Composite

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Abstract

The purpose of this study was to evaluate the effect of silanization and thermocycling on the microshear bond strength (μSBS) of a silane-containing universal adhesive (Scotchbond Universal adhe-sive; 3M ESPE) (SU), and a 3-step etch and rinse adhesive system (Adper™ Scotchbond™ Multi-Purpose Adhesive; 3M ESPE) (SM). Seventy-two thermocycling-aged resin composite specimens were prepared and divided into four groups based on silane application. Group 1: no silane application before SM adhesive (SMN), Group 2: silane application before SM adhesive (SMS), Group 3: no silane application before SU (SUN), and Group 4: silane application before SU adhesive (SUS). Each group was randomly divided into two equal subgroups: 24 h in water storage (n=9) or 5,000-cycle thermocycling (n=9) before μSBS evaluation. The μSBS values were analyzed using Three-way ANOVA and Tukey's post hoc test (p=0.05) and the fracture modes of the fracture interface were evaluated. Threeway ANOVA indicated that thermocycling and silanization significantly affected μSBS (p<0.05), while the adhesive system did not affect μSBS (p>0.05). In the 24 h water storage subgroups, the SMS group had a significantly higher μSBS compared with that of the other groups. In contrast, in the thermocycled subgroups, there was no significant difference in μSBS between groups. In conclusion, after a 5,000-cycle thermocycling, the repair bond strengths of a silane-containing universal adhesive and a conventional etch-and-rinse adhesive were comparable.

Keywords: Aged resin composite, Microshear bond strength, Silanization, Thermocycling, Universal adhesive

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Introduction

The popularity of resin composite restorations has increased because their use can preserve tooth structure with high esthetic results. However, the oral environment and function can cause resin composites to degrade, resulting in defects, e.g. microleakage, marginal discoloration, wear, chipping, and restoration fracture.[1,2] Repairing the restoration