< ORAL PRESENTATION II >

O-5 ~ O-14 : Auditorium (7th F) 10:20 - 12:10

O-15 ~ O-23 : Seminar Room II (6th F) 10:20 - 12:00

O-5 The effect of cavity wall property on the shear bond strength test using iris method

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Ⅰ. Objectives

In the unique metal iris method, the developing interfacial gap at the cavity floor resulting from the cavity wall property, even with the good quality, during polymerizing composite resin might affect the nominal shear bond strength values. The aim of this study is to confirm that the iris method reduce the cohesive failure in the substrates and to evaluate that the effect of cavity wall property on the shear bond strength tests using iris method.

Ⅱ. Materials and Methods

64 extracted fresh human molars were embedded in self-curing epoxy resin. The teeth were sectioned through the mid-crown to expose the dentin surface and were polished on 500 grit silicon carbide paper. Prepared specimens were randomly divided into 4 groups and 4 experimental setups were used to simulate two different levels of cavity wall property (metal and dentin iris) and two different materials (ONE-STEP and ALL-BOND 2) for each wall property. Metal iris with Teflon coating represented no bond to cavity wall, and dentin iris treated with bonding agent represented an optimal bond to cavity wall. According to the manufacturer's instruction, the bonding agents were applied, and iris was fixed to the specimens. Then composite resin was packed and light-cured for 40 s. After 24 hours the specimens were loaded in shear mode until fracture in an Instron testing machine at a crosshead speed of 0.5 mm/min. After debonding, fracture analysis was performed using a 31.25x power microscope and steel images were captured. Then the fractures were classified as adhesive, cohesive in dentin, cohesive in the composite resin. Especially cohesive failure specimens were examined further by SEM. The data was analyzed statistically by a two-way ANOVA and t-test.

Ⅲ. Results

The most areas of fracture sections were greater than hole size. This is due to the bond area coating the entire dentin area. Without regard to bonding agent, the shear bond strength of metal group was significant higher than those of dentin iris group ($p=0.034$). In the condition of using ONE-STEP as bonding agent, the shear bond strength of metal group was significant higher than those of dentin iris group ($p=0.005$), but not in ALL-BOND 2 ($p=0.774$). The Percentage of cohesive failure was the lowest in M2 group (0%, metal iris, ONE-STEP), increasing among groups in the following order: D2 group (0.3%, dentin iris, ONE-STEP), D1 group (0.7%, dentin iris, ALL-BOND 2), M1 group (1.4%, metal iris, ALL-BOND 2). These results were very lower than the others that did not use iris method.

Ⅳ. Conclusions

The iris method may reduce significantly the cohesive failures in the substrates. The shear bond strength was affected by the cavity wall property in the condition of ONE-STEP, but not in ALL-BOND 2. According to the bonding agent systems, the effect of cavity wall property on the shear bond strength is different.