

REPAIR BOND STRENGTH OF AGED RESIN COMPOSITE USING UNIVERSAL ADHESIVE SYSTEM

BACKGROUND:

Nowadays, the repair of failed restoration is preferred when the damage was small according to its advantages. The main advantages of repaired resin composite include prevention of unnecessary removal tooth structure and dental pulp, reduction of chair time and costs of dental care and increasing of longevity of the restorations. New composite can be retained to old composite through micro-mechanical interlocking to irregularities in their prepared composite surface and through chemical bonding of silane coupling agent along with adhesive system. To perform a good repair resin composite restoration, a stable bond strength is required.

OBJECTIVE:

To evaluate the effect of universal adhesive system to repair bond strength of aged resin composite

DATA ANALYSIS:

Shapiro-Wilk test was used to evaluate if the data is normal distributed and Levene's test was used to evaluate homogeneity of variances. The data was normal distribution, One-way ANOVA was then utilized to find if there is significant difference between groups. Tukey's test was also used for comparing all tested groups.

RESULT:

Mean shear bond strength of the 3 groups are shown in Table 1. The mean shear bond strength values of group 1, group 2 and group 3 were 10.21, 15.86 and 14.14 MPa, respectively. Group 2 and 3 showed statistically significant higher shear bond strength than Group 1 ($p < 0.05$). However, there was no significant difference in shear bond strength between group 2 and 3 ($p > 0.05$).

Table 1. Mean and standard deviations of shear bond strength (MPa) in studied groups

Group	Mean Bond Strength (MPa) ± SD
Group 1 (Scotchbond™ etchant + Clearfil SE Bond)	10.21 ± 2.21 ^a
Group 2 (Scotchbond™ etchant + Clearfil Ceramic Primer + Clearfil SE Bond)	15.86 ± 2.87 ^b
Group 3 (Scotchbond™ etchant + Single Bond™ Universal Adhesive)	14.14 ± 2.80 ^b

Groups with the same letter do not show statistically significant difference ($p > 0.05$)

Under the stereomicroscope with a magnification of 45X, 53.33% of group 1 failed adhesively and 46.67% were mixed failure. While group 2 and 3 showed 33.33% of adhesive failure and 66.67% of mixed failure (figure 4).

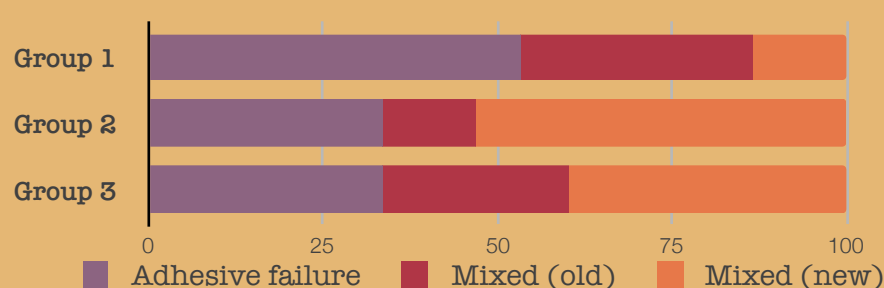


Figure 4. Percentages of fracture modes

MATERIALS AND METHODS:

Clear self-cured epoxy resin was poured into the prepared PVC (Figure 1). Flitek™ Z350 XT shade A1 was packed into 45 PVC tube (Figure 2). 45 packed composite specimens were thermocycled for 5,000 cycles between 5 and 55°C. The specimens were grinded by 500-grit silicon carbide waterproof abrasive paper, then, treated with Scotchbond™ etchant and divided into 3 groups. Group 1 was treated with Clearfil SE Bond. Group 2 was treated with Clearfil Ceramic Primer and Clearfil SE Bond. Group 3 was treated with Single Bond™ Universal Adhesive. Flitek™ Z350 XT shade A4 was packed in the split stainless steel mold to bond with the prepared specimens. All specimens were subjected to shear bond strength testing (Figure 3) and record the result.

The fractured surface of all specimens were examined at X45 under a stereomicroscope and classified as adhesive, cohesive and mixed failure.

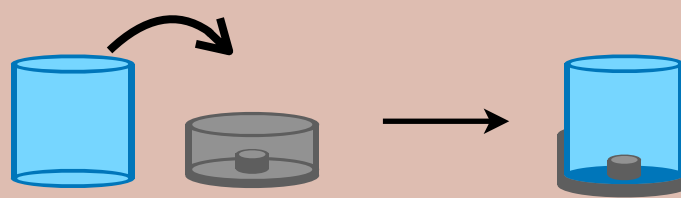


Figure 1. Specimen preparation

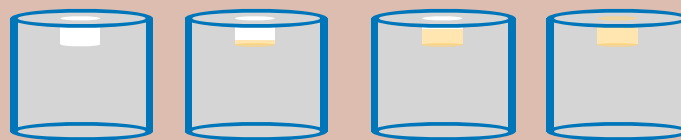


Figure 2. Composite packing in epoxy resin mold

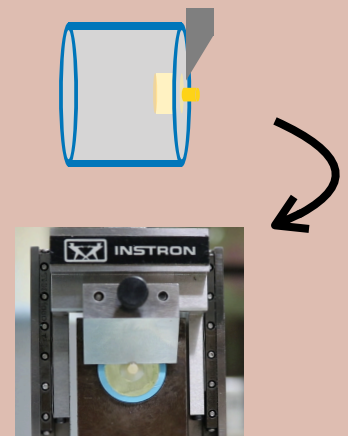


Figure 3. Shear bond strength testing of prepared specimens

CONCLUSION:

Within the limitations of this study, it was concluded that silanization can improve repair bond strength of aged resin composite and can be recommended to obtain optimal repair bond strength. The application of a silane-containing universal adhesive was as effective as use of silane and adhesive combination tested. The use of this material can be applied for nanofilled composite repair.

KEYWORDS:

Aged resin composite, repair bond strength, Repair resin composite, Shear bond strength, Universal adhesive system



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