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Effect of carbamide peroxide bleaching gel contains re-mineralization agent on microtensile bond strength of composite resins

A Salehi and **N Salehi**
Rafsanjan University of Medical Sciences, Iran

This study aimed to evaluate the effect of carbamide peroxide bleaching gel containing re-mineralization agents (CCP-ACP and fluoride) on microtensile bond strength of different composite resins. In this laboratory study, 30 extracted human molars were randomly divided into five groups, each group divided into two subgroups. Group 1: control, Group 2: bleaching gel without fluoride, Group 3: bleaching gel contains fluoride, Group 4: bleaching gel contains CCP-ACP, and Group 5: bleaching gel contain fluoride and CCP-ACP. In the first subgroup: nanofill composite resin (Filtek Z350 XT) and the second subgroup: microhybrid composite resins (Filtek Z250) were used for buildup on the enamel surfaces. After cutting the samples the universal test machine was used to measure the microtensile bond strength. Data were analyzed using one-way ANOVA and Tukey's tests via SPSS 21 software at a $P<0.05$ level of significance. The most microtensile bond strength of the composite resin to enamel was observed in control group and the lowest was observed in bleaching contains fluoride group. The average bond strength of the Filtek Z250 composite was higher than Filtek Z350 in all the groups. So the result show that applying carbamide peroxide bleaching gel and re-mineralization agent decreases microtensile bond strength of composite resin to enamel. Also microtensile bond strength of the nanofill composite resin (Filtek Z350 XT) is higher than the microhybrid composite resin (Filtek Z250).

armansalehi1984@gmail.com

Effect of shade and light curing mode on the degree of conversion of silorane-based and methacrylate-based resin composites

A Salehi and **N Salehi**
Rafsanjan University of Medical Sciences, Iran

The degree of conversion depends on the material composition, light source properties, distance from light source, light intensity, curing time, and other factors such as shade and translucency. We evaluated the effects of different light-curing modes and shades of methacrylate and silorane-based resin composites on the degree of conversion of resin composites (DC). The methacrylate-based (Filtek Z250, 3M ESPE) and low-shrinkage silorane-based (Filtek P90, 3M ESPE) resin composites were used in three groups as follows: group 1-Filtek Z250 (shade A3), group 2-Filtek Z250 (shade B2), and group 3-Filtek P90 (shade A3). We used a light-emitting diode (LED) curing unit for photo-polymerization. 10 samples were prepared in each group to evaluate the degree of conversion; 5 samples were cured using soft-start curing mode, and the other 5 were cured using standard curing mode. The DC of the resin composites was measured using Fourier Transform Infrared Spectroscopy (FTIR). The data were analyzed using Kruskal Wallis and one-way ANOVA statistical tests. The degree of conversion of silorane-based resin composite was 70 - 75.8% and that of methacrylate-based resin composites was 60.2 - 68.2% ($p=0.009$). The degree of conversion of the composite with brighter color (B2) was statistically more than the darker composite (A3). Higher degree of conversion was achieved applying the standard curing mode. The results of the study showed that the color and type of the resin composite and also the curing mode influence the degree of conversion of resin composites.

armansalehi1984@gmail.com