

Influence of Pre-heating Temperature on Nanoleakage and Degree Of Conversion Of Dual-Cured Adhesive/Resin Composite



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Abstract

The purpose of this study was to evaluate the effect of pre-heating temperature on dentin nanoleakage (NL) and degree of conversion (DC%) of dual-cured adhesive/resin composite. **Materials & Methods:** A total of 27 human-molars were divided into 9 groups (n=3/group) according to: 1) Adhesive temperature (25°C, 32°C and 40°C) and 2) Resin composite temperature (25°C, 32°C and 40°C). After removal of occlusal enamel, adhesive (Futurabond U, VOCO GmbH, Germany) was applied (20s), air-dried (5s) and light-cured (10s). Each dentin substrate was restored with 3mm height dual-cured composite (Rebuilda DC, VOCO GmbH), light-cured (40s) and stored (48h/37°C). Dentin slabs (2mm thickness) were immersed in silver nitrate (24h) and photodeveloping (8h) solutions. Slabs were examined under SEM. Three photomicrographs were taken for each slab and the relative percentage of silver nitrate uptake was measured using digital image analysis software and scored (0-4). Data were statistically analyzed using Jonckheere-Terpstra test (P=0.05). For adhesive DC%, adhesive was applied (20s) over Potassium Bromide pellets (n=5/each temperature), air-dried (5s), light-cured (10s) and stored dry (48h). For composite DC%, cylinders (2mmx2mm) were prepared (n=5/each temperature), light-cured (40s) and stored dry (48h). DC% for both adhesive and resin composite was evaluated using FT-IR spectra. Data were statistically analyzed using ANOVA/Tukey HSD test (P=0.05). **Findings:** For NL, Score 0 (64.49%) showed significant difference with Scores 1 (14.21%), 2 (11.73%), 3 (2.48%) and 4 (6.80%). Significant difference was also displayed between Scores 1 and 3. For adhesive DC%, 25°C (67.47±2.13%), 32°C (67.52±4.19%) and 40°C (68.85±6.21%) showed no significant difference. For composite DC%, only 40°C (68.61±2.91%) and 25°C (62.52±3.12%) showed significant difference. No correlation was found between adhesive DC% and NL (P=0.587) and between composite DC% and NL (P=0.355). **Conclusions:** The pre-heating temperatures did not affect nanoleakage score. Pre-heating of composite improved its DC%, with no influence on adhesive DC%.

Biography

Dr Sara A. Botros holds the position of Assistant Lecturer at the department of Restorative Dentistry, Faculty of Dentistry, British University in Egypt. She has an extensive experience in the scope of adhesive and restorative dentistry, which is the same field of her master's and PhD projects. She also collaborated in several research projects in the of branches of adhesion and dental materials. She has publications in prestigious journals and presented some of her works as poster presentations at international conferences

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