

Comparison of Depth of Cure and Degree of Conversion between Opus Bulk Fill and X-Tra Fill Bulk Fill Composites

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Abstract : Introduction: The degree of conversion and depth of cure affects the clinical success of resin composite restorations directly. One of the main challenges in achieving a successful composite restoration is the achievement of sufficient depth of cure. The insufficient polymerization may lead to a decrease in the physical/mechanical and biological properties of resin composites and, as a result of that, unsuccessful composite restoration. Thus, because of the importance of studying and evaluating the depth of cure and degree of conversion in bulk-fill composites, we decided to evaluate and compare the degree of conversion and depth of cure in two bulk-fill composites; x-tra fill (Voco, Germany) and Opus Bulk fill APS (FGM, Brazil). Materials and Methods: Composite resin specimens (n=10) per group were prepared as cylinder blocks (4×8 mm) with bulk-fill composites, x-tra fil (Voco, Germany) designated as Group A, and Opus Bulk fill APS (FGM, Brazil) designated as Group B. Depth of cure was determined according to "ISO 4049; Depth of Cure" method, In which each specimen were cured (iLED, Woodpecker, China) 40 seconds and FTIR spectroscopy method was used to estimate the degree of conversion of both the bulk-fill composites. The degree of conversion of monomer to polymer was estimated individually in the coronal half (Group A1 and B1) and pulpal half (Group A2 and Group B2) by dividing each specimen into two halves. The data were analyzed using a Student's t-test and one-way ANOVA at a 5% level of significance. Results: The mean depth of cure in x-tra fil (Voco, Germany) was 3.99 (±0.16), and for Opus Bulk fill, APS (FGM, Brazil) was 2.14 (±0.3). The degree of conversion percentage in Group A1 was 82.7 (±6.1), in group A2 was 73.4 (±5.2), in group B1 was 63.3 (±4.7) and in Group B2 was 56.5 (±7.7). Statistical analysis revealed a significant difference in the depth of cure between the two bulk-fill composites with x-tra fil (Voco, Germany) higher than Opus Bulk fill APS (FGM, Brazil) (P<0.001). The degree of conversion percentage also showed a significant difference, Group A1 being higher than A2 (P=0.0085), B1, and B2 (P<0.001). Group A2 was also higher than B1 (P=0.003) and B2 (P<0.001). There was no significant difference between B1 and B2 (P=0.072). Conclusion: The results indicate that x-tra fill has more depth of cure and a higher percentage of the degree of conversion than Opus Bulk fill APS. The coronal half of x-tra fil had the highest depth of cure percentage (82.66%), and the pulpal half of Opus Bulk fill APS had the lowest percentage (56.45%). Even though both bulk-fill composite materials had an acceptable degree of conversion (55% and higher), x-tra fill has shown better results.

Keywords : depth of cure, degree of conversion, bulk-fill composite, FTIR

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