

Microleakage in Composites Cured with Varied Exposure Times

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Objective: To investigate microleakage in composites cured by the Bluephase® PowerCure (Ivoclar) in three and five second curing modes, compared to a traditional curing time of 20-seconds.

Methods: Sixty posterior teeth were prepared with a Class II preparation. Prepared teeth were restored with either Ivoclar Tetric® EvoCeram® (n=30 – Evo) or Ivoclar Tetric® PowerFill (n=30 - Power). Ten samples of Evo restored teeth were cured with the Bluephase PowerCure in the three-second mode, 10 different samples were cured with Bluephase PowerCure in the five-second mode, and the last 10 samples were cured with the Bluephase PowerCure for 20 seconds. The same process was repeated for samples restored with Power restored teeth, creating six different groups. The samples were placed in 37° C deionized water for 24 hours then were thermocycled for 500 cycles between 5°C and 55°C (20 second dwell time). Directly after thermocycling, samples were immersed in 2% methylene blue dye for 24 hours then sectioned mesiodistally and evaluated under the Olympus® SZX16 microscope. Microleakage was evaluated using the 0-4 scale: 0=no leakage of the dye, 1=leakage penetrated enamel only, 2=leakage penetrated past the dentinoenamel junction (DEJ), 3=leakage reached the axial wall of the preparation, 4=leakage extended past the axial wall of the preparation. The evaluator was blinded to the group being evaluated when rating microleakage scores.

Results: Using the Kruskal-Wallis test, no significant difference in microleakage scores were found between Power samples cured with the 3s mode and the 20s mode ($p = 0.74$) or between the samples cured with the 5s mode and 20s mode ($p = 0.08$). There was a significant difference found in the microleakage scores of samples cured with the 3s mode compared to samples cured with the 5s mode ($p = 0.01$). There was no statistically significant difference in median microleakage between any of the light modes tested with Evo ($p = 0.50$) using Kruskal-Wallis test.

Conclusion: There was no statistical difference in microleakage values between 3s and 20s curing modes for Power. There were no statistical differences in microleakage values between any curing modes for Evo. Parameters such as shrinkage, stress, moisture control, sensitivity, plastic sleeve over light, positioning of the light, and composite shade must be considered in future studies.