COMMENTARY

EFFECT OF DIFFERENT LIGHT-CURING MODES ON DEGREE OF CONVERSION, STAINING SUSCEPTIBILITY AND STAIN'S RETENTION USING DIFFERENT BEVERAGES IN A NANOFILLED COMPOSITE RESIN

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The search for innovative and superior dental composites has assumed a significant place in dental materials research. The major concerns in the use of these composites systems are their performance in the oral environment post polymerization. As most systems use methacrylate-based resins, a considerable amount of polymerization shrinkage is encountered on placement onto the prepared tooth surface. Despite steady improvements in physical and mechanical properties, the polymerization shrinkage and resultant stress encountered with composite causes debonding of the restoration followed by leakage of salivary bacterial products in the restoration tooth, subsequently producing marginal staining and recurrent caries. Although extensive research to resolve this concern by using novel filler materials and revising resin chemistry is underway, there also appears to be a strong relationship between the mechanism of curing these resins and the physical properties of resultant composites.

In this study the authors aim to see the difference in surface microhardness, depth of cure, degree of conversion and cervical microleakage of commercially available composites cured with quartz-tungsten-halogen (QTH) and light-emitting diode (LED). Two different resin chemistries, methacrylate-based composites (MBC), and siloranes were tested. The authors of this study are to be commended for a controlled study with substantiated methods and materials to compare basic material properties.

Within the limitations of an in vitro study the results seem to suggest that both the LED and QTH modes of curing perform equally on silorane-based composites, whereas the degree of conversion is higher with LEDs for MBC. The overall depth of cure achieved with both sources of light also is lower for siloranes than MBC. The difference in the cure mechanism of this composite provides a slower cure by maintaining "live" for a longer duration. The initial conversion seems to not affect the cervical seal achieved by the siloranes, which is a factor of the stresses generated at the tooth composite interface. For all resin systems tested, the surface hardness was not found to alter significantly by using either cure unit. The data suggests that the silorane composite seems to perform adequately in vitro in comparison with MBC, and enhanced resistance to degradation by moisture over time can be expected from former. Whether or not the material properties tested in this study make a significant impact on the clinical performance of silorane restorations is yet to be substantiated. Additionally, the need for a dedicated bonding system for the silorane system may dictate its overall popularity and clinical success.

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