

A study on the depth of cure and microhardness of posterior composite resins

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I. Objectives

The physical properties of composite resin are influenced by the extent to which a resin cures and the degree of cure is an important factor in the success of the composite resins. The purpose of this study was to evaluate the microhardness and depth of cure and to determine if significant enhancements in physical and mechanical properties have been achieved for these materials compared with one popular conventional composite resin.

II. Materials and Methods

Posterior composite resin of SureFil, ALERT, Prodigy and hybrid type of Z-100 were used. Composite resin was filled in a mold with cylindrical cavity (diameter:6mm, thickness:2, 3, 4, 5mm) which was placed on the glass slide, after that, upper surface was pressed with a mylar strip and the glass slide. Upper surface was irradiated with intensity of 400 mW/cm². Curing time was 40 seconds. After curing the depth of cure of resins was evaluated by the measurements of microhardness. [Knoop Hardness Number (KHN)] KHN hardness values were obtained at 0, 2, 3, 4, 5mm using a 100g load and 10s dwell time. Adequate depth of cure was determined as the bottom hardness being at least 80% of the top.

III. Results

1. Conventional composite resin, Z-100 showed harder surface than that of posterior composite resin. Upper surface was generally harder than lower surface.
2. The depth of cure of composite resins decreased with increasing thickness of resin.
3. No composite had adequate depth of cure when tested in increments greater than 2mm thick.

IV. Conclusion

Packable composites are unlikely to offer improved clinical performance over conventional composites. No composite had adequate depth of cure when tested in increments greater than 2mm thick.