Cracking the Packable Composites (5/03)


Packable resin composites have been available since 1997, and dentists often use them as amalgam substitutes for the restoration of posterior teeth. They purportedly offer the advantages of having handling characteristics similar to those of amalgam, being able to be light cured in thicker increments than traditional resin composites, and having less shrinkage. This study evaluated the fracture toughness of three packable composites (SureFil, Dentsply/Caulk; Alert, Jeneric Pentron; Solitaire, Heraeus Kulzer) two conventional composites (Heliomolar, Ivoclar Vivadent; Herculite XRV, SDS/Kerr), and one laboratory-processed composite (Belleglass, Belle de St. Clair/Kerr). Eight specimens were made of each product by placing the composite in a circular mold into which a razor blade had been partially inserted. This resulted in specimens with a pre-established crack. After being cured, the specimens were removed from the mold and stored in water for seven days. They were then loaded to failure in a testing machine and the force required to fracture them was measured. Results found that Alert exhibited a significantly higher fracture toughness than the other composites, and Solitaire had a significantly lower one. There was no significant difference among the other three.

DIS Comment: Packable composites were introduced to the market as substitutes for amalgam in the posterior dentition. They were claimed to handle more like amalgam and to be packable, which made it easier to establish an acceptable proximal contact. The manufacturers of these products claim that their physical properties and handling characteristics are better than those of traditional hybrids and microfills. They purportedly have larger filler particles, higher filler loading, and different shapes and types of filler particles. If true, one would expect that their fracture toughness (their ability to resist failure from crack propagation) should be better than that of traditional composites because their filler particles should make it harder for cracks to move through the resin. This was not the consistent finding of this study, however. The packable composite with chopped microfibers as fillers, Alert, did perform significantly better than the others, but Solitaire performed worse. This shows that at least this physical property varies widely across the class of packables. Perhaps most surprisingly is that the indirect composite, Belleglass, did not perform better. One would expect that it would because it is processed using heat and pressure, which should make it more highly cured. DIS has found, and others have confirmed, that the physical properties of packables are generally no better than those of hybrid resin composites. It is also important to note that none can be cured to the 5-mm depth that their manufacturers claim, and they tend to be more expensive than traditional resin composites. Perhaps the main reason to use one is because they tend to resist packing better than traditional composites, so it is easier to establish a good proximal contact.