Clinical Relevance

The mini-flexural test holds promise as a replacement for the ISO flexural test for the dynamic and static appraisal of dental resin-based composites.

SUMMARY

The objective of this study was to determine the influence of specimen dimension and conditioning medium on the dynamic and static flexural properties of resin-based composites (RBCs). One conventional (Filtek Z350) and two bulk-fill RBCs (Filtek Bulk-fill and Beautifil-Bulk Restorative) were evaluated. Bar-shaped specimens with dimensions 25 × 2 × 2 mm (ISO flexural [IFT]) or 12 × 2 × 2 mm (mini-flexural [MFT]) were fabricated using customized stainless-steel molds, finished, measured, randomly divided into two groups, and conditioned in air or artificial saliva (SAGF) for seven days at 37°C. The specimens (n=10) were then subjected to dynamic and static three-point flexural testing. Data for storage modulus, loss modulus, loss tangent, flexural strength, and modulus were computed and subjected to t-test, analysis of variance/Tukey test, and Pearson correlation.
at a significance level of $\alpha = 0.05$. For both IFT and MFT, significant differences in
dynamic and static flexural properties were more prevalent between materials after
storage in saliva. For both conditioning mediums, the strongest correlation between IFT
and MFT was observed for flexural strength. While significant positive correlations were
observed for all flexural properties with saliva, no significant correlations were detected for
loss tangent and flexural modulus with air. For both IFT and MFT, storage in saliva
appeared to be more discriminative than storage in air. As moderate to strong positive
relationships exist between IFT and MFT for dynamic and static flexural properties, the
mini-flexural test holds promise as a replacement for the ISO 4049 in view of its clinical
relevance and greater efficiency.