

## Fracture Toughness of Composites and Compomers (3/04)

Fracture resistance of compomer and composite restoratives. Yap AUJ, Chung SM, Chow WS, Tsai KT, Lim CT. Oper Dent 2004;29:29-34.

Compomers or polyacid-modified composite resins were introduced in an attempt to combine the benefits of both glass ionomers (e.g., fluoride release, chemical bonding) and composite resins (e.g., ease of use, esthetics). Compomers have been marketed for use in all classes of restorations. Laboratory studies have shown lower mechanical properties (e.g., compressive and flexural strength) for compomer materials compared with composite resins.<sup>1</sup> Fracture toughness has been used to estimate *in vivo* wear and marginal and bulk fractures of composite resin restorations.<sup>2</sup> This is the first laboratory study to directly compare the fracture toughness of composite resins with compomers. Seven fracture-toughness specimens (i.e., single-edge notch) were fabricated using each of three compomers (Compoglass F, Vivadent; F2000, 3M EPSE; Dyract Posterior, Dentsply) and three composite resins (Tetric Ceram, Vivadent; Z250, 3M ESPE; Esthet-X, Dentsply). After one week of storage in water, the specimens were loaded to failure in a mechanical testing device (Instron).



**Analysis of variance found that the composite resins had significantly higher fracture toughness than the compomers.**

**DIS comment: Some product manufacturers market compomers for posterior placement. Limited clinical studies are available comparing composite resin and compomer materials in posterior restorations in the permanent dentition. In a three-year study by Wucker and others,<sup>3</sup> compomer restorations exhibited significantly greater occlusal wear and degradation of marginal integrity compared with the composite restorations. A two-year study by Luo and others<sup>4</sup> found acceptable clinical performance with a compomer in Class I and II restorations, but did not include a composite resin for comparison. Since compomers were found to be less resistant to crack propagation in this *in vitro* study, the authors expressed caution in their use in load-bearing areas of posterior teeth.**

### References

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