

## Abstract

### Compressive Deflection of Composite Layered on Biodentine and Two Bases

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**Objective:** To determine the mechanical-support-equivalency of three materials when used as bases below a composite restoration. Base materials must develop adequate stiffness to support the restoration during masticatory loading. The stiffness of a new calcium silicate dentin substitute (B, Biodentine, Septodont) and two commercially successful glass ionomer bases (F, Fuji IX, GC America; V, Vitremer, 3M ESPE) were compared at 4 curing times when an indenting load was applied to a simulated Class I composite restoration.

**Methods:** A stainless-steel test fixture composed of a base block and two plates each 1.85 mm thick with a cylindrical hole 4.04 mm  $\Phi$  drilled thru each was assembled to produce a cylindrical cavity with one closed end. The test materials were placed into the cavity of the first plate and allowed to cure for 10 min before adding the second plate and an equal layer of light-cured composite (TPH3, DENTSPLY Caulk). The materials were allowed to cure for 1/2, 1, 2, or 24 H before loading to 1334 N with a spherical-ended indenter attached to a universal test machine (Instron 5866). The deflection was determined for both 500 and 1334 N. **Results:** The composite did not fracture for any material or condition during loading.

#### Composite/Base Material Deflection @ ½ H Curing

Material	d@500 N, mm	d@1334 N, mm
B	0.17(0.045)	0.32 (0.07)
V	0.16 (0.03)	0.30 (0.03)
F	0.13 (0.01)	0.26 (0.01)

**Conclusions:** The composite applied as early as 10 min after initiation of mixing of Biodentine, Vitremer or Fuji IX exhibited no fracture when tested ½ H after initiation of mixing. Deflection of the composite and Biodentine at ½ H was greater compared to Fuji IX and similar to Vitremer. Biodentine has immediate physical properties comparable to other base materials so that it can be used as a dentin substitute and the tooth restored with composite resin during the same treatment visit.

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