



# Bond strength and failure characteristics of zirconia-based dental ceramic to resin cements

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## Abstract

**Purpose:** The objectives of this study were to determine the microtensile bond strength of zirconia-based dental ceramics to three resin cements and to define their failure characteristics.

**Materials and Methods:** Zirconia specimens (IPS Emax ZirCAD) were cut from pre-sintered blocks and fired to the final dimension of 10mmx10mmx4mm. Bonding between zirconia material was made using three resin cements and their corresponding adhesives, which were Panavia F2.0, Multilink N, and Calibra Esthetics resin cements. All bonded specimens were stored at 37°C for 24 hr and cut into microbars (1mm x 1mm x 8 mm). All microbars were loaded in tension at a crosshead speed of 1 mm/min using a universal testing machine. Microtensile bond strength were calculated and analyzed using one-way ANOVA at  $\alpha=0.05$ . The fracture surfaces were investigated using a scanning electron microscope.

**Results:** The mean microtensile bond strength of zirconia bonded to Multilink N ( $35.5 \pm 7.6$  MPa) was significantly higher than those bonded with other resin cements. The mean microtensile bond strength of zirconia bonded to Panavia F2.0 and Calibra Esthetics were comparable (21.6-22.9 MPa). Failure of specimens in all groups originated at the interface between resin cement and core ceramic.

**Key words:** adhesive bonding, bond strength, dental zirconia, resin cement, microtensile

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