In Vitro Bond Strength of Adhesive Cements to Tooth Structure

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Purpose – Recently, new self-etching resin cements have been introduced into the dental market. The purpose of this study was to determine the bond strength of three dual-cured, self-adhesive cements (EMBRACE WetBond Universal Resin Cement/Pulpdent, Maxcem/SDS Kerr, RelyX Unicem Self-Adhesive Universal Resin Cement/3M ESPE) using light- and self-cured modes to bond pre-cured composite to extracted human enamel and dentin.

Methods – Extracted human third molars were abraded on the facial surface with 600-grit SiC paper to form bonding substrates of enamel or superficial dentin. A resin composite (Filtek Supreme/3M ESPE) was fabricated in a mold in the shape of an inverted truncated cone (3-mm bond diameter) and light cured. Each adhesive resin cement was applied in a thin layer as recommended by the manufacturer. The cured composite was then applied to the tooth with finger pressure for 10 seconds. Specimens were stored at 37 C for the cement’s recommended setting time and then the cement was light cured (from four sides) or self cured following manufacturer’s directions. Bonded specimens were stored in water at 37 C for 24 hours before debonding in tension on a testing machine (Instron) at a crosshead speed of 0.5 mm/min. Means and standard deviations of bond strength were calculated and failure sites were recorded. Data were analyzed by analysis of variance and Fisher’s PLSD test at the 0.05 level of significance.

Results – The bond strengths (MPa) are listed in the table. All bond failure sites were 100% adhesive at the cement-tooth interface.

Conclusions – For cementation to enamel, RelyX Unicem had the same or higher bond strengths as EMBRACE WetBond. Both cements had higher bond strengths than Maxcem. For cementation to dentin, RelyX Unicem had higher bond strengths than either EMBRACE WetBond or Maxcem. In most cases, light curing improved bond strengths.

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