Abstract

PURPOSE: To evaluate the effects of tribochemical silica coating and different 10-methacryloyloxydecyl dihydrogen phosphate (MDP)-containing primers on the shear bond strength (SBS) of orthodontic metal brackets to yttrium-stabilized tetragonal zirconia polycrystal (Y-TZP) surfaces.

MATERIALS AND METHODS: One hundred ninety polished Y-TZP specimens were randomly assigned to 19 groups (n = 10): 30 specimens were used for surface analyses after polishing with 600-grit silicon carbide paper, airborne-particle abrasion with 50-μm alumina (A), or tribochemical silica coating (CoJet [C]); 160 specimens were used in SBS testing of orthodontic metal brackets to Y-TZP after alumina airborne-particle abrasion or tribochemical silica coating and application of either ESPE-Sil (S) (ASn, ASa, CSn, CSa), Alloy Primer (AP) (AAPn, AAPa, CAPn, CAPa), Clearfil Ceramic Primer (CP) (ACPn, ACPa, CCPn, CCPa), or Scotchbond Universal (U) (AUn, AUa, CUn, CUa) and either stored in water for 24 h (non-aged, n) or thermocycled 5000 times (aged, a). The surface analyses and SBSs were statistically analyzed with ANOVA and Tukey’s tests.
RESULTS: Both mechanically treated surfaces had significantly greater surface roughness and surface free energy than did the polished surfaces. The type of primer and aging significantly affected the bond strength. Among the thermocycled specimens, the AAPa, AUa, and CCPa groups showed the greatest SBS.

CONCLUSION: After alumina airborne-particle abrasion, the application of Alloy Primer, Clearfil Ceramic Primer, or Scotchbond Universal provided stable bonding to Y-TZP ceramics. After tribochemical silica coating, however, only Clearfil Ceramic Primer produced a durable bond to Y-TZP ceramics.

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