Abstract:
To evaluate post-to-composite bonds in terms of their durability, achieved either by physical vapor deposition (PVD) or tribochemical silica coating (TSC) compared to coupling strategies for fiber posts at chairside. Thirty uncoated fiber posts (DT Light) each were either left untreated (control) or silanized with a one-bottle (Monobond Plus) or a two-bottle (Clearfil SE Bond/Porcelain Bond Activator) silane at the chairside. Thirty coated fiber posts each had already been silica coated and silanized by the manufacturer using PVD (DT Light SL) or TSC (DentinPost Coated) deposition techniques. Surface analysis was carried out by profilometry and x-ray microanalysis. All the posts were surrounded by 2-mm-thick disks of a dual-curing composite resin (MultiCore Flow). After water storage for 24 h at 37°C, the specimens in each group were randomly divided into three subgroups (n=10) and subjected to 0, 1500, and 20,000 thermocycles (5°C to 55°C) prior to push-out testing. Failure modes were evaluated by optical and scanning electron microscopy. The statistical significance was determined with two-way ANOVA, the Student-Newman-Keuls test, and Fisher’s exact test. The conditioned posts had significantly higher interfacial bond strengths than the control posts after thermocycling (p<0.05). Coatings deposited by TSC reached the highest bond values (p<0.05) and showed predominantly
adhesive failures in the form of coating delamination (p<0.0001). In contrast, the other coupling strategies showed significantly lower values and adhesive failures between the post and the composite. PVD and TSC techniques enhanced the bond durability of fiber posts. TSC led to a superior post-to-composite bond, probably based on more effective micromechanical adhesion due to the higher surface roughness.