

Effect of Food and Oral Simulating Fluids on Structure of Adhesive/Composite Systems

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Abstract

This work evaluates the degradation of three adhesive/composite systems (Tenure/Marathon One, Scotchbond Multi-Purpose/Z100 and Optibond/Herculite XRV) upon immersion in 75% ethanol solution and in an artificial saliva (Moi-Stir). Shear bond strength (SBS) and diametral tensile strength (DTS) specimens were employed for this study. For the SBS specimens, the bonded interface and composite were exposed to food and oral simulating fluids at 37 degrees C for up to 30 days. A similar control series was stored in air. DTS specimens were stored in 75% ethanol at 37 degrees C for up to 30 days. The SBS specimens were sheared to failure. Small quantities of bonding resin were removed from the tooth side of the fractured surface and from the non-fractured end of the composite for Fourier transform infrared microscopic evaluation. Similar scrapings were taken from DTS specimen surfaces. The infrared absorbance intensity (AI) of the major peaks was measured as a function of storage time and ratioed against the aromatic C = C (1609.4 cm⁻¹) peak. The data were analysed using ANOVA and the Tukey LSD test. The AI of major peaks was similar for the materials stored either in air or in Moi-Stir for all testing periods. Storage in ethanol caused the AI of aliphatic C = C (1638 cm⁻¹) and of O-H (approximately 3500 cm⁻¹) bonds to significantly decrease (30-50%) for specimens of bonding resin while the AI of C = O bonds (1730 cm⁻¹) increased (60-120%). (ABSTRACT TRUNCATED AT 250 WORDS)