

Degradation of repaired denture base materials in simulated oral fluid.

李勝揚,林哲堂

Lin C-T; Lee S-Y; Tsai T-Y and Dong D-R

Abstract

This in vitro study evaluates the degradation of repaired denture bases upon immersion in a simulated oral fluid. Denture base materials (Luciton 199), after being repaired by Repair Material and Triad, using three different joint surface designs (butt, round and 45 degrees bevel), were immersed onto 99.5 vol.% ethanol/water solution (with similar solubility parameter) for various amounts of time (0-72 h). The flexural loads of the six combination of groups were measured by the three-point bending tests using a universal testing machine. Acoustic emission (AE) during sample fracturing were processed using the MISTRA 2001 system. The fracture pattern and surface details of the interface were examined with a scanning electronic microscope (SEM). Data were analysed using three-way ANOVA and Tukey LSD tests. SEM micrographs of the fracture interface were used to differentiate the fracture mode. The flexural loads (2.72 ± 0.51 Kgf) of the round joint specimens were significantly higher ($P < 0.05$) than those (butt: 1.66 ± 0.38 Kgf, 45 degrees bevel: 1.93 ± 0.41 Kgf) of the other two designs. This corresponds to the microscopic examination in which more cohesive failure mode was found for the round joint group after storage. The flexural loads (2.54 ± 0.39 Kgf) of the specimens repaired with Triad were significantly higher ($P < 0.05$) than those (1.59 ± 0.40 Kgf) of specimens repaired with Repair Material. Significant progressive reduction of the flexural load and/or AE signals of the specimens was noted in proportion to the length of time of the immersion in the simulated oral fluid. Mechanical strength of a denture base repaired with a round joint design and light-cured material is significantly higher after immersion in simulated oral fluid.