

## The Impact of Alcoholic Solutions on Polyacrylate Materials

**Introduction:** PMMA (polymethylmethacrylate) is still widely used in denture fabrication. In daily denture hygiene, patients often use means that are not recommended by dentists, including those containing alcohol due to its disinfecting qualities. This study aimed to quantitatively describe the effect of denture disinfection in alcohol solutions on the physical parameters of the material.

**Purpose:** To evaluate the effect of alcoholic solutions with different percentages of ethanol on the

**Material and Methods:** 15 samples of fast-polymerizing (Duracryl Plus) and 15 samples of slow-polymerizing (Vertex Rapid Simplified) polyacrylate were made. The samples were then immersed in Listerine (21.6% ethanol), spirit (98% ethanol) and water, ISO grade 2, for 12, 24 hours, 1, 2, 4 weeks. After each removal from the solutions, the samples were weighed and their microhardness was examined under a microscope.

**Results:** After being placed in the solutions of the compounds, the weight of the test samples increased and the microhardness decreased. Faster solution saturation, and thus a faster increase in mass and decrease in microhardness, compared to initial values occurred for fast-polymeric polyacrylic in 98% ethanol. It changed mass by 40% after 24 hours and this value did not change in subsequent measurements.

For slow-polymerized polyacrylic, the weight change after 4 weeks was 43.7%. The percentage weight gain for 21.6% ethanol was less. In both alcohol solutions, the microhardness gradually decreased to values that could not be measured at the end. After drying, the samples permanently changed their dimensions.

**Conclusions:** Ethanol, which is an organic solvent, is a better solvent for polymers than water. Improper hygienic procedures involving too long exposure of the polymer in water and alcoholic solutions are associated with increased absorption of the solvent, which can affect the degradation of the internal structure of the material and reduce wear resistance.