

An Experimental Study on the Effect of Heptane Food Simulating Liquid on the Micro-hardness of Four Different Resin Composites

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Abstract

Background and Aim: One of the problems encountered in the restorative dentistry is the degradation of composites in the presence of foods, saliva, and their interaction. In view of that, this study evaluates the effect of Heptane food simulating liquid on the micro-hardness of four different Z250, Z350XT, P60, and P90 composites.

Materials and Methods: In this experimental-in vitro study, 20 disks of 2 mm in height and 5 mm in diameter are prepared from each composite (leading to a total number of 80 samples). Using an LED light cure unit, the specimens are carefully polymerized for 40 seconds under a 1000 mw/cm² light radiation and then immediately polished under water spray by means of subsequent application of coarse to super-fine aluminum oxide disks. These samples are immersed in a 37°C distilled water dark tank for 24 hours. Next, samples of each composite are randomly put into two equal groups of ten. The micro-hardness of each sample is then measured in a Vickers microhardness testing machine. Next, keeping temperature at 37 °C, the first (control) group and the second (test) group are immersed for 7 days in distilled water and Heptane food simulating liquid, respectively, and the micro-hardness is re-evaluated for each disk. Finally, the recorded data are analyzed using one-way analysis of variance (ANOVA) and Tukey's multiple comparison tests with significance level of lower than 0.05 in SPSS V20 software.

Result: It is found that immersing composite disks in distilled water meaningfully increases the micro-hardness of samples ($P < 0.05$). The same finding has been confirmed for the P90 disks which are kept in Heptane. ($p = 0.01$) The micro-hardness of other composites (Z250, Z350XT, and P60) is also increased in the presence of Heptane but none of them was significant ($P > 0.05$).

Conclusion: The micro-hardness of samples is increased in the presence of both distilled water and Heptane food simulating liquid but the amount of this increase totally depends on the type of composite and also the sample storage environment.

Keywords: Composite resin, Micro-hardness, Food Simulating Liquid, Heptane