0606 Effect of multiple preheating cycles on hardness of composite materials

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An important property for composites is their ability to conform to tooth structure during placement. Recently a device (Calset, AdDent Inc.) has been introduced that lowers the viscosity of composites by preheating them to 54°C. In a clinical setting, composite may be preemptively heated, but not used that day, and allowed to cool back down to room temperature overnight for reheating the next day. Objectives: The aim of this study was to determine the effect of three 54°C preheating cycles over a period of two days on the hardness of two composites: nanocomposite (Filtek Supreme 3M ESPE) and microhybrid composite (Filtek Z250 3M ESPE). Methods: Five samples for each of the two materials and four treatments were evaluated. The materials were tested: 1) with no heating (control); 2) after heating to 54°C; 3) after being maintained at 54°C for 2 hrs, cooled for 24 hrs, then reheated to 54°C; 4) after an additional cycle like (3) to give a total of 48 hours. The samples were prepared by pressing the composite materials contained in 6.4 mm inside diameter by 2mm deep Plexiglas rings between Mylar sheet covered glass slides. Knoop hardness (kg/mm2) was measured with a 500 g load at three locations on the top surfaces. Data were analyzed using a two-way ANOVA and Tukey pairwise comparisons with α=0.05. Results: No statistically significant hardness changes were observed when each material was subjected to the four treatments (1, 2, 3, and 4). However, significant differences were found between the two materials after treatments 1, 2, and 4. The microhybrid had between 15% and 29% higher hardness than the nanocomposite. Conclusions: The preheating treatments caused statistically insignificant hardness changes. The microhybrid was significantly harder than the nanocomposite after most treatments. Funded in part by AdDent, Inc.

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