

## **Degree of conversion and microhardness evaluation of bulk composites after using two different polishing systems.**

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**Aim:** The aim of this study was to analyse the effect of new polishing systems applied on two bulk composites at different times.

**Methods:** Estelite Bulk-Fill Flow (Tokuyama) and One Bulk Fill Restorative (3M, ESPE) were used for this study. Homemade Teflon cylinders (4 mm in height and 6 mm in internal diameter) were used to make ten samples for each resin composite. All samples were photo-polymerized in bulk using Elipar DeepCure S (3M, ESPE) for 20 seconds, with an energy output around 1470 mW/cm<sup>2</sup> and spectrum between 430-480 nm. During the photo-polymerization, samples were covered with a Mylar strip to exclude oxygen inhibition. After curing, the samples were divided in two groups: five samples were polished immediately after curing and five were polished after 24 hours. For each sample, degree of conversion (DC) and Vickers micro hardness (VMH) were evaluated both before and after polishing. A Perkin Elmer Spectrum One NTS FT-NIR spectrometer, equipped with Perkin Elmer NIRA (Near Infrared Reflectance Accessory), was used for DC evaluations, while the VMH was determined by means of Leitz Micro-Hardness tester. One way ANOVA test and post hoc t-test were used for statistical evaluations ( $p < 0.05$ ).

**Results:** The tested materials showed statistically different ( $p < 0.05$ ) values for DC and VMH. Immediately after curing ( $t_0$ ) and after 24 hours ( $t_{24}$ ), the DC values of both groups were statistically different ( $p < 0.05$ ). At  $t_0$ , One Bulk Fill DC of polished samples resulted higher than the DC of the unpolished ones; at  $t_{24}$ , all DC values were not statistically different. At  $t_0$ , Estelite DC of polished samples was higher than the one of unpolished samples. At  $t_{24}$ , all DC and VMH values of both groups after polishing, were not statistically different. On the other hand, all the VMH values of Estelite were not statistically different.

**Conclusion:** DC and VMH values of tested materials increased after polishing. The two materials behave differently: One Bulk Fill, after polishing and finishing procedures, improves DC and VMH values; in the case of Estelite samples, DC values seem to depend more on the time than on polishing and finishing, while VMH values appear unconnected from both procedures.