

## Documents

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**Understanding the Effect of Thermal Treatment on the Physico-Mechanical Properties of Light-Cured Composites for use in Indirect Restorations**

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**Abstract**

OBJECTIVES: To study the potential benefits of a post-cure thermal treatment on key physico-mechanical properties of light-cured resin-based composites for use in indirect restorations, a CAD/CAM composite block being used as control. MATERIAL AND METHODS: Six commercial composites were light-cured before being thermally treated in a furnace at 90°C during 15 minutes (CAD/CAM composite used as a control). The properties measured with or without thermal treatment were: degree of conversion, flexural strength, elastic modulus, Vickers microHardness, organic mass content and eluted and absorbed mass before and after storage in ethanol. The data were analysed using one-way ANOVA, and Weibull distributions. RESULTS: A general increase in the properties measured was observed for all materials after thermal treatment, except a general decrease in mass elution and absorption (most statistically significant:  $p(0.05)$ ). Weibull analysis showed a tendency ( $p(0.05)$ ) of increased reliability of the flexural strength after thermal treatment for all materials. CONCLUSION: The present data revealed clear physico-mechanical improvements after thermal treatment of light-cured composites. Such method could hence be beneficially used to produce indirect restorations as compared to stratifying and light-curing the same composites in situ. However, most properties of the control CAD/CAM composite were higher, but CAD/CAM technologies aren't available everywhere. Copyright© 2021 Dennis Barber Ltd.

**Author Keywords**

CAD/CAM Composite; Composite Resins; Degree of Conversion; Mechanical Properties; Post-cure; Thermal Treatment

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