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PRINT ISSN : 0040-8891

**The Bulletin of Tokyo Dental College**

Vol. 50 (2009), No. 4 :183-190

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## **Light Energy Transmission through Composite Influenced by Material Shades**

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(Received April 6, 2009)  
 (Accepted September 14, 2009)

**Abstract:** This study investigated the influence of different composite resin shades on light energy transmission through the composite, hardness and cross-link density (CLD). The composite Filtek Z250 was used in shades A1, A2, A3, A3.5 and A4. A quartz tungsten halogen light curing unit was used at an irradiance of  $900\text{mW/cm}^2$ . Thirty specimens were made for each shade. Light energy transmission that passed through the composite was calculated ( $n=10$ ). Differences in Knoop hardness between the top and bottom (DKH) of the same specimen were calculated ( $n=10$ ). The Knoop hardness value for each surface was recorded as the average of three indentations ( $\text{KHN}_1$ ). Thereafter, the specimens were soaked in absolute ethanol for 24hr at room temperature, and hardness was again determined ( $\text{KHN}_2$ ). The CLD was estimated by the softening effect produced by ethanol, i.e., by decrease in hardness. The percentage of decrease in  $\text{KHN}_2$  compared with  $\text{KHN}_1$  (PD) in the same specimen was then calculated for both surfaces ( $n=10$ ). The data were submitted to an ANOVA in different tests (Light energy transmission, Knoop hardness and CLD). The irradiance of light that passed through composite shade A1 ( $408\text{mW/cm}^2$ ) was statistically greater than that through shade A2 ( $376\text{mW/cm}^2$ ), and was greater through A2

than A3 (359mW/cm<sup>2</sup>) and through A3 than A3.5 (327mW/cm<sup>2</sup>); A3.5 showed no statistical difference when compared to A4 (324mW/cm<sup>2</sup>). The DKH of A4 (20.56%) was not statistically higher than that of A3.5 (20.14%), which was greater than that of A3 (14.08%), A2 (11.65%) and A1 (9.06%). There was no statistical difference in CLD. Darker shades had a significant influence on light energy transmission through dental resin composite and its hardness. However, CLD was not affected by darker dental composite shades.

**Key words:** [Composite resin](#), [Shades](#), [Light energy transmission](#), [Hardness](#), [Cross-link density](#)

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To cite this article:

Ricardo Danil Guiraldo, Simonides Consani, Rafael Leonardo Xediek Consani, Sandrine Bittencourt Berger, Wilson Batista Mendes and Mario Alexandre Coelho Sinhoreti: "Light Energy Transmission through Composite Influenced by Material Shades". The Bulletin of Tokyo Dental College, Vol. **50**: 183-190 (2009) .

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doi:10.2209/tdcpublication.50.183

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