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# Influence of Light Curing Unit and Ceramic Thickness on Temperature Rise during Resin Cement Photo-activation

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**Abstract:** The aim of this study was to determine the effect of different ceramic thickness on heat generation during resin cement photo-activation by QTH (quartz-tungsten-halogen), LED (light emitting diode), and PAC (plasma arc-curing) LCUs (light curing units). The resin cement used was Rely X ARC (3M-ESPE), and the ceramic was IPS Empress Esthetic (Ivoclar-Vivadent), of which 0.7-, 1.4- and 2.0-mm thick disks, 0.8 mm in diameter were made. Temperature increase was recorded with a type-K thermocouple connected to a digital thermometer (Iopetherm 46). An acrylic resin base was built to guide the thermocouple and support the 1.0-mm thick dentin disk. A 0.1-mm thick black adhesive paper matrix with a perforation 6 mm in diameter was placed on the dentin to contain the resin cement and support the ceramic disks of different thicknesses. Three LCUs were used: QTH, LED and PAC. Nine groups were formed (n=10) according to the interaction: 3 ceramic thicknesses, 1 resin cement and 3 photo-activation methods. Temperature increase data were submitted to Tukey's test (5%). For all ceramic thicknesses, a statistically significant difference in temperature increase was observed among the LCUs, with the highest mean value for the QTH LCU ($p<0.05$). For all the LCUs, a thickness of 0.7 mm produced the highest temperatures (1.4 and 2.0mm, $p<0.05$). There was no difference in temperature values between the latter two thicknesses ($p>0.05$). The interaction of higher energy density with smaller ceramic thickness showed higher temperature increase values.

**Key words:** Ceramic thickness, Photo-activation methods, Temperature increase, Resin cement



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