Conclusions: ES achieved significantly lower shear bond strength to enamel than the other splinting materials and the resin composite. No statistically significant differences emerged in the distribution of failure modes among the groups. QS, TX, CNS, and ES significantly increased flexural strength of the resin composite. QS yielded significantly higher flexural strength than THM and CNN.

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Effect of resin shade and LED light intensity on microhardness

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Objectives: The clinical performance of light cured dental composites is greatly influenced by light intensity of the light curing unit and the shade of the resin composite used, affecting microhardness values. The purpose of the present study was to control multiple combinations of LED curing devices with different light intensities and various composite resin shades.

Materials and methods: A nanohybrid resin composite in shades A3, B2 and C2 was used along with higher and lower light intensity modes from LED curing devices (Radii, Elipar S10, Valo in standard and plasma mode). Four groups were formed for each shade and five specimens were made for each group, which were 4 mm thick. Specimen were evaluated with Vickers microhardness (100 gr for 15 s) both at the top and bottom surface to assess microhardness values. Data were analyzed with ANOVA and Tukey–Kramer test.

Results: No significant differences were found for A3 shade at top surface and at the bottom surface for most of the curing modes used. Shade B2 on top, exhibited no significant difference in comparison between Elipar S10 and Valo standard mode ($p > 0.05$) and within Valo modes ($p > 0.05$). Shade B2 at bottom surface exhibited extremely significant difference for Radii and Elipar S10 ($p < 0.001$), Elipar S10 and Valo standard mode ($p < 0.001$). As for shade C2 at the top surface, it exhibited significant differences ($p < 0.05$) in comparison between Radii and Elipar S10 and for every curing unit at the bottom except for Valo modes ($p > 0.05$).

Conclusions: Top surfaces exhibited greater microhardness values compared to bottom as expected. A3 exhibited acceptable microhardness values with all the LED curing devices. Higher power LEDs generally result in lower microhardness values when curing shade C2, but there is no difference between Valo modes, which represent the lowest and highest light intensity of this experiment. Elipar S10, with an average light intensity, seems to polymerize efficiently all shades.

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Temperature increase during composites polymerisation using two LED curing lights

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Objectives: The aim of curing light technology has been the development of lights that would result in faster curing of resin composites and less heat generation (Aravamudhan et al., *Dent Mater* 2006). The purpose of this *in vitro* study was to evaluate thermal changes on the tooth structures during the exposure of two different light emitting diode-curing units (LED).

Materials and methods: Caries-free human first molar were randomly selected and pulp residues were removed after root resection. Four thermocouples were positioned according to a Hannig and Bott modified method (Dent Mater, 1999). The experimental set-up was composed by Keithley data acquisition system (model 2700 with 7700 card) and by a set of type J-thermocouples with cold junction in ice. The thermocouples were hand made with a thin-coated wire (0.5 mm in diameter) fitted in the tooth capable of a fast time-response. The precision of the thermocouples was ±0.1 °C. Two LED lamps were tested: A: VALO (ultradent), tested at light intensity of 1000 mW/cm^2 (for 20 s) or 4500 mW/cm^2 (for 3 s); B: Starlight PRO (Mectron) tested at light intensity of 1000 mW/cm^2 (for 20 s). Maximum temperature rises among the two LED light tested were analyzed using one-way analysis of variance (ANOVA).

Results: When composite was light cured the temperature values increased rapidly reacting the plateau in 0.7–1 s. Thermal flux generated by monomer conversion was added to light curing heat. Means and standard deviations of maximum temperature increase (expressed in °C) measured at different site of tooth during composite polymerization with VALO or Starlight PRO are reported in the table.

Light intensity	Pulp chambre		Occlusal surface		$M = 3$ mm below occlusal surface		Composite	
	VALO	Starlight PRO	VALO	Starlight PRO	VALO	Starlight PRO	VALO	Starlight PRO
1000 mW/cm^2	1.58 ± 0.12^{a,d}	1.08 ± 0,13^{a}	7.34 ± 4.40	3.92 ± 1.73	1,99 ± 0.22^{b,e}	1.26 ± 0.11^{b}	20.56 ± 0.48^{c}	12.77 ± 3.07^{c}
4500 mW/cm^2	0.87 ± 0.16^{d}	–	5.07 ± 0.05	–	1.08 ± 0.08^{e}	–	21.76 ± 4.58	–

Different superscript letters indicate different groups: a, b, d, e ($p < 0.005$); c ($p < 0.01$).

Conclusions: Differences in temperature raises during composite polymerization were found between the two LED light tested, regardless the selected sites. Further studies are needed to clarify *in vivo* the clinical relevance of temperature increase during light-activated polymerization.

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