EFFECT OF POLYWAVE MULTILED CURING LIGHT DISTANCE ON SURFACE MICRO-HARDNESS DISTRIBUTION OF NANOFILLED COMPOSITES

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Category: Student's Session

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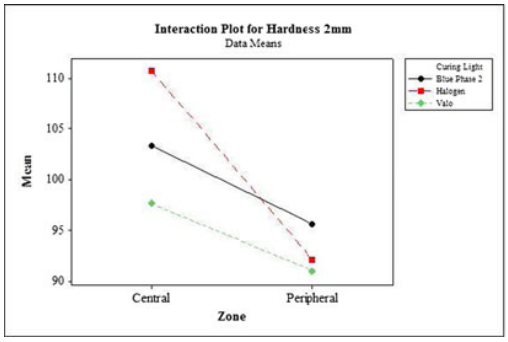
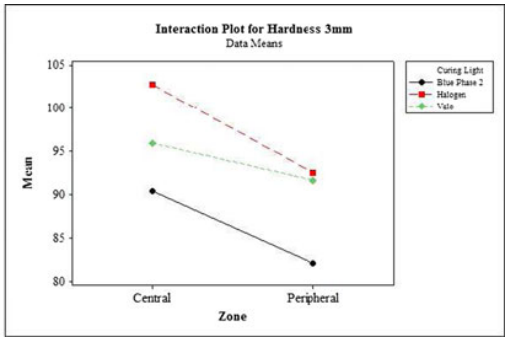
Objective: The aim of this *in vitro* study was to assess the effect of light curing distance on surface microhardness of different nanofilled composites. The hypothesis is that polywave multiLED lights induce uniform hardness distribution on composite surface.
Methods: A non-carious molar tooth, extracted for periodontal reasons, was selected. Crown was horizontally sectioned 2-mm above the CEJ. A 3×4-mm Class I cavity was prepared in order to obtain a "tooth mould". Four resin composites with different photoinitiators (Venus Pearl-Heraeus Kulzer, Filtek Supreme XTE-3 M ESPE, Estelite-Tokuyama, Ceram X-Dentsply) were selected. Composite discs, with the top surface distant 2 mm (n=10) and 3 mm (n=10) from the curing light tip, were prepared using the tooth mould. Composites were cured with three curing lights (Valo-Ultradent, Bluephase G2-Ivoclar Vivadent, Swiss Master Light-EMS) at the same energy density (1400 mW). Composite discs were submitted to Vickers hardness test on the top surface, performing 4 measurements in the central area of the specimen and 4 measurements in the peripheral area of the specimen. Analysis of variance (ANOVA) was performed to evaluate the effects of composite, curing light, specimen zone (central vs peripheral) and their influence on hardness. Differences were considered statistically significant at $p<0.05$.
Results: Statistical analysis revealed that all factors significantly influenced the surface hardness (Table 1). The interaction between curing light and zone was confirmed only in specimens where the curing tip was 2 mm distant from the surface. The halogen light, when 2 mm distant from the surface, showed the greatest difference between the central and peripheral zones of composite specimens. When the curing tip was 3 mm distant, no difference between the curing lights was observed (Figures 1 and 2)

Table 1: Analysis of Variance for Hardness

	Tip distance = 2		Tip distance = 3	
Source	F	P	F	P
Composite	37.79	0.000	10.02	0.000
Curing light	5.41	0.005	15.68	0.000
Zone	36.63	0.000	20.53	0.000
Composite*Curing light	10.61	0.000	29.48	0.000
Curing light*Zone	4.50	0.012	1.08	0.341





Conclusions: The tested hypothesis was rejected since none of the tested curing light produced a uniform micro-hardness distribution on nanofilled composites. In all cases, the peripheral area was significantly softer than the central area, in particular when the tip was 2 mm from the composite surface.

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INFLUENCE OF SURFACE COATING ON STAINING SUSCEPTIBILITY AND SURFACE ROUGHNESS OF ESTHETIC COMPOSITE RESIN MATERIALS

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Objective: The aim of this in vitro study was to evaluate the influence of surface coating on color stability and surface roughness of composite resin materials when exposed to several staining agents. The hypothesis is that surface coating sealer reduces color change and roughness of nanofilled composites.
Methods: Pressed 2 mm thick disk-shaped specimens were prepared with eight different composites: Venus Pearl, Venus Diamond, Clearfil Majesty, Filtek, Gradia, Adonis, Tetric, GC Kalore. Each specimen was polished and one-side was coated with BisCover (Bisco, USA). The initial color of each specimen's side was assessed by a calibrated reflectance spectrophotometer (SpectroShade) and the surface roughness (Ra) was assessed using a RT-70profilometer with a 5 μm Diamond stylus. The specimens were placed into six different staining solutions after 7 days: coffee, tea, red wine, orange juice, coca-cola and water. L*a*b* scores, which determined the color changes, and surface roughness were calculated at 0, 1, 7, 30, 90, 180 days. The differences among coated and polished composites surfaces for each staining solution were statistically analyzed using ANOVA and Student-Newman-Keuls post-hoc tests ($p<0.05$).