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P3-Pol14 Effects of Resin Cements on Hardness, Thickness and Bond Strength with Titanium Post: An Intraradicular Assessment.

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Introduction: Resin cements are being frequently used to cement both non-metallic and metallic types of endodontic post. Polymerization of resin cements need to be evaluated as uncured resin is considered harmful to periodontal tissues and can compromise mechanical properties of the cement. Hardness is considered as an indirect property to evaluate polymerization of resin materials. The purpose of this study was to evaluate hardness, thickness and bond strength of two types of resin cement at 3 different root canal depths around metallic post.

Materials and Methods: Root canals of 10 extracted maxillary anterior teeth were prepared for post cementation. Panavia F (dual-cured (PF)) and Rely X Luting 2 (self-cured (RL)) were used to cement titanium post. After 24 hours of water storage, samples were longitudinally sectioned; hardness and thickness of cement were measured using vicker's hardness tester and with microscope along the cement line at 1-mm, 4.5-mm, and 8-mm level from coronal point of each root. For push out bond strength (PBS) measurement 3 teeth for each of the group were obturated and cemented with titanium post. Each of the teeth was sectioned to measure PBS of resin cement with titanium post at coronal, middle and apical level (3 mm thickness for each level). Statistical analysis was performed to test significance of differences in hardness, thickness and bond strength of the two types of cement (t-test; $p= 0.05$) and at different levels of the same type (one-way ANOVA followed by multiple comparison; $p = 0.05$).

Results and discussion: Significant difference of hardness was observed at the apical level between the two groups and between the coronal and apical level of PF ($p<0.05$); no significant differences in hardness and thickness at different level were observed in RL ($p>0.05$). Reduced hardness of PF at apical level is probably due to absence of light. More voids were detected in PF group which suggests further evaluation of adaptability of resin cement with metallic post. Significantly less PBS was observed between the 2 groups at coronal and middle level.

Conclusions: Results of PBS were not associated with hardness of PF cements. Greater polymerization shrinkage due to presence of curing light might be associated with decreased PBS at coronal and middle level between the 2 groups. Application of resin cements with metallic posts should be further investigated to explore the effect of uncured resin at apical level.

Table. Results of hardness, thickness and bond strength of the 2 types of resin cements with titanium post

Type of resin cements		1-mm level (coronal third)	4.5-mm level (middle third)	8-mm level (apical third)
Panavia-F	Hardness (Hv)	77 ± 11.0^{aA}	63.5 ± 10.0^{aA}	48 ± 14.0^{aB}
	Thickness (μm)	380 ± 87.3^{aA}	368 ± 36.7^{aA}	342 ± 60.7^{aA}
	PBS (MPa)	33.03 ± 19.1^{aA}	11.70 ± 4^{aA}	24 ± 17.9^{aA}
Rely-X Luting 2	Hardness (Hv)	71 ± 14.8^{aA}	64.4 ± 16.5^{aA}	72 ± 10.4^{bA}
	Thickness (μm)	377 ± 44.1^{aA}	358 ± 97.6^{aA}	352 ± 91.7^{aA}
	PBS (MPa)	72.24 ± 14.7^{bA}	65.23 ± 9.4^{bA}	49.87 ± 32.6^{aA}

Lower case letters compare between 2 groups of cement at each level; capital letters compare means between 3 different levels of each cement group.

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