48th Meeting of the CED-IADR
September 2017, 21-23 in Vienna, Austria

Pull-Out Strength of Titanium Post Luted With Novel Calcium-Silicate Cement

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Objectives: The cementation of intracanal posts aids in retention of the permanent restoration and core build-up of endodontically treated teeth. Novel calcium silicate cement with fast-setting has been developed for post luting and sealing in root canals. This study investigated the pull-out retention of prefabricated titanium posts luted with novel calcium silicate cement, zinc-phosphate cement, or glass-ionomer cement.

Methods: Sixty extracted single-rooted human incisors with equal length and shape were selected and cleaned. The root canals of teeth were prepared and obturated with gutta-percha and AH plus sealer. Post space was prepared for ParaPosts size #5 (Coltene/Whaledent, OH, USA). Novel calcium silicate cement (n=19, Protooth Bond, Dentosolve, Denmark) was compared versus zinc-phosphate cement (n=17, Dentsply Detrey, Germany) and Fuji I glass-ionomer cement (n=20, GC, Tokyo, Japan). Each cement was mixed according to the manufacturer's instruction and placed into the canals using a lentulo attached to a slow-speed handpiece. Subsequently, the titanium posts (Parapost, Coltene/Whaledent, OH, USA) were coated with cement and inserted into the canal. Excess cement was removed. All specimens were stored in >95% humidity for 24 h followed by storage in phosphate-buffered saline (PBS) for 4 weeks at 37°C. Subsequently, the posts were subjected to increasing axial tensile force by an Instron machine until visual bond failure occurred. Data were analyzed by one-way ANOVA followed by Tukey-Kramer multiple comparisons.

Results: The post retentive strength cemented with zinc phosphate (7.95 ± 2.57 MPa, mean ± sd) and Fuji I glass ionomer cements (8.04 ± 2.72 MPa) were lower ($p<0.05$) than Protooth Bond luting cement (10.50 ± 3.83 MPa).

Conclusion: Within the limitations of this study, the retentive force of titanium post cemented with Protooth Bond in endodontically treated teeth was superior to zinc phosphate and glass-ionomer cements after immersion in PBS.