Retention of prefabricated titanium dowels cemented with three luting resins.

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Abstract

PURPOSE: to evaluate the effects of three luting resins and roughening of the dentinal walls on the long-term retention of tapered titanium dowels.

MATERIALS AND METHODS: ninety-six single-rooted teeth were endodontically treated. All root specimens were divided into three groups (n = 32). Dowel spaces were then prepared with ISO 90 drills 10 mm deep. Corresponding prefabricated tapered titanium dowels were air abraded and luted with Panavia 21 (P21), Super Bond C&B (SB) or with Chemiace II (CH) according to the manufacturers’ instructions. In the subgroups of each luting agent, the dentinal walls were either left in their original state as prepared by the drills (n = 16), or roughened with a handheld diamondcoated ISO 90 cutting instrument (n = 16). The bonded specimens were stored in water at 37°C for 3 days (n = 8) or 150 days with simulated aging conditions of 37,500 thermal cycles (5°C/55°C) and 300,000 mechanical loading cycles with 30 N (n = 8). Dowel retention in N was measured using a universal testing machine with a crosshead speed of 2 mm/min. Statistical analysis was performed with ANOVAs followed by Scheffé post-hoc tests.

RESULTS: the dowel retention with P21 and SB was significantly higher than that of CH (p ≤ 0.05). Roughening the dentinal walls significantly increased the retention for all cements (p ≤ 0.01). Storage for 150 days with thermal cycling and mechanical loading caused a significant decrease in dowel retention (p ≤ 0.05).

CONCLUSION: P21 and SB luting resins provided a durable retention of prefabricated titanium dowels in root canals, especially for root canals with roughened dentinal walls, as the combined result of sliding friction,
micromechanical interlocking and adhesive dentin bonding.

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