

Title:	A comparison of four gutta-percha filling techniques in simulated C-shaped canals
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Abstract:	<p>Aim:To compare four gutta-percha filling techniques in simulated C-shaped canals based on filling quality at three cross-sectional levels, filling time and the apical extrusion of gutta-percha. Methodology:Forty resin simulated C-shaped canals were constructed and filled using one of four techniques: cold lateral compaction (LC), ultrasonic compaction (UC), single cone with injectable gutta-percha (Obtura II) (IT) and core-carrier (Thermafil((R))) (CC). Cross sections were made at 1 (L1), 3 (L3) and 6 (L6) mm from the canal terminus. Areas of gutta-percha, sealer and voids in each cross section were measured using an image analysis system. Data were analysed using a univariate general linear model and post hoc test (Dunnett's T3). Data on time taken to fill canals was evaluated using the Bonferroni post hoc test. Results: CC had more gutta-percha and less sealer compared with IT at L1 (P<0.05). LC had marginally significantly less gutta-percha than CC at this</p>

	<p>level (P=0.049). At level 3mm, significantly more gutta-percha and less sealer were present in IT compared with LC (P<0.05). The techniques showed no difference in quality at L6. The time for LC (20.72min) was three times longer than for both IT (6.11min) and CC (6.67min), whereas for UC (26.92min), it was four times longer (P<0.001). Finally, the four techniques were not different in the occurrence of apical extrusion of gutta-percha. Conclusions: The core-carrier technique was the most effective technique when assessed by gutta-percha area in this simulated C-shaped canal.</p>
Keyword:	<p>c-shaped canals; image analysis; resin simulated canal; root canal obturation; mandibular 2nd molars; root canals; lateral condensation; computed-tomography; chinese population; sealing ability; ultrasonic condensation; obturation techniques; anatomical features; periapical tissues</p>
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