

2007

# Warm Vertical Compaction versus Lateral Compaction for Root Canal Obturation

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## Abstract

**Objectives:** This study compared warm vertical compaction with lateral compaction for obturating root canals with either a polymer-based resin system or gutta-percha. Quality of obturation was evaluated by (i) analysis of the canal area occupied by filling core materials, sealers and voids at three cross-sectional levels and (ii) SEM examination.

**Methods:** Single canals in 64 mandibular premolars were instrumented, irrigated and divided into four equal groups. They were root filled as follows: lateral compaction/resin (RealSeal™, SybronEndo) (LC/R), lateral compaction/gutta-percha with AH Plus™ (LC/GP), warm compaction/resin (WC/R) and warm compaction/gutta-percha (WC/GP). One specimen from each group, randomly chosen for SEM examination, was longitudinally sectioned so that the dentine-filling interface could be evaluated. The remaining teeth were sectioned horizontally at 1 mm (L1), 3 mm (L3) and 6 mm (L6) intervals from the obturated canal terminus. Cross-sectional areas of filling core materials, sealers and voids were measured using a Leica Qwin Colour (RGB) image analysis system. Data were analyzed using independent sample t test and Mann-Whitney U test.

**Results:** Techniques showed no significant differences for canal obturation with resin at L1 and L3 ( $p>0.05$ ). However at L6, obturation quality was significantly better for warm compaction ( $p<0.05$ ). For obturation with gutta-percha, there were no differences between the two techniques at L1 ( $p>0.05$ ). However at L3 and L6, warm compaction was significantly better than lateral compaction ( $p<0.05$ ). Under SEM, for gutta-percha obturation using both techniques, a uniform gap was observed between the sealer and gutta-percha and also between the sealer and dentine. However, for resin obturation, there was no evident gap.

Conclusions: Both techniques showed comparable obturation quality at the apical level (L1). However, at more coronal levels of the canal, warm compaction was better than lateral compaction, especially for obturation with gutta-percha.

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**Journal:** Journal of Dental Research; 86B, 2007  
([www.dentalresearch.org](http://www.dentalresearch.org)).  
**Year:** 2007

**Keywords :** ROOT CANAL SYSTEM; RESILON, GUTTA-PERCHA, OBTURATION TECHNIQUE.

**Please cite as:**

A.A. MADFA and Y.L. THONG. (2007). Warm Vertical Compaction versus Lateral Compaction for Root Canal Obturation. *Journal of Dental Research*; 86B, 2008 ([www.dentalresearch.org](http://www.dentalresearch.org)).

**URL :** [https://iadr.confex.com/iadr/sea07/preliminaryprogram/abstract\\_95821.htm](https://iadr.confex.com/iadr/sea07/preliminaryprogram/abstract_95821.htm)