

# Micro-CT assessment of the sealing ability of *BioRoot RCS* using two root canal obturation techniques

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## Abstract

**Aim:** To investigate the efficiency of BioRoot RCS, a tricalcium silicate-based root canal sealer in filling single rooted mandibular premolars using the single matched cone obturation technique.

**Methodology:** Thirty single-rooted mandibular premolars were prepared using rotary files and randomly allocated into 3 groups (n = 10), two groups were filled with the single cone technique BioRoot RCS (RCS-S) and AH-Plus (AH-S) and the third group was filled with the cold lateral compaction technique using AH-Plus sealer as the control group (AH-C). Specimens were scanned with micro-CT post preparation, 7 days post-obturation, and 6 months post-obturation. The volume of prepared canals (mm<sup>3</sup>) and percentage of voids (%) were calculated for the whole canals and the coronal, mid and apical thirds individually. Nonparametric tests were used for statistical data analysis at significance level of  $\alpha = 0.05$ .

**Results:** The volume (mm<sup>3</sup>) of the root canals following preparation was similar in all groups (p=0.065). Both single cone techniques RSC-S and AH-S exhibited significantly more percentage of voids than the conventional lateral compaction technique AH-C (p=0.007), this was predominantly due to more voids (%) at the coronal third. After 6 months, AH-S showed significantly higher voids (%) across the whole canal (19.30%) compared to 7 days post obturation (11.56), (p=0.011). This significant increase was found to be primarily due to the increase in the voids (%) at the coronal third of the canals. However, RSC-S and AH-S groups showed no significant changes in the voids (%) at 6 months, (p>0.05).

**Conclusions:** None of the investigated root canal sealers and techniques were able to completely fill the canals. The single matched cone technique with a tricalcium silicate-based root canal sealer should be used with caution especially for teeth with wide bucco-lingual root canals such as mandibular premolars.