

## The effectiveness of manual and mechanical instrumentation for the retreatment of three different root canal filling materials

Somma F, Cammarota G, Plotino G, Grande NM, Pameijer CH, JOE 2008; 34: 466-469

**Aim:** The purpose of this study was to compare ex-vivo the efficacy of two new engine driven NiTi rotary systems: the M<sub>two</sub><sup>®</sup> R and the ProTaper<sup>®</sup> retreatment files with a manual technique in the removal of 3 root filling materials (Guttapercha, Resilon and EndoRez).

**Material & Methods:** Ninety intact straight single-rooted permanent extracted premolars with a round canal, a curvature < 5° and with completely developed apices were selected for this study on the basis of similar root lengths, approximately 16mm. Endodontic treatment was performed using M<sub>two</sub><sup>®</sup> NiTi rotary instruments. Canals were enlarged to a size 40, .04 taper at the working length. All roots were filled using lateral condensation. Retreatment was deemed complete when the last file reached the working length, there was no filling material covering the instrument, and the canal walls were smooth and free of visible debris. Extrusion of debris of root canal filling material through the apical foramen was observed visually using loupes with 3x magnification. Canal wall cleanliness was evaluated through optical stereo microscopy (OSM) and scanning electron microscopy (SEM) analysis. A linear regression analysis was performed to assess the influence of different covariates on the time required for material removal, whereas three different logistic regression analyses were performed to investigate the influences of filling materials, instruments used, and level of observation, considered as potential prognostic factors on the prevalence of apical extrusion of material.

**Results:** For all groups, none of the NiTi rotary instruments or hand files showed intracanal failure or visible signs of plastic deformation. Furthermore, no perforations, blockages or ledgings were recorded. The multivariate linear regression showed that retreatment time was fastest when using M<sub>two</sub><sup>®</sup> instruments followed by ProTaper<sup>®</sup>. Resilon root filling material required more time for removal compared with gutta-percha and Endorez. Cleaner canals were observed when the sizes of the retreatment files were matched to the original size of the preparation. More apical extrusion was observed with the rotary instruments than with the Hedstrom files.

**Conclusions:** The results showed that NiTi rotary instruments and hand instruments left remnants and debris on the root canal walls, mostly in the middle and apical third of the canal, irrespective of the root filling material that was used. The results suggest that a combined use of rotary and hand instruments may achieve the desired optimal results. NiTi retreatment rotary files remove filling material quickly yet should be followed by hand instrumentation to refine and complete the removal process. This ensures better canal wall cleanliness especially in the apical third. In addition the size of apical preparation can be increased. Furthermore, to minimize apical extrusion of debris, NiTi rotary instruments should be used 1 to 2mm short of the working length.



M<sub>two</sub><sup>®</sup> Retreatment files  
with cutting tip