

MODIFICATION OF ROOT CANAL GEOMETRY AFTER ROTARY INSTRUMENTATION WITH TWISTED FILES, ASSESSED BY MICROCOMPUTED TOMOGRAPHY.

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Aims. This study investigates the effects of Twisted Files (TF) (SybronEndo) rotary instruments on root canal geometry of curved teeth using μ CT.

Methods. Fourteen mesial roots of mandibular molars were selected. Canals curvature was ranging within 35° to 55° (Schneider's classification). Root canals were submitted to μ CT before and after preparation with TF. Serial cross-sectional images were obtained at 14.16 μ m, while measurements of root canal cross section circularity ratio (shape factor), area and perimeter were metrically assessed at 2mm intervals from the apex. The root canal working length, 3D curvature, volume and side surface area were estimated for the entire canal. The 3D curvature was determined by segmenting the root canal, estimating the central axis point on each cross section and fitting a spline curve.

Results. Differences in circularity ratio were 0.0319 \pm 0.1377 at 2mm, 0.03504 \pm 0.0383 at 4mm and 0.08035 \pm 0.0574 at 6mm from the apex. Differences in cross section perimeter were 0.5152 \pm 0.7627mm at 2mm, 0.6280 \pm 1.006mm at 4mm and -0.04758 \pm 1.9644mm at 6 mm. Cross section area increased by 0.0571 \pm 0.0788 mm², 0.1606 \pm 0.1603 mm², 0.2867 \pm 0.1865 mm² at 2, 4, 6mm respectively. The loss of working length was 0.89 \pm 0.71mm. The canal curvature decreased in the coronal third, whereas the changes vary in the middle and apical third. Canal volume and side surface area increased by 0.7553 \pm 0.461mm³ and 1.5052 \pm 4.322mm² respectively. No instrument fracture was noted.

Conclusions. Although the change of working length was within the accepted limits, further investigation on the change of 3D canal curvature assessed by μ CT, is required.