

**Analysis of the tomographic density and the sealing ability of GuttaFlow versus AH26 root canal sealers using three obturation techniques (An in vitro study)**

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## ***Abstract***

The radiographic appearance of obturation and apical microleakage are widely used criteria to determine the obturation quality. Apical leakage in relation to the radiographic density of obturation materials has been analyzed by many studies.

The aim of this study was to determine the relation between radiographic density of two sealers and their apical microleakage by the use of three obturation techniques.

Seventy two single rooted teeth were used; all teeth were shortened to a length of 15 mm and instrumented by hybrid technique, the coronal and middle parts were instrumented in crown down manner with Gates Glidden drills number (4, 3, and 2) in descending sequence while the apical part was prepared in a step back manner with NiTi Flex K- Files with master apical file #40 and final flaring to #70. The teeth were randomly divided into 3 groups and filled with cold lateral condensation (CLC), E & Q Master (EQ), and Soft Core (SC). Each group was further subdivided into 2 subgroups according to the sealer type, GuttaFlow (GF) or AH26 sealer. Each experimental sample was examined with spiral computed tomography machine (CT) in 6 sections with 2mm intervals; four readings were taken for each section to determine the radiographic density (RD) of the sealer. Apical microleakage (AM) was measured by 2% methylene blue dye.

Statistical analysis showed that the (RD) of (GF) was higher than that of AH26 in the 3 groups, with no significant difference in (SC) group ( $p > 0.05$ ); a significant difference was obtained in (CLC) ( $p < 0.05$ ) and (EQ) groups ( $p = 0.05$ ). Concerning (GF), ANOVA and LSD tests showed that there were highly significant differences between the 3 groups (CLC  $>$  EQ  $>$  SC). For AH26 sealer, the (RD) was arranged in the following

sequence (CLC > EQ > SC). All but (EQ) versus (CLC) were significantly different.

For (AM), (GF) leaked higher than AH26 in (CLC) and (EQ) groups, and lower in (SC) group with no significant difference. Within the same sealer; the (AM) difference was significantly high between the groups (for both sealers) and the groups were arranged in the following order (CLC > EQ > SC).

In conclusion, good radiographic appearance of the obturation is not always an indication of the obturation quality, as it is influenced by the composition of materials that are used for obturation. GuttaFlow sealer with Soft Core provided the best combination and had the lowest apical microleakage.