

An in-vitro evaluation of sealer placement methods in simulated root canal extensions

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I. Objectives

The aim of this study was to evaluate and compare the effectiveness of sealer placement in simulated root canal extensions using the K file, ultrasonic file, lentulo spiral and EZ-Fill.

II. Materials & Methods

Forty resin blocks were attained from cutting Endo-training Bloc with diamond saw. In each parallelepiped block, the simulated root canal was made with #20, 08taper GT file. After each block was longitudinally split into two halves using mallet and chisel, a standardized groove of 4mm in length, located 2mm apart from the root apex, was prepared on one wall of two halves using the custom-made knife to simulate the canal extensions with various irregularities. The two halves of each block were assembled using ligature wire and cyanoacrylate adhesive for hermetic seal. All simulated root canals were obturated by single cone method with AH26 sealer. Four different methods of sealer placement were used: group 1, #20 K-file; group 2, ultrasonic file; group 3, lentulo spiral; group 4, EZ-Fill. A single mix of sealer was used for all canals. All obturated blocks were stored in 100% humidity at 37°C for 1 week. Using a low speed saw, each block was sectioned horizontally at 3, 4 and 5mm from apex. Images of the sections were taken using a stereomicroscope at ×30 magnification and a digital camera. The amount of the sealer in the groove was evaluated using a scoring system, a higher score indicated better sealing effectiveness. The data was statistically analysed by Fisher's Exact Test.

III. Results

1. The sealing score was the lowest in Group 1 and that was statistically significant difference from other groups. And there was no statistically significant differences among group 2, 3 and 4.
2. In group 1, the sealing score was lower at 4mm from the apex than 3 and 5mm and that was statistically significant difference. But in group 2, 3 and 4, there was no statistically significant differences at 3, 4 and 5mm from apex.

IV. Conclusions

The ultrasonic file, lentulo spiral and EZ-Fill were effective methods of sealer placement in simulated canal extensions. The K file was the least effective method, specially at the middle 1/3 area of canal extensions.