

Comparison of various factors in the filling of simulated oval canals using the continuous wave technique: temperature and penetration depth of the plugger

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I. Objectives

The purpose of this study was to compare the gutta-percha-filled area in oval canals while varying the temperature and penetration depth of the System B plugger.

II. Materials & Methods

Seventy-five resin blocks, with artificially created oval canals, were obturated using a continuous wave technique. In groups 1, 2 and 3, the plugger was introduced to a depth of 4mm from the apex at set temperatures of 100, 200 and 350°C, respectively. In group 4, the plugger was inserted to a depth of 2mm from the apex at a set temperature of 200°C. Group 5 was obturated in the same way as group 2, and then an additional cold plugging was performed to a depth of 3mm from the apex. The cross sections of the obturated canals were photographed and the percentage of the gutta-percha-filled area (PGP) was measured.

III. Results

No significant differences were found between the three different temperature settings. ($p > 0.05$) At 1mm from the apex, group 4 showed the highest PGP ($95.57\% \pm 6.86$), followed by group 5 ($84.72\% \pm 12.19$), and group 2 (67.33 ± 13.03). ($p < 0.05$)

IV. Conclusions

In artificially created oval canals, plugger temperature within the range used in this study did not affect the PGP. However, the penetration depth of the plugger was significantly related to PGP.