Differential efficacy of endodontic obturation procedures : an ex vivo study

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Abstrak

By means of a double-chamber model, different root canal filling materials and procedures were compared. Briefly, the root canals of single-rooted human teeth, extracted for periodontal reasons, were instrumented and obturated by gutta-percha/Pulp Canal Sealer EWT (PCS) or by Resilon, in association with different sealers (Real Seal, RelyX Unicem or Meta). Obturation was achieved by traditional continuous wave of condensation technique (TCWCT), a modified version of it (MCWCT), or single cone technique (SCT). The obturated roots, inserted in a double-chamber model, were sterilized by gamma irradiation. Next, Enterococcus faecalis was added to the upper chamber and the specimens were incubated at 37°C for up to 120 days: the development of turbidity in the lower chambers' broths indicated bacterial leakage through the obturated root canals. The kinetics of leakage were analyzed in different groups by means of Kaplan-Meier statistics and compared by log-rank test. The results showed that root canals obturated with either gutta-percha/PCS using the MCWCT, Resilon/Real Seal SCT or Resilon/RelyX Unicem using the TCWCT displayed significantly better performance than the remaining groups ($p < 0.01$). Histological evaluation, performed to investigate microbial localization inside specimens, confirmed that this parameter varied according to the obturation procedures and materials employed. This ex vivo study indicates that gutta-percha/PCS, if used with the MCWCT, is as effective as Resilon when coupled to Real Seal with the SCT or, interestingly, to RelyX Unicem with the TCWCT. These data suggest that further improvement of the currently employed root canal filling procedures is achievable, depending on booth the filling materials and the technique employed, thus encouraging clinical studies in this direction.