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The effect of the irrigant QMix on removal of canal wall smear layer : an ex vivo study

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Abstrak

The aim of this study is to evaluate the effectiveness over application time of different formulations of a novel endodontic irrigant (QMix™ 2in1) composed of a polyaminocarboxylic acid chelating agent, a bisbiguanide antimicrobial agent, a surfactant and deinoized water to remove the root canal smeal layer and expose patent dentinal tubules compared to a standard solution of 17 % EDTA. Eighty human tooth roots from extracted, single-rooted teeth were instrumented (size 40.06) using 0.2 mL of sodium hypochlorite (6.15 %) between each file size with a 3 mL water rinse after final instrumentation. Eight groups of 10 roots were irrigated with 3 mL of different formulations of QMix: QMix A, QMix B, and QMix C, or 17 % or EDTA for 60 and 90 s, respectively, then rinsed with 5 mL of sterile water. The roots were irrigated using a standard irrigation syringe and a 30 ga side-vent needle with an apical-coronal motion to within 1 mm of the working length. The coronal, middle and apical thirds of one canal surface of each root was evaluated at 1000x using scanning electron microscopy. The presence of smeal layer was scored using a 5-point scale. Data were analyzed with the Kruskal-Wallis rank sums test, the Steel-Dwass, all-pairs comparison test, and the Steel method (with control) test. Irrigant type was highly significant ($p < 0.007$). Combined 60 and 90 s exposure data indicated QMix A ($p = 0.014$) and QMix C ($p = 0.028$) were superior to EDTA. While at the 90 s exposure time, smear layer removal by solutions QMix A ($p = 0.043$), QMix B ($p = 0.018$), and QMix C ($p = 0.011$) was superior to EDTA. All irrigants removed smear layer more effectively at the coronal and middle levels compared to the apical level ($p < 0.001$). Analysis showed all three QMix formulations were superior to EDTA in smear layer removal and exposure of dentinal tubules in the root canal system in single-rooted teeth.