

Evaluation of Smear Layer Removal using Different Irrigation Protocols: An *In Vitro* Sem Study

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Abstract

Objectives: Sodium hypochlorite (NaOCl) and decalcifying agents are common irrigation solutions used in endodontic therapy. The aim of this study was to compare solutions of ethylenediaminetetraacetic acid (EDTA) and 1-hydroxyethane-1,1-diphosphonic acid (HEDP) in combination with sodium hypochlorite to observe their abilities to remove smear layer using scanning electron microscope (SEM). **Results:** SEM evaluation showed the smallest significant amount of smear layer in the coronal part of the canals irrigated with 2.5% NaOCl + 18% HEDP compared with the apical part ($P = 0.014$). Root canals irrigated with NaOCl + EDTA and NaOCl + HEDP showed a greater ability to remove the smear layer when compared with the canals irrigated with 2.5% NaOCl alone or saline water in all canal thirds ($P < 0.05$). No significant difference was found between groups 1 and 4, or between groups 2 and 3, in all canal thirds ($P > 0.05$). **Conclusion:** A chelator used together with NaOCl can reduce but not completely remove a smear layer from root canal dentin during rotary root canal instrumentation.