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The effect of three different root canal irrigant protocols for removing smear layer on the apical micro-leakage of Real-Seal system

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Introduction & Aim: Complete root canal seal is one of the most important aims of root canal treatment. For this purpose, elimination of the smear layer and the kind of sealer used has important roles. The aim of this study was to compare the sealing ability of resin type sealer (Real-Seal) against the micro-leakage of *Enterococcus faecalis* when used in association with three different root canal irrigants (17% EDTA, 7% citric acid, 20% citric acid).

Materials & Methods: In this experimental study, 85 single-rooted extracted human teeth were selected. Step back canal preparation was performed to Iso No. 40 in the apical portion of the canals with 5.25% NaClO irrigation. Teeth were randomly divided into 5 groups: Three experimental groups of 25 teeth and two control groups of 5 teeth. Final irrigation in group-1 was performed with EDTA+NaClO, in group-2 with 7% citric acid+NaClO and in group-3 with 20% citric acid+NaClO. All groups were obturated with Real-Seal system (resin cone and sealer). The 5 positive control teeth were not obturated and the 5 negative control teeth were thoroughly obturated with Real-Seal system. After 48 hours in 100% humidity and 37 °C temperature, the roots were assembled in the designed system for this experiment. A fresh solution of *Enterococcus faecalis* was injected to the system every 3 days. The samples were evaluated daily for 90 days and the time of culture contamination with *E. faecalis* was registered in each case.

Result: All the samples in positive control group were infected after 24 hours. None of the negative control samples were infected after 90 days. There was no significant difference with between experimental group ($p>0.05$), but they had significant difference with samples in control groups ($p<0.05$).

Conclusion: In this study 20% citric acid group showed the greatest micro-leakage mean time. The least micro-leakage mean time occurred in 17% EDTA group.

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