An *in vitro* study on the effectiveness of EDTA and sodium hypoclorite on smear layer removal

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**Aim**

It is known that the smear layer does not consist only of anorganic substance, but also of the remnants of odontoblastic processes, pulp tissue and bacteria. As chelators have limited antibacterial and dissolving activity, this study is aimed to compare the smear layer removal efficacies in different parts of root canals of one dissolving (5% sodium hypochlorite)and one chelating irrigant (17% ethylenediaminetetraacetic acid - EDTA).

**Methodology**

Forty five single-rooted human teeth with straight canals were selected.Teeth were prepared by hand instrumentation technique using K- reamers. Master apical file on working length was No 30 and all the canals were instrumentated, using “step back” technique, to final size 45. Canals were irrigated passively with 2,5% NaOCl using standard 30-gauge NaviTip irrigation needle between each subsequent file size in all experimental groups. The specimens were randomly divided into three groups: distilled water (control group); 17% EDTA; and 5% NaOCl. Irrigation with tested irrigants was performed at the and of the instrumentation, through five minutes. Analysis of smear layer was performed on cross-sectional slices using stereomicroscopy and light microscopy with adapted camera. Statistical analysis was performed using one-way analysis of variance (one-way ANOVA) and post hoc Scheffe test ( P < 0.05).

**Results**

The smear layer was more effectively removed with 17% EDTA compared to 5% NaOCl (P < 0.05). At the cervical third the amount of smear layer in specimen treated with EDTA was significantly lower compared to control (P < 0.001), while the difference between the NaOCl group and the control was not statistically significant. In the middle third EDTA removes the smear layer more efficiently when compared to NaOCl and control group (P= 0.007).When the removal of smear layer in apical third was compared in all groups, no differences were found (P= 0.392).

**Conclusions**

EDTA was more effective agent for the purpose of smear layer removal in the cervical and middle third of the root canals. In the apical level both irrigant solutions tested was not effective.