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## ORIGINAL RESEARCH

### Assessment of efficacy of two different irrigating solutions in patients undergoing root canal therapy

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#### ABSTRACT:

**Background:** The present study was conducted to compare different irrigating solution in patients undergoing endodontic therapy. **Materials & Methods:** The present study comprised of 60 freshly extracted mandibular premolars. Teeth were divided into 3 groups of 20 each. In group I (Control), teeth were irrigated with distilled water solution during preparation, group II teeth with 5.25% NaOCl&17% EDTA and group II teeth with 17% EDTA along with ultrasonication. The samples were prepared and observed under a scanning electron microscope (SEM). The photomicrographs were recorded and evaluated with a scoring system. **Results:** There was significant difference in occurrence of smear layer at different level of tooth surface in group I whereas non- significant difference was observed in group II and group III. **Conclusion:** All irrigating solution found to be equally effective in patients undergoing root canal therapy.

**Key words:** irrigating solution, Premolars, Sodium hypochlorite

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#### INTRODUCTION

Bacteria have long been recognized as the primary etiologic factors in the development of pulp and periapical lesions. Successful root canal therapy depends on thorough chemomechanical debridement of pulpal tissue, dentin debris, and infective microorganisms. Irrigants can augment mechanical debridement by flushing out debris, dissolving tissue, and disinfecting the root canal system.<sup>1</sup> Chemical debridement is especially needed for teeth with complex internal anatomy such as fins or other irregularities that might be missed by instrumentation.<sup>2</sup>

Ideal requirements of root canal irrigants are that it should have broad antimicrobial spectrum, high efficacy against anaerobic and facultative microorganisms organized in biofilms, ability to dissolve necrotic pulp tissue remnants, ability to inactivate endotoxins and ability to prevent the formation of a smear layer during instrumentation or to dissolve the latter once it has formed.<sup>3</sup>

The irrigating process has three objectives as advocated by the Walker: 1) Dissolution of remnant tissue, 2) anti-

microbial action, and 3) lubrication of the canal. Many researchers have pointed out that the smear layer is difficult to remove.<sup>4</sup> One of the irrigants should be a chelating agent to remove it more effectively. Earlier, Abbott et al<sup>5</sup> had advocated that irrigation with 17% ethylenediamine tetraacetic acid (EDTA) followed by 5.25% sodium hypochlorite (NaOCl) produced very clean surface of root canals. The present study was conducted to compare different irrigating solution in patients undergoing endodontic therapy.

#### MATERIALS & METHODS

The present study comprised of 60 freshly extracted mandibular premolars. The study protocol was approved from institutional ethical committee.

Teeth were divided into 3 groups of 20 each. In group I (Control), teeth were irrigated with distilled water solution during preparation, group II teeth with 5.25% NaOCl&17% EDTA and group II teeth with 17% EDTA along with ultrasonication. The samples were prepared and observed

under a scanning electron microscope (SEM). The photomicrographs were recorded and evaluated with a scoring system. Results thus obtained were subjected to

statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of teeth**

Group	Group I	Group II	Group II
Solution	Distilled water	5.25% NaOCl, 17% EDTA	5.25% NaOCl 17% EDTA with ultrasonication
Number	20	20	20

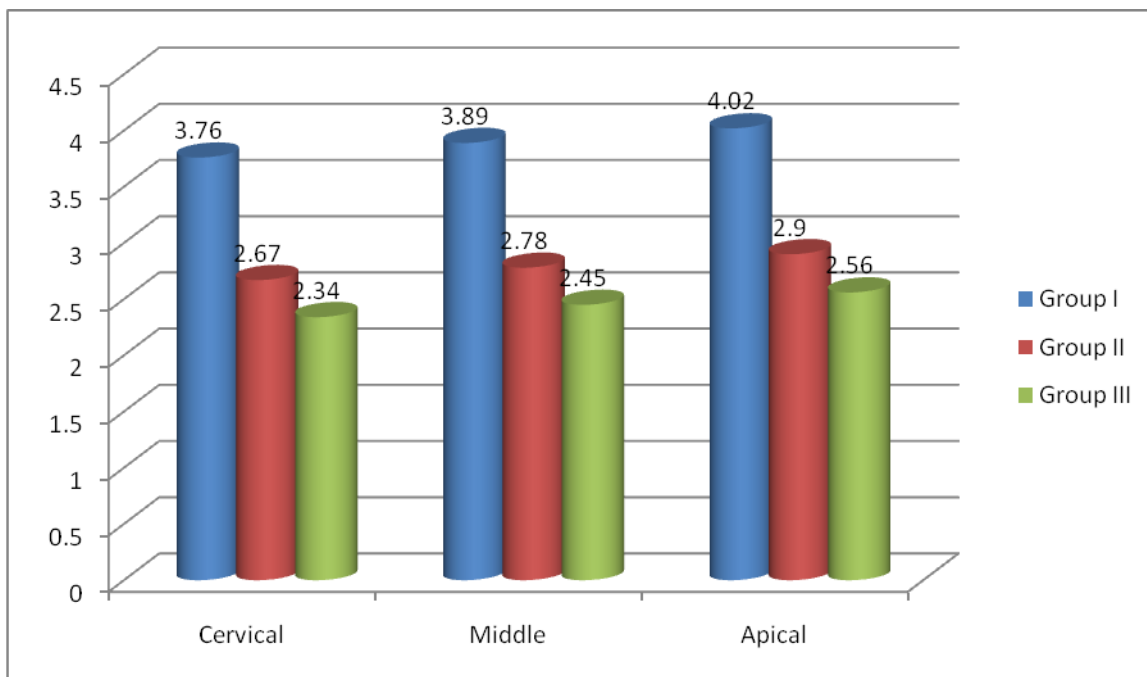
Table I shows that group I teeth were irrigated with distilled water, group I with 5.25% NaOCl, 17% EDTA and group III with 5.25% NaOCl-17% EDTA with ultrasonication.

**Table II: Comparison of smear layer score in all groups**

Surface	Group I	Group II	Group III
Cervical	3.76	2.67	2.34
Middle	3.89	2.78	2.45
Apical	4.02	2.90	2.56
P value	0.05	0.21	0.32

Table II shows that there was significant difference in occurrence of smear layer at different level of tooth surface in group I whereas non- significant difference was observed in group II and group III.

**Graph I: Comparison of smear layer score in all groups**



## DISCUSSION

Sodium hypochlorite causes complete dissolution of cells with absence of visual evidence, bacterial cells are disrupted and separated from the biofilm and are nonviable, bacterial cells remain adherent within the biofilm but are viable, bacterial cells remain adherent within the biofilm and are still viable. NaOCl exhibits a dynamic balance as is shown by the reaction:<sup>6</sup>

$\text{NaOCl} + \text{H}_2\text{O} \leftrightarrow \text{NaOH} + \text{HOCl} \leftrightarrow \text{Na}^+ + \text{OH}^- + \text{H}^+ + \text{OCl}^-$

When hypochlorous acid, a substance present in NaOCl solution, comes in contact with organic tissue it acts as a solvent and releases chlorine, which combines with the proteinamino group to form chloramines [Scheme 3]. Hypochlorous acid (HOCl) and hypochlorite ions (OCl<sup>-</sup>) lead to amino acid degradation and hydrolysis.<sup>7</sup> The chloramination reaction between chlorine and the amino group (NH) forms chloramines that interfere in cell metabolism. Chlorine (a strong oxidant) has an antimicrobial action, inhibiting bacterial enzymes and leading to an irreversible oxidation of SH groups (sulphydryl group) of essential bacterial enzymes. The present study was conducted to compare different irrigating solution in patients undergoing endodontic therapy.

We included 60 mandibular premolars. We found that there was significant difference in occurrence of smear layer at different level of tooth surface in group I whereas non-significant difference was observed in group II and group III.

Ciucchi et al<sup>8</sup> in their study compared the efficacy of different irrigants including ethylene diamine tetraacetic acid (EDTA), EDTA along with ultrasonication, citric acid, and mixture of tetracycline isomer, an acid, and a detergent (MTAD) as final irrigants where sodium hypochlorite (NaOCl) was used in each experimental group during root canal preparation with special emphasis on the apical third. Forty-five human upper anterior teeth were selected and divided into one control group (group 1) and four experimental groups (group 2 to group 5), each containing nine teeth. All the four experimental groups were irrigated with 5.25% NaOCl solution during preparation, whereas test irrigants (5 mL) as the final solution used in each experimental group were 17% EDTA, 17% EDTA along with ultrasonication, 25% citric acid, and MTAD, respectively. The samples were prepared and observed under a scanning electron microscope (SEM). The photomicrographs were recorded and evaluated with a scoring system. None of the combined irrigants was found completely effective. All the test irrigants including MTAD worked well in the middle and cervical third, whereas MTAD showed excellent results in the apical third as compared to the other groups.

## CONCLUSION

All irrigating solution found to be equally effective in patients undergoing root canal therapy.

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