

## Original Article

### The Role of Various Irrigating Solutions in Endodontic Use: A Clinical Study

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#### ABSTRACT

**Introduction:** The success of any endodontic treatment is directly associated with infection control ability of the irrigating solution. Available data indicates that any rotary, hand or hybrid instrumentation, even when performed correctly, is unable to remove all organic and inorganic debris from the root canal complex. Therefore, this being the main reasons that irrigating solutions play a chief role in making up for the shortcomings of instrumentation and aiding in endodontic disinfection procedures. Now considering Sodium hypochlorite (NaOCl) solution, is the standard irrigating solution for cleaning and disinfection of the root canal complex. It has active antimicrobial and histolytic characteristics, among other properties. **Material and method:** A detailed study analysis was designed for the comparison of two main irrigating solutions. The study was conducted in our clinic. An informed consent was obtained from each patient. The study comprised of 130 patients over a period of 6 months. Patients were having chronic apical lesions and were non-vital on the EPT monitor. All patients of age group 18-55 years were included in the study. Exceptions were made in case of immune-compromised patients, patients with history of T.B, history of hepatitis, history of bleeding disorder, calcified and ankylosed teeth and improper apical formation. Only those patients were included who were not in pain. Also, all patients were advised not to take any pain medication one week prior the procedure. **Results:** The results were obtained manually and later were interpreted electronically. Group A and group B had 75 patients each. Group A had 32 females and group B had 27 females. On the scale of discomfort, group A patients had more post obturation pain i.e. in 18 individuals of score 3 and 4. Group B had merely 09 patients who had a discomfort score of 3 and 4. **Conclusion:** Both of the irrigating solutions tested in this study (5.25% NaOCl and 2% Chlorhexidine with 0.9% NaCl) were associated with low rates of postoperative pain among patients undergoing single-visit endodontic treatment for chronic apical lesion with pulp necrosis.

**Keywords:** Endodontic, hypochlorite, pain.

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#### INTRODUCTION

The success of any endodontic treatment is directly associated with infection control ability of the irrigating solution. <sup>(1-5)</sup> Available data indicates that any rotary, hand or hybrid instrumentation, even when performed correctly, is unable to remove all organic and inorganic debris from the root canal complex. <sup>(6-8)</sup> Therefore, this being the main reasons that irrigating solutions play a chief role in making up for the shortcomings of instrumentation and aiding in endodontic disinfection procedures. Now considering Sodium hypochlorite (NaOCl) solution, is the standard irrigating solution for cleaning and disinfection of the root canal complex. It has active antimicrobial and histolytic characteristics, among other properties. <sup>(9)</sup> However, in some cases NaOCl may be cytotoxic to the peri-apical tissues at high

concentrations only. Clinical consideration reveals that postoperative pain is a major concern when highly concentrated NaOCl solutions are used in single-visit treatment of a non-vital teeth because of the risk of extravasation of the irrigating solution into the peri-apical tissues. <sup>(10)</sup> So as to, overcome such problems of sodium hypo-chloride investigators have suggested use of 2% chlorhexidine solution (CLX) as a prime choice of irrigating solution for necrotic teeth because of its antimicrobial action, high substantivity and least toxicity. <sup>(11)(12)</sup> Also, 2% chlorhexidene is less caustic than sodium hypochlorite. An effort has been made in this study to establish an vivo assessment of the incidence of postoperative pain after single-visit endodontic treatment of patients with radiographically visible chronic apical lesions and necrotic pulp, with either 5.25% NaOCl or

2% CLX plus normal saline (0.9% NaCl) as the irrigating solution. The present study was conducted to determine the role of different irrigating solutions in management of endodontic treatment.

**MATERIAL AND METHOD**

A detailed study analysis was designed for the comparison of two main irrigating solutions. The study was conducted in our clinic. An informed consent was obtained from each patient. The study comprised of 130 patients over a period of 6 months. Patients were having chronic apical lesions and were non-vital on the EPT monitor. All patients of age group 18-55 years were included in the study. Exceptions were made in case of immune-compromised patients, patients with history of T.B, history of hepatitis, history of bleeding disorder, calcified and ankylosed teeth and improper apical formation. Only those patients were included who were not in pain. Also, all patients were advised not to take any pain medication one week prior the procedure. During the single visit root canal treatment it was assured that all procedure was carried out in complete rubber dam isolation and with the need of any anesthesia. Both manual and rotary system for cleaning and shaping were used. Hero-shapers were used as the rotary system, with apical formation up-to 30-4% taper was achieved. Irrigating solution of 5.25% of sodium hypochlorite and 2% chlorhexidine with dilution of 0.9% normal saline was used in randomly selected patients. Use of EDTA was kept to bare minimum. The choice of root canal sealer was AH+ by dentsply (U.S.A). Patients were divided into two groups; group A had sodium hypochlorite solution as irrigating solution and group B had chlorhexidine as irrigating solution. The patients were now evaluated with questionnaire to be filled on the basis of pain and requirement of NSAID'S, on the 1<sup>st</sup>, 5<sup>th</sup> and 7<sup>th</sup> day of the procedure. Readings were; 0=no pain, 1= slight discomfort but no need of NSAID, 2= pain but managed by NSAID, 3= severe pain not relieved by NSAID. Choice of NSAID was ibugesic and paracetamol combination, for severe pain tramadol was dispensed by the institute itself. All the data was arranged in a tabulated form and analysed statistically.

**RESULTS**

The results were obtained manually and later were interpreted electronically. Group A and group B had 75 patients each. Group A had 32 females and group B had 27 females. (Graph1). On the scale of discomfort, group A patients had more post obturation pain i.e. in 18 individuals of score 3 and 4. Group B had merely 09 patients who had a discomfort score of 3 and 4. (Graph2). Group A had; 18 maxillary anterior, 4 maxillary canines, 6 maxillary premolars, 15 maxillary molars, 7 mandibular anterior, 3 mandibular canines, 8 mandibular premolars and 14 mandibular molars. Group B had; 11 maxillary anterior, 9 maxillary canines, 10 maxillary pre molars, 14 maxillary molars, 10 mandibular anterior, 4 mandibular canine, 7 mandibular premolars and 10 mandibular molars. (table1).

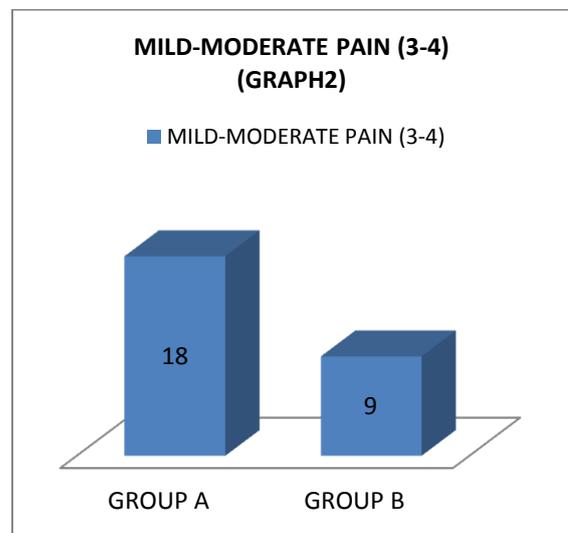
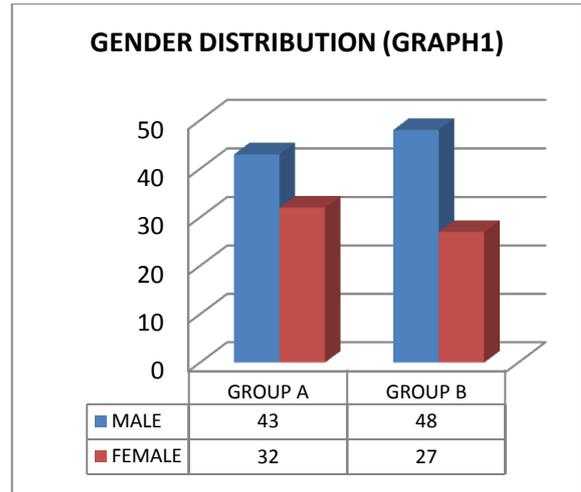


TABLE1: Teeth involved in both the groups.

Tooth Involved	Group A	Group B
Maxillary Anterior	18	11
Maxillary Canine	4	9
Maxillary Promolars	6	10
Malillary Molars	15	14
Mandibular Anteriors	7	10
Mandibular Canine	3	4
Mandibular Premolars	8	7
Mandibular Molars	14	10

**DISCUSSION**

One attempt to modern endodontics is completion of required therapy in a single visit and prospective, randomized clinical trials have shown promising results of single-visit endodontics. (13-18) One of the reasons of success in endodontic therapy is the minimization of postoperative pain. Also, the frequent occurrence of such pain has been a concern since the last century. (19) Any discomfort after completion of endodontic treatment is generally due to a tissue response caused by one or more factors, including failure at the cleaning and shaping stages, presence of infected debris and damage to the pulp. Other mechanical aspects include over instrumentation of the canal, chemical factors might

include extrusion of intra-canal medications, filling materials or irrigating solution.<sup>(20)</sup> It is noteworthy, that preoperative pain is one of the strongest predictors of postoperative pain, but the study was restricted to patients without any preoperative pain, no reference can be kept for any decrease in the pain.<sup>(21)</sup> Sodium hypo chlorite is still currently the irrigating solution of choice because of its chemical properties, which make it an effective cleanser and disinfectant of the root canal system and an excellent solvent for organic tissue. A standard concentration of 5.25% was chosen to ensure more effective antimicrobial action (than would be the case with a lower concentration) and stability of histolytic activity. Also, high-concentration solutions might have greater potential for dissolution of debris in areas that cannot be reached by endodontic instrumentation. However, high concentrations considerably, increase the toxicity of this irrigating solution. So, in cases of extravasation it could lead to severe postoperative pain. On the other hand, 2% chlorhexidine with normal saline has been suggested as a good choice of irrigating solution for necrotic teeth because of its antimicrobial action, high substantivity and low toxicity. It should not, however, be used as the sole irrigating solution, as 2% chlorhexidine cannot dissolve organic matter. The results of our study did showed major difference, in terms of postoperative pain at any of the time points evaluated, between 5.25% NaOCl and 2% CLX when used for irrigation during single-visit endodontic therapy. The post-operative pain decreased with time and by day 7 only 2% of patients in each group reported mild pain which did not required analgesia. This data is clinically important, indicating that the main reason for postoperative pain is probably tissue debris (contaminated or not) that is pushed outside the canal toward the peri-apical tissue during bio-mechanical preparation.

## CONCLUSION

Both of the irrigating solutions tested in this study (5.25% NaOCl and 2% Chlorhexidine with 0.9% NaCl) were associated with low rates of postoperative pain among patients undergoing single-visit endodontic treatment for chronic apical lesion with pulp necrosis. It is safe to say that as long as the selected irrigating solution is kept inside the root canal by means of a low-pressure irrigation technique, (active irrigation) postoperative pain and flare-ups can be avoided to a large extent.

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