

Assessment and Evaluation of Use of Chlorhexidine Gluconate as an Irrigant During Endodontic Treatment

Snehashree Pophli^{1*} Laxmikant Late² Pankaj Malhotra³ Akash Sharma⁴ Priya Kulkarni⁵

¹PG Student, Department of Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.

²PG Student, Department of Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.

³Professor and Head, Department of Periodontology, Maharana Pratap College of Dentistry, Gwalior, M.P, India.

⁴Senior Lecturer, Department of Periodontology, Maharana Pratap College of Dentistry, Gwalior, M.P, India.

⁵BDS, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.

ABSTRACT

Background: Complex and unpredictable anatomy of root canal system sometimes makes it difficult for endodontic treatment. A mechanical instrumentation technique is generally used to obtain clean, bacteria free canals. Various irrigant such as, normal saline, chlorhexidine, sodium hypochlorite and hydrogen peroxide are generally used.

Aim: The aim of this study is to compare and assess the efficacy of chlorhexidine gluconate as an irrigant during endodontic treatment.

Material and method: 50 patients diagnosed as irreversible pulpitis, pulp necrosis and non-vital teeth exhibiting acute apical periodontitis and in need of root canal treatment were included in present study. Patients were divided into two groups, 2% chlorhexidine solution in group I and normal Saline solution in group II were used as an irrigating solution.

Result: In present study Visual Analogue Scale showed that of in group 1, moderate pain was felt in 20% cases postoperatively, and 28% felt moderate pain in group 2 i.e. normal saline group. Visual Analogue Scale after 1 week showed that after 1 week only 4% cases from CHX group felt mild pain and 16% patients from normal saline group felt moderate pain.

Conclusion: A significant difference was observed in pain scale between two groups. Pain scale for CHX group was very less. Thus CHX can be successfully used as an irrigating solution.

Keywords: Chlorhexidine gluconate, normal saline, irrigating solution, endodontic treatment.

INTRODUCTION

Microorganisms are the causative organism which leads to pathogenesis of pulp and periapical diseases.¹ Sometimes elimination of microorganisms becomes difficult due to complex structure of root canals and infected root canals. Microorganism free canals are obtained with the help of mechanical instrumentation. However mechanical instrumentation alone does not help in achieving bacteria free canal, mechanical

instrumentation along with irrigating solution and intracanal medicaments results in bacteria free canal.^{2,3} Some authors have suggested that pulpal tissue remanence, debris both bacteria and dentin may be present due to the irregularities of root canal systems, even after meticulous mechanical preparation.^{4,5} Thus there is need of various irrigating solution.

Several irrigant like sodium hypochlorite (NaOCl), chlorhexidine gluconate, 17% EDTA, citric acid,

Received: Oct. 17, 2018; Accepted: Jan. 10, 2019

*Correspondence Dr. Snehashree Pophli.

Department of Endodontics, CSMSS Dental College and Hospital, Aurangabad, Maharashtra, India.

Email: Not Disclosed

MTAD, hydrogen peroxide, normal saline and 37% phosphoric acid solution as endodontic irrigant of the root canal system. Chlorhexidine (CHX) is one of the most commonly used endodontic irrigant and medicament. CHX at low concentration has a bacteriostatic effect and at high concentration it has a bactericidal effect because of precipitation and/or coagulation of intracellular constituents.⁶ CHX has antimicrobial property and affects both gram positive and negative microorganism.⁷ So in present study we aimed to study and to compare and assess the efficacy of chlorhexidine gluconate as an irrigant during endodontic treatment.

MATERIAL AND METHOD

A total of 50 patients were included in the present study. Age group selected for the present study was children aged between 18 to 40 years. Of the 50 patients 30 were males and 20 were females. Ethical committee clearance was obtained before initiating the study. A written informed consent was obtained from parents/guardians before starting the procedure. Patient's parents/ guardians were explained in detailed regarding the procedure to be formed.

Patients presenting to the dental hospital for evaluation and treatment of decayed teeth were considered in present study. For this clinical evaluation, 50 mandibular first molars of 50 patients of age range 18-40 years were selected. Patients with history of allergy to any medications, retreatment cases and abscess cases were excluded in the current study. All root canal treatments were completed in two visits. Patients were divided in to two groups. 25 patients in each group, group 1 received 2% chlorhexidine solution and group 2 received normal saline.

Group 1 - CHX

Group 2 – Normal saline

Inclusion Criteria

1. Age group 18 to 40 years
2. Decayed Mandibular first molar

Exclusion Criteria

1. Patients not willing to participate
2. Patients with mental disorders

3. Patients with chronic illness

Data analysis:

Data was collected safely. Data so collected was subjected to analysis using Statistical Package for Social Sciences (SPSS) Version 15.0. Non parametric data has been represented as frequencies and percentages. All variables that were significantly different were recorded at a $p < 0.005$ level.

Results:

A total of 50 patients were included in the present study. Of the 50 patients 30 were males i.e. 60% and 20 were females 40%. Age group selected for the present study was patients aged between 18 to 40 years (Table 1). All 50 patients were divided in two groups. Group 1 consisted of 25 patients, 2% chlorhexidine was used for 25 patients. Group 2 consisted of 25 patients; normal saline was used for irrigation (Table 2).

In Visual Analogue Scale showed that of the 25 patients in group 1, 10 patients reported moderate pain was felt with 2% CHX i.e. 20% postoperatively, and 14 patients said they felt moderate pain in group 2 i.e. normal saline group i.e. 28%. Visual Analogue Scale after 1 week showed that after 1 week only 2 patients from CHX group felt mild pain i.e. 4% and 8 patients from normal saline group felt moderate pain i.e. 16% (Table 3). A statistically significant difference was observed in both the groups. Results in present study showed that 2% CHX was most comfortable during endodontic treatment as compared to normal saline (Graph 1). In current study none of the patients reported to us with postoperative swelling.

DISCUSSION

Complete extirpation of pulp and disinfection of the pulpal space are considered to be essential for long term success in endodontic treatment. Presence of remnant pulp can serve as a nutrient source for remaining bacteria and can lead to reinfection and patient may have severe pain or swelling. One of the most important steps in endodontic treatment is complete preparation of the root canal space which involves cleaning and shaping of the canal, however studies have shown that it leads to extrusion.⁸ Therefore; several irrigating materials are used in combination with canal preparation. So it is very

necessary that root canal irrigant should be nontoxic and biocompatible with its surrounding tissues in order to avoid postoperative discomfort. However all the irrigating materials used in endodontic treatment presents one or the other side effect there come the need of an alternative irrigating solution.

In present study 2% CHX was used as a irrigant in study group and normal saline in control group. Various studies in the past have mentioned about the influence of a variety of factors such as age, gender, tooth type, presence of allergy or systemic diseases, size of peri radicular lesion, preoperative pain, intracanal medications, level of instrumentation and presence of sinus tract stomas etc.

However in present study patients with allergy and chronic illness were excluded from the study. In present study to maintain the standardization 50 Mandibular first molar were included in the study. In present study 50 patients were included in the study 60% were males and 40% were females. The results of present study showed that highly significant difference was observed in the incidence of postoperative pain between the two groups postoperatively and after 1 week of treatment. Pain was more in normal saline group as compared to CHX group and the probable reason for this may be attributed to the fact that CHX has antimicrobial properties.⁹

According to the literature studies have shown that CHX exhibits sustained antimicrobial activity in the root canal for 72 hours after being used as an endodontic irrigant.¹⁰ Our study is in agreement with those reported by others.

CONCLUSION

The result in the present study showed that Chlorhexidine gluconate is a good alternative irrigating solution. A Significant difference was observed in the pain level between 2% chlorhexidine and normal saline group postoperatively and after 1 week of treatment. Level of discomfort was less in CHX group.

Table 1: Demographic characteristics of patients.

GENDER	PATIENTS	PERCENTAGE
Male	30	60%
Female	20	40%
Total	50	100%

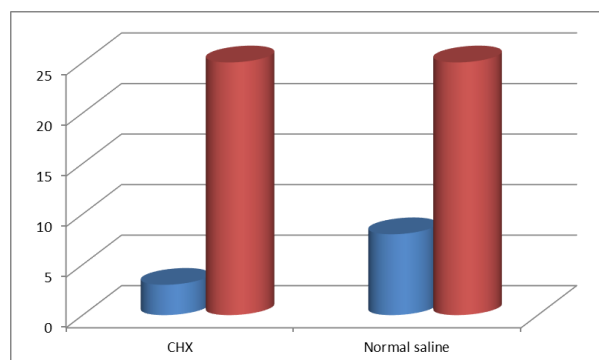
Table 2: Distribution of group.

GROUPS	SAMPLE
Group 1- 2% CHX	25 (50%)
Group 2- Normal saline	25 (50%)

Table 3: visual analogue scale observed in both groups.

GROUPS	PATIENTS	PERCENTAGE
Group 1	12	20%
Group 2	14	28%

Graph 1: Level of discomfort observed.



CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Mohammadi Z, Abbott PV. The properties and applications of chlorhexidine in endodontics. International Endodontic Journal, 42, 288–302, 2009.
2. Byström A, Sundqvist G (1981) Bacteriologic evaluation of the efficacy of mechanical root

- canal instrumentation in endodontic therapy. Scand J Dent Res 89, 321-328.
3. Hess W (1925) Anatomy of root canals of the teeth of the permanent dentition, part 1. William Wood, New York, 1-39.
 4. Abou-Rass M, Piccinino MV. The effectiveness of 4 clinical irrigation methods on the removal of root-canal debris. Oral Surg Oral Med Oral Pathol 1982;54:323-328.
 5. Gomes BP, Ferraz CC, Vianna ME, Berber VB, Teixeira FB, Souza FJ. In vitro antimicrobial activity of several concentrations of sodium hypochlorite and chlorhexidine gluconate in the elimination of *Enterococcus faecalis*. Int Endod J 2001;34:424-428.
 6. McDonell G, Russell AD. Antiseptics and disinfectants: activity, action, and resistance. Clin Microbiol Rev 1999;12:147-9.
 7. Russell AD, Day MJ. Antibacterial activity of chlorhexidine. J Hospital Infection 1993;25:229-38.
 8. Vande Visse JE, Brilliant JD. Effect of the irrigation on the production of extruded material at the root apex during instrumentation. J Endod 1975;1:243-6.
 9. Basson NJ, Tait CM (2001) Effectiveness of three root canal medicaments to eliminate *Actinomyces israelii* from infected dentinal tubules in vitro. SADJ 56, 499-501.
 10. White RR, Hays GL, Janer LR. Residual antimicrobial activity after canal irrigation with Chlorhexidine. J Endod 1997;23:229-31.