

COMPARISON OF CALCIUM HYDROXIDE AND 2% CHLORHEXIDINE GEL AS INTRACANAL MEDICATIONS IN REDUCING POSTOPERATIVE PAIN IN MOLAR TEETH WITH APICAL PERIODONTITIS AND NECROTIC PULP-RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Objective: To compare the effect of calcium hydroxide and 2% chlorhexidine gel intracanal medications in postoperative pain in molar teeth with apical periodontitis and necrotic pulp.

Materials and Methods: A Randomized clinical trial was carried from Nov 2017 to Oct 2018 at Department of Operative Dentistry, Sardar Begum Dental College Peshawar. Sixty patients with molar teeth having apical periodontitis and necrotic pulp were divided in two groups by lottery method with thirty patients in each group. Following the access cavity preparation, canals were located and prepared by protaper files. After preparation of the canals, Calcium hydroxide was placed as intracanal medicament in one group while 2%chlorhexidine gel was placed in the second group. The effect of intracanal medicaments on postoperative pain was checked using a visual analog scale after 6, 24, 48 and 72 hours. Data was entered and analyzed using SPSS version 22. The Chi square test was applied for categorical variables and independent sample t-test was applied to analyze the difference in continuous variables to detect in pain scores between the two groups.

Results: There was a significant difference in preoperative and postoperative pain after placing intra canal medicament but postoperative pain was found statistically insignificant in both the groups comparing after 6,24,48 and 72 hours (p-value=0.456).

Conclusions: Both calcium hydroxide paste and 2% chlorhexidine gel when used as intracanal medicament are equally effective in reducing the postoperative pain in molar teeth with apical periodontitis and necrotic pulp.

Keywords: Calcium hydroxide, Chlorhexidine, Postoperative pain, Apical periodontitis and Necrotic pulp

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INTRODUCTION

Post-treatment endodontic pain remains a common problem that a dental profession come across¹. Post-treatment endodontic pain occurs after initiation of endodontic treatment i.e inter-appointment and

post obturation². Post treatment endodontic pain also encompass endodontic flare-ups, which presents as strong pain with or without swelling that occurs after initiation or continuation of root canal treatment³.

Based on different studies^{4,5} the incidence of post-operative pain has been reported ranging from 1.9% to 48%. Various factors that results in post-operative pain comprises of single versus multiple visit root canal treatment, status of the pulp, type of intracanal medicament used and root canal instrumentation protocol (enlargement /non enlargement of apical foramen)^{6,7}.

The most common cause of post-operative pain is the presence of micro-organisms in the root canal system due to improper disinfection of the canals⁸. Thus elimination or reduction of microorganisms from the root canal system is very important in the treatment of root canals, which can be achieved by placement of an antimicrobial dressing after preparation.

Calcium hydroxide (CH) is widely accepted intracanal medicament in endodontic therapy⁹. The antibacterial action of calcium hydroxide is via release of hydroxyl ions that kills or inactivate bacteria. Calcium hydroxide also alters bacterial cell walls and denatures endotoxin, a lipopolysaccharide, thereby making it less antigenic. Due to its antimicrobial or tissue-altering effects, it has been advocated that calcium hydroxide also possess pain preventive properties¹⁰. It also controls inflammatory process and induces repair¹⁰. However handling and proper placement of Calcium hydroxide, the complete removal of Calcium hydroxide from the root canal system, its interaction with the setting time of zinc oxide eugenol-based endodontic sealers and resistance of some endodontic pathogens, including *E. faecalis* and *Candida albicans* are a few drawbacks of calcium hydroxide¹¹.

Chlorhexidine, a broad spectrum antimicrobial agent has been reported as an effective intracanal medicament in endodontics¹². Chlorhexidine is a positively charged molecule that interacts with phospholipids and lipopolysaccharides on the cell membrane of bacteria and then enters the cell through active or passive transport mechanism¹³. The advantages of Chlorhexidine include substantivity in root canal dentin and relatively low toxicity¹³. Chlorhexidine is even effective against Calcium hydroxide resistant

bacteria¹⁴. Some studies have suggested that combination of chlorhexidine and calcium hydroxide could enhance the antimicrobial efficacy against calcium hydroxide resistant microorganisms¹⁴.

Different studies conducted on the use of calcium hydroxide and chlorhexidine addresses the antimicrobial efficacy in root canal treatment. Few studies have been done to show the pain reducing effect of calcium hydroxide and chlorhexidine as intracanal medication. Therefore the aim of this study was to compare the incidence of postoperative pain after antimicrobial treatment protocols based on intracanal medication with either 2% chlorhexidine gel or a calcium hydroxide paste.

MATERIALS AND METHODS

A Randomized clinical trial was carried from Nov 2017 to Oct 2018 at Department of Operative Dentistry, Sardar Begum Dental College Peshawar. This study was conducted after approval from the Ethical Review Committee of Sardar Begum Dental College Peshawar. Total Sample size was 60. Patients were selected from the outpatient department of Operative Dentistry and Endodontics at Sardar Begum Dental College. Teeth with apical periodontitis and necrotic pulp in Mandibular molars of both genders requiring endodontic treatment were included while teeth associated with fluctuant facial swelling (acute abscess) which would require incision and drainage, the patients who received antibiotic therapy within previous three months, patients having more than one tooth that require root canal treatment and patients taking medications for pain or medication that would alter the pain perception were excluded. The diagnosis of pulpal necrosis with apical periodontitis was confirmed by negative response of the pulp to electric pulp tester and absence of bleeding during access preparation. Clinical and radiographic evidence of apical periodontitis was confirmed by tenderness to percussion and widening of periodontal ligament space

All the objectives and protocols of the study were briefed to the patients and selection was made after strictly fulfilling the inclusion and exclusion criteria. A written informed consent was taken from each patient for their participation in the study. Patients were allotted to two medication group randomly by using lottery method. Patients of Group 1 received calcium hydroxide medicament and that of Group 2 received

2% chlorhexidine gel as a intracanal medicament.

The teeth of the patients were anaesthetized using local anesthesia injection with 1.8 mL of 2% lignocaine with 1:100,000 epinephrine (Medicaine Inj, Huons Co.Ltd). Isolation was done using a rubber dam and access cavity was prepared. EDTA was used as lubricant and No. 10 k file of 0.02 taper was used to check the patency of canal. Working length was determined with apex locator (J. Morita, Japan) and then confirmed radiographically. using No. 15 K file. Shaping of the canals was done by universal protaper files(Dentsply, maillefer) using endomotor (x-smart, Dentsply). Irrigation was done using 2.5% sodium hypochlorite solution throughout the preparation. After preparation, the canal was irrigated with normal saline and then dried and one of the intracanal medicament was placed with the help of lentulo spiral as following:

Group I: calcium hydroxide paste

Group 2: 2% chlorhexidine gel.

Cavities were sealed using cavit (Provis, Favodent karl Huber GmbH). At the end of the appointment, each patient was given a proforma sheet and the visual analog pain scale was explained to them. Patients were instructed to record their pain level experienced after 6 hours, 24, 48 and 72 hours of treatment on the basis of visual analog scale in the proforma. Values attributed were according to the postoperative pain characteristics.

Pain rating at 0 point was categorized as no pain, 1-3 as mild pain, 4-6 as moderate pain, and 7-10 as severe pain. Antibiotics and analgesics were not prescribed to the patients except if pain persisted or recurred. Inclusion and exclusion criteria were strictly followed to avoid biases and confounders.

RESULTS

Out of total 60 patients the mean age of the participants were 32.8 ± 7.06 (Figure 1) while most of the participants were males. Table 1 shows mean age of the patients in each group. Gender descriptive

statistics are presented and Pearson chi-square test was applied and no significant difference was found between the gender in both groups (p -value=0.434). (Table 2)

Independent sample t-test was applied to analyze the difference in pain scores between group A and group B (table 3). Postoperative pain after 6 hours was found un significant in both the groups (p -value= 0.456). The p -value for pain difference after 24, 48 and 72 hours cannot be calculated because there was no pain in both the groups after 24, 48 and 72 hours. (Table 3)

DISCUSSION

This study was done to compare the incidence of postoperative pain after antimicrobial treatment with either 2% chlorhexidine gel or a calcium hydroxide paste in molar teeth with apical periodontitis and necrotic pulp.

The results of the present study showed that both medication (calcium hydroxide and 2% chlorhexidine gel) causes decrease in postoperative pain in both necrotic and apical periodontitis patients. In the follow up period (6, 24, 48, 72 hours), no statistical significant difference was observed in post-operative pain in both groups ($p=0.456$). It was also found that there was no significant difference between the

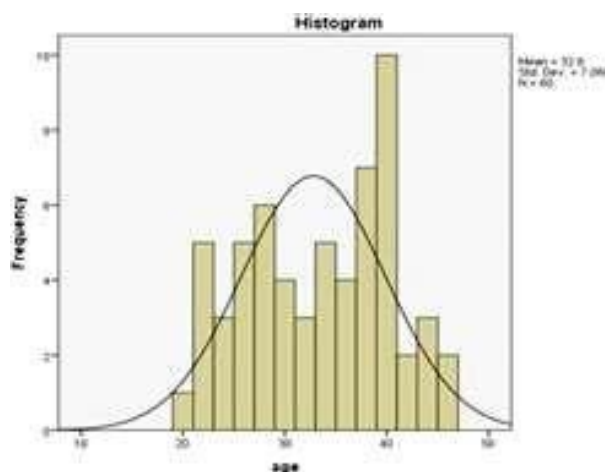


Fig 1: Mean Age of the Study Patients

Table 1: Mean age of the patients in both groups

	Group A (Calcium hydroxide)	Group B (2% chlorhexidine)
Total number of patients	30	30
Mean age	33.30	32.30
Standard deviation	7.671	6.497

gender of both groups (p-value =0.434).

Post-endodontic pain is a major problem faced by the patients seeking their dental treatment. Post-endodontic pain ranges from 35-40% of cases, therefore elimination or reduction of post-endodontic pain is associated with the success of endodontic treatment¹⁵. It has been advocated that placing an intracanal medication having antibacterial properties can reduce the number of bacteria and therefore reduce post-operative pain¹⁰.

A study conducted by Fauzia et al¹⁵, on comparison of intracanal medications for the assessment of pain after root canal treatments showed that chlorhexidine is most effective in reducing postoperative pain as compared to calcium hydroxide while in present study we found no significant difference in both the intracanal medicaments in reducing postoperative pain. The difference in the results may be due to difference in the concentration of chlorhexidine gel used. In present study, 2% chlorhexidine gel is used while in fauzia et al study concentration of

chlorhexidine gel was not mentioned. Secondly they compared chlorhexidine and calcium hydroxide with the placebo group while in the present study calcium hydroxide and 2% chlorhexidine gel are compared.

Another study done by Ripu et al² showed that there is significant postoperative pain reduction in teeth dressed with chlorhexidine alone or in combination with calcium hydroxide than those teeth dressed with calcium hydroxide or placebo. They compared the medicaments groups to the placebo group and secondly they used combination of different medicaments, while in the present study there was no placebo group and no combination of any medicaments. This might be the reason that accounts for the difference in the results.

Gamma et al¹⁶ conducted a study on postoperative pain following the use of two different intracanal medications (chlorhexidine and calcium hydroxide/camphorated paramonochlorophenol/glycerin paste), showed that there were no statistical significant differences between the two medicaments in all possible

Table 2: Gender frequency

			Medicament group			
Diagnoses			calcium hydroxide	chlorhexidine	Total	p-value
Necrotic	gender	Male	9	12	21	0.434
		Female	6	6	12	
	Total		15	18	33	
Apical peri - odontitis	gender	Male	8	6	14	
		Female	7	6	13	
	Total		15	12	27	
Total	gender	Male	17	18	35	
		Female	13	12	25	
	Total		30	30	60	

Table 3: Comparison of preoperative and post-operative pain

	medicament group	N	Mean	Std. Deviation	p-value
Preoperative pain	calcium hydroxide	30	1.30	0.877	0.885
	Chlorhexidine	30	1.27	0.907	
postop pain after 6 hours	calcium hydroxide	30	0.17	0.379	0.456
	Chlorhexidine	30	0.10	0.305	
postop pain after 24 hours	calcium hydroxide	30	.00	.000a	----
	Chlorhexidine	30	.00	.000a	
postop pain after 48 hours	calcium hydroxide	30	.00	.000a	----
	Chlorhexidine	30	.00	.000a	
postop pain after 72 hours	calcium hydroxide	30	.00	.000a	----
	Chlorhexidine	30	.00	.000a	

comparisons in treatment and retreatment cases and in teeth with or without apical periodontitis. These results are in accordance to the present study.

Similarly a study was conducted by Menakaya³ on incidence of postoperative pain after use of calcium hydroxide mixed with normal saline or 0.2% chlorhexidine digluconate as intracanal medicament in the treatment of apical periodontitis. They showed that there was no significant difference in postoperative pain between the two medicaments groups which in accordance to the results of present study.

Different studies done by Sholeh¹⁷, Fava¹⁰, and Abouelenien¹⁸ had showed that calcium hydroxide or chlorhexidine when used as intracanal medicament causes reduction in post-operative pain which supports the results of the present study.

CONCLUSIONS

Based on the results of the present study it can be concluded that both calcium hydroxide paste and 2% chlorhexidine gel when used as intracanal medicament are significantly effective in reducing the postoperative pain in molar teeth with apical periodontitis and necrotic pulp.

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