



ORIGINAL ARTICLE



Evaluation of calcium hydroxide and triple antibiotic paste as an intra-canal medicament to reduce interappointment pain: An in vivo study

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Abstract

Aim: The aim of this study was to evaluate and compare the effectiveness of Calcium hydroxide and triple antibiotic paste as an effective method to control interappointment pain.

Material and method: Forty-four patients were included in this study, presenting with chief complain of symptomatic irreversible pulpitis with apical periodontitis. The patients were equally divided into two groups, Group 1 received calcium hydroxide as an intracanal medicament and Group 2 received triple antibiotic paste as an intracanal medicament. Preoperative and interappointment pain was recorded using a numerical rating scale (NRS).

Results: Both groups reported highest incidence of pain post-operatively at 6hrs, which decreased gradually from 6 hours to 12, 24, 48 hours. There was no statically significance difference between two groups in this study.

Conclusion: Intracanal application of CaOH and TAP in teeth with symptomatic pulpitis with apical periodontitis were found to be equally effective in reducing the interappointment pain

Keywords: Interappointment pain, Intercanal medicament, triple antibiotic paste, calcium hydroxide

1 | INTRODUCTION

Interappointment pain is a universal concern for clinicians and patient alike which remains a significant challenge for dental professionals. The intracanal antibacterial dressing is suggested to eliminate the existing microorganism after chemo-mechanical preparation.¹ Several Intracanal medicaments are recommended for the removal of bacteria and prevent the growth of microorganisms between

appointments. To provide a complete bacterial free canals calcium hydroxide dressing is being suggested. Calcium hydroxide (CaOH) was introduced in dentistry by Herman in 1920, since, it has been used as a most common intracanal medicament.² Various biological properties of CaOH, such as antimicrobial activity, tissue-dissolving ability, inhibition of tooth resorption, and hard tissue formation, have been investigated, and its wide use in root canal treatment has been associated with periradicular healing and

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few adverse reactions.³ Systemic antibiotic therapy has proven useful in dental surgical and non-surgical procedures.⁴ Antibiotics have been used locally as an intracanal medicament to provide adequate concentrations and avoid the risk of systemic side effects. Root canal infection is polymicrobial which warrants a coverage for both aerobic and anaerobic bacterial species. As an effective model for drug delivery in tooth which have undergone pulpectomy a combination of antibiotics consisting ciprofloxacin, metronidazole, and minocycline is referred as triple antibiotic paste (TAP).^{4,5}

2 | MATERIAL AND METHOD

Forty-four patients reporting to the conservative and endodontic department KVG dental college with chief complain of pain were included in this study. Informed consent of the patients was obtained after explaining about the procedure. The patients were divided into two groups randomly with twenty-two patients in each group. Group 1 received CaOH as an intracanal medicament and Group 2 received (TAP) as an intracanal medicament. Inclusion criteria were as follows

Inclusion criteria:

- Mandibular first molar with symptomatic irreversible pulpitis
- Mandibular first molar with symptomatic apical periodontitis
- Patient between the age group 18 to 60 years

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Exclusion criteria:

- Uncooperative patients
- Pregnant patients
- Any history of systemic disease
- Patients who had received antibiotic treatment during the last 3 months
- Patients having more than one tooth requiring root canal treatment
- Periodontal probing depth >4mm
- Teeth where isolation is difficult
- Retreatment and teeth with fluctuant swelling

Preoperative pain and interappointment pain were recorded by using a NRS with a score attributed as 1 to 10. Serial readings of pain score were taken at 6, 12, 24 and 48 hours.

NRS Rating⁸

- No pain to mild pain, requiring no analgesic medication (score 0-3)
- Moderate pain, requiring analgesic for relief (score 4-6)
- Extreme pain, requiring analgesic for relief (score 7-10)

Analgesics were advised to the patient only on encountering a recurrence of moderate to extreme pain, no antibiotics were prescribed.

First visit: The teeth were locally anaesthetized (lidocaine 4% solution with epinephrine in the concentration of 1:100000). A standard access preparation was prepared with a sterile high-speed endodontic access bur #2 (Dentsply Maillefer) and Endo Z carbide bur until the orifice was exposed. After access was prepared, the rubber dam was placed. Patency of the root canal was obtained using stainless steel hand k- files size #15 (MANI, INC.). Working length was established 1 mm from the radiographic apex. The root canals were instrumented with hand files and ProTaper gold rotary files (Dentsply Maillefer) in a crown-down motion up to file size #4 for all

cases. In total 10 ml of 2.5% sodium hypochlorite was used for irrigation between each file and the next using a 25-gauge needle. 5 ml of 17% EDTA (Prime dental) was used at the end of the procedure to remove the smear layer. 5 ml of saline solution was the final irrigant used to neutralize all the previously used solutions. Following instrumentation and irrigation, canals were dried and treated in the following manner.

Group I: After root canal treatment an intracanal medicament as CaOH was introduced inside the canal A paste prepared using CaOH powder and propylene glycol was dispensed on glass slab in a thick paste-like consistency, a 100 mg of CaOH and one drop of propylene glycol was used to prepare the mixture. Lentulo spirals were used for compacting the paste inside the canal. Finally, an endodontics spacer was placed over root canal orifice and interim restoration was given using zinc oxide eugenol cement.

Group II: Triple antibiotic paste was formulated using metronidazole 500 mg, minocycline 100mg and ciprofloxacin 200mg. Tablets were crushed separately using mortar and pestle, a finely grained powder was obtained and weighed separately and mixed in 3:3:1 proportion to obtain a triple antibiotic (TAP) mixture. A 1:1 ratio of TAP and propylene glycol were used to prepare a mixture in a thick paste-like consistency.⁶ Lentulo spirals were used for compacting the paste inside the canal. Finally, an endodontics spacer was placed over root canal orifice and interim restoration was given using zinc oxide eugenol cement.

Second visit: The patients were recalled after 7 days following the first visit to change the intracanal medicament.

Third visit: Obturation of root canal was done using lateral condensation technique and AH Plus resin-based sealer

Statistical analysis

Analysis of the data was done using IBM SPSS version 22 software. Median and range were calculated and the pain score was compared between the two groups using the Mann-Whitney U test. Level of significance was kept P <0.05. Qualitative pain score was compared using the Chi-square test.

3 | RESULTS

Forty-four patients were evaluated during this study period. There was no difference between the groups when demographics were compared (Table 1). At six hours the highest incidence of pain was measured in both the group, with a gradual decrease from 6 hours to 12, 24 and 48 hours postoperatively, varying significantly. Both the groups showed no statistically significant difference at time interval between 6 to 48 hours (Table 2).

TABLE 1: Gender distribution of participants.

Gender	Group 1	Group 2
Male	14	16
Female	10	8
X2	0	
p-value	1ns	

X2:Chi square test, Significance level: p<0.05, ns: non-significant

TABLE 2: Median and range values inter appointment pain intensity in between groups

Groups	Preoperative	6 hrs.	12 hrs.	24 hrs.	48hrs
	pain				
Group 1 Median	1	3	3	2	
Min	0	0	0	0	0
Mean rank	10	10	9	6	9
median	2.78	4.10	3.52	3.10	2.70
Group 2 Median	2	2	1	1	
Min	0	0	0	0	0
Max	7	8	7	6	8
Mean ran	3.78	4.70	2.60	2.40	2.18
P value (p <0.005)	0.370	0.412	0.369	0.073	0.0514

4 | DISCUSSION

Pain is subject emotion experienced by a person and it's measured via a verbal report by the patients.⁷ Several different scales have been used for assessment of pain after endodontic therapy and NRS is considered a consensus-based, standardized assessment method and reports better compliance compared to other scales. Hence NRS was used in this study to evaluate the pain score during the appointments.^{8,9} The scores of NRS were categorized into two groups (score, ranging from 1 to 10) to make the patient understand the pain scale accurately and quantitatively.

The success of endodontic treatment depends on a reduction in the microbial flora in the root canal.¹⁰ Mandibular teeth with symptomatic pulpal and periapical pathology were selected for the assessment in this study as preoperative pain is suggested to influence the development, course, and response of interappointment pain after endodontic treatment.¹¹ In this study rotary ProTaper gold rotary files NiTi files were used in a crown-down motion, owing to lesser debris extrusion it considered to have the least incidence of interappointment pain along with copious irrigation.^{12,13}

Calcium hydroxide is considered to have antimicrobial, anti-inflammatory and has tissue dissolving properties, thus its effect can be classified as chemical, physical and antimicrobial. In aqueous solution calcium hydroxide dissociate into Ca⁺ and OH⁻ ion which results in its high alkalinity and is not conducive for the survival of microorganism inside root canals.¹⁴ Pai et al¹⁴ in his study showed the TAP as an effective intra-canal medicament to reduce interappointment pain. Additive and synergistic effect of TAP enhance the spectrum of antimicrobial activity and hence a lower pain score is observed. In our study, a reduction of pain score was seen in both the group over 48 hours. With the highest incidence of pain in first 6 hours, the CaOH and TAP don't differ significantly in the respective pain score, similar results were shown by studies done by Ghoddusi J¹⁵ and Quadir F¹⁶, Combination of three antibiotics overcomes bacterial resistance and achieves higher antimicrobial action. Previous studies have shown favourable results when an antibiotic mixture of ciprofloxacin, metronida-

zole, and minocycline has been used as topical root canal agents.^{4,5}

The recommended retention period for the intracanal medicament is 7 days; however, recontamination of the canal may take place if the medicament is retained for 2 weeks. Thus, intracanal medicament was replaced at the initial appointment and the end of one week.¹⁷

5 | CONCLUSION

Local application of CaOH and TAP in teeth with symptomatic pulpitis with apical periodontitis were found to be equally effective in reducing the interappointment pain. Systemic antibiotics can be avoided where interappointment pain is a primary concern.

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