

THE EFFECT OF LEDERMIX PASTE AND CALCIUM HYDROXIDE AS INTRACANAL MEDICAMENT ON PAIN AFTER INSTRUMENTATION OF ROOT CANALS

Madiha Sattar, Beenish Abbas, Shoaib Rahim, Sidra Aamer, Sana Abbas*

Armed Forces Institute of Dentistry/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To compare the effect of Ledermix paste and Calcium hydroxide as intracanal medicament on the mean postoperative pain after instrumentation of the root canals.

Study Design: Comparative prospective study.

Place and Duration of Study: Department of Operative Dentistry, Armed Forces Institute of Dentistry, Rawalpindi, from Sep 2017 to Mar 2018.

Methodology: A total of 256 patients (128 patients in each group) were included in the study. Cases were divided into two groups i.e., group-A and group-B randomly based on lottery method dressed with Ledermix paste and Calcium hydroxide respectively. Access cavity was sealed with cavit, each patient was given an evaluation sheet and visual analogue pain scale was explained.

Results: Mean age of the patients was 27.45 ± 7.52 and 26.77 ± 7.32 years in group-A and B, respectively. In group-A 80 patients (62.5%) and in group-B 63 patients (49.2%) were males while 48 patients (37.5%) from group-A and 65 patients (50.8%) from group-B were females. Comparison of mean pain score after 72 hours shown statistically significant difference between group-A and group-B (1.90 ± 1.52 vs. 3.47 ± 2.16) with p -value <0.001 .

Conclusion: Calcium hydroxide was found inferior to ledermix treatment in controlling the postoperative pain after instrumentation of the root canals.

Keywords: Calcium hydroxide, Intracanal medicament, Ledermix paste.

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INTRODUCTION

The endodontic therapy aims at eliminating bacteria from the root canal system and preventing the re-growth of residual microbes^{1,2}. Elimination of microorganisms, which is a difficult task, requires mechanical instrumentation of the root canals, irrigation of the canals and use of various intracanal medicaments³.

The majority of patients with symptomatic necrotic teeth had significant postoperative pain, and required analgesic medication to manage this pain. Genet *et al* reported association between preoperative and postoperative pain after first endodontic visit; 65% patients with preoperative pain had postoperative pain while 23% patients with preoperative pain had no postoperative pain⁴. Postoperative pain may result from

mechanical instrumentation in about 10-30% of the cases accompanied or not by swelling. It is caused by the irritants (biological and non-biological), regressing from the root canals during treatment, leading to the inflammation of the radicular tissues⁵.

Reduction in postoperative pain and intracanal antiseptics is achieved by use of different antimicrobial agents as intracanal medicaments during inter appointments. Calcium hydroxide is commonly used as intracanal medicament because of its anti-inflammatory and antibacterial properties⁶. Corticosteroid/antibiotic mixture also assists in controlling the inflammatory reaction and over growth of bacteria. Successful management of the endodontic pain is a continuing challenge. The rationale of this study is to explore the intracanal medicament which is effective in reducing the postoperative pain after the instrumentation of the root canals. So that, the distressing experience of postoperative pain

Correspondence: Dr Sana Abbas, Graded Anaesthetist, Combined Military Hospital, Rawalpindi Pakistan

Email: doctor_amcollian@yahoo.com

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may be reduced and patients may show more compliance towards the endodontic treatment^{7,8}.

Accurate selection of which intracanal medicament is to be used during endodontic therapy depends on having a clear diagnosis of the case under treatment. If the primary goal is to control inflammation, then a corticosteroid and antibiotic mixture is indicated. The current study indicated that calcium hydroxide may not be the most ideal medicament for all cases with infected root canal systems with or without apical periodontitis and in previously root filled teeth. One of the diagnostic challenges faced by dental clinicians is that many patients presenting with persistent dentoalveolar pain may be having non-odontogenic origin. So conventional endodontic treatment is unsuccessful in such patients.

METHODOLOGY

Comparative prospective study was conducted at department of Operative Dentistry (AFID), Armed Forces Institute of Dentistry Rawalpindi, from September 2017 to March 2018. Sample size was calculated to be $n=254$ with 95% confidence interval and 4% margin of error keeping in view 12% prevalence of post endodontic pain⁹, allocated $n=128$ to each. Sampling technique was non-probability, consecutive sampling.

Patients of either gender 15-40 years of age, symptomatic mandibular posterior teeth with a diagnosis of pulp necrosis and apical periodontitis, teeth with root formation completion, teeth with no external/internal root resorption defects were included in the study. Mentally handicapped patients, acute apical abscess, badly broken teeth/Vertical root fractures, teeth with clinical and radiographic diagnosis of alveolar bone loss were excluded out of selection criteria. Formal approval was taken from ethical review committee (ERB 02/09/2017) before commencement of the study. Patients reporting to operative department AFID.

Were screened for inclusion in the study. A written consent was taken after explaining the purpose of the study to the patients. Thorough medical and past dental history was obtained

from the patient and signs and symptoms were noted. The clinical examination including pulp vitality tests e.g. cold test, periodontal probing, mobility assessment, periapical radiographs were performed. Diagnosis was done on history, examination, vitality testing and radiography.

Local anaesthesia was administered and carious lesion was removed. Teeth was isolated with the rubber dam; coronal access was gained, canals were prepared and irrigated to facilitate debridement and disinfection. Intracanal medicaments was inserted in the dried root canals by means of file/lentulo filler. Cases were divided into two groups i.e. group A and group B randomly based on lottery method dressed with Ledermix paste and Calcium hydroxide respectively. Access cavity was sealed with cavit, each patient was given an evaluation sheet and visual analogue pain scale was explained. The patient was self-recording pain scores after 72 hrs. The visual analogue scale (VAS) is a simple and frequently used method for the assessment of variations in intensity of pain scored from¹⁻¹⁰.

Follow-up was ensured by keeping contact no. and address and was done by the same trainee conducting study. Data was entered and analyzed using SPSS-10. Descriptive statistics was calculated for both qualitative and quantitative variables. For quantitative variables like age and pain scores mean \pm SD was calculated. For qualitative variables like gender frequency and percentage was calculated. Independent samples t-test was used to compare mean pain score in two groups. p -value <0.05 was considered significant.

RESULTS

A total of 256 patients (128 in each group) were included in the study. Mean age of the patients was 27.45 ± 7.52 and 26.77 ± 7.32 years in group-A and B, respectively table-I. In group-A 80 patients (62.5%) and in group-B 63 patients (49.2%) were male while 48 patients (37.5%) from group-A and 65 patients (50.8%) from group-B were female table-II. Comparison of mean pain score after 72 hours reveals statistically

significant difference between group-A and group-B (1.90 ± 1.52 vs 3.47 ± 2.16) with *p*-value

endodontic therapy. Patients who are having severe pain before treatment were five times

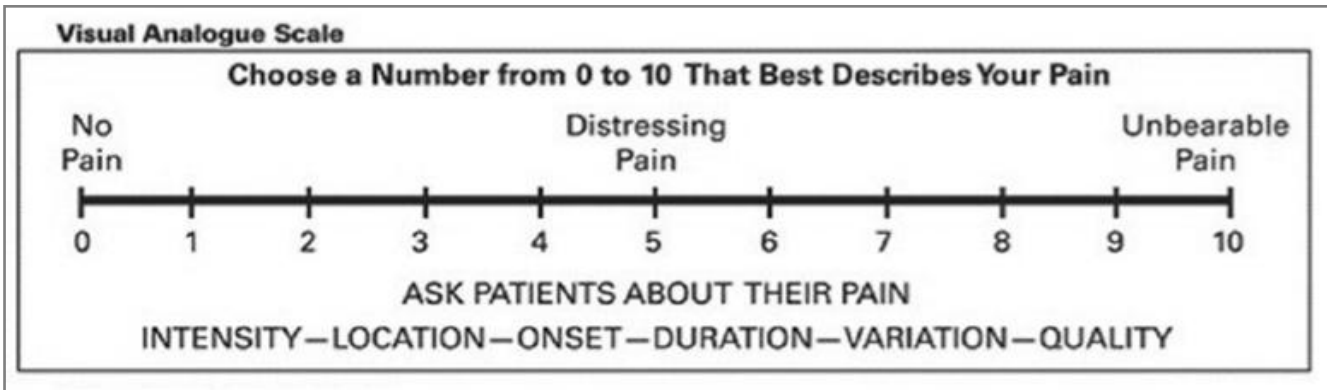


Figure: Visual analogue scale 10.

<0.001 table-III.

DISCUSSION

Endodontic pain often last several hours and it may result in sever inflammatory reaction in periapical tissues. Mechanical over instrumentation, bacterial agents chemical and thermal

likely to experience sever to moderate pain post endodontic treatment^{11,12}.

Long term complications can result after endodontic treatment which includes interappointment flare up periapical swelling, exudation and after obturation tenderness of periapical area, pain, swelling and exudation is often a sign of treatment failure. The objective of root canal therapy is to eliminate the disease process so that it results in resolution of clinical signs and symptoms of flare up¹³.

Clinicians must be equipped with adequate knowledge and awareness on etiological factors responsible for interappointment flare up in order to timely manage this condition which results in considerable patient distress. Etiological factors of flare up during endodontic therapy are of bacterial origin, chemical insult or mechanical over instrumentation. Flareup is considered an endodontic emergency, accurate diagnosis and active intervention is required for the clinician to relieve patient symptoms. Thereis a strong influence of various factors that significantly effects development of interappointment flare up. These factors includes patient age, gender, molar tooth type, preoperative pulpal and periapical status, severity of preoperative pain, potential for allergies, and preoperative presence of sinus tract¹⁴.

Intracanal medicaments will result in prevention of endodontic flare up either by acting

Table-I: Distribution of cases by age (n=128).

| Age (Year) | Group-A (Ledermix Paste) | Group-B (Calcium Hydroxide) |
|------------|--------------------------|-----------------------------|
| <20 | 28 (21.9%) | 34 (26.6%) |
| 21-30 | 51 (39.8%) | 51 (39.8%) |
| 31-40 | 49 (38.3%) | 43 (33.6%) |
| Mean ± SD | 27.45 ± 7.52 | 26.77 ± 7.32 |

Table-II: Distribution of cases by gender (n=128).

| Gender | Group-A (Ledermix Paste) | Group-B (Calcium Hydroxide) |
|--------|--------------------------|-----------------------------|
| Male | 80 (62.5%) | 63 (49.2%) |
| Female | 48 (37.5%) | 65 (50.8%) |

Table-III: Comparison of mean pain score after 72 hours (n=128).

| Group | Mean ± Standard Deviation | <i>p</i> -value |
|-----------------------------|---------------------------|-----------------|
| Group-A (Ledermix Paste) | 1.90 ± 1.52 | <0.001 |
| Group-B (Calcium Hydroxide) | 3.47 ± 2.16 | |

trauma results in damage to periapical tissues and damage sustained by tissues depends upon virulence and nature of damaging agent. Endodontic paincan occur at any stage during

as physical barrier to limit the ingress of endodontic pathogens secondly by exerting antimicrobial action can prevent the penetration of bacteria from saliva in the root canal system.

Calcium hydroxide has a long history of clinical use in endodontics and has many clinical applications including direct and indirect pulp capping procedures, apexification of traumatized cases and as intra canal medicament. It has narrow antibacterial spectrum and is not effective against all endodontic microbes. Additionally, physicochemical properties of this medicament limit its usefulness in disinfection of entire root canal system after limited time use. Antibacterial properties of calcium hydroxide are limited and its complete removal from root canal system is controversial and there is no clear benefits of this medicament based only upon superior antibacterial efficacy. Multiple factors are responsible for the failed antibacterial action of calcium hydroxide as an intracanal medicament. One of these factors is rapid absorption of calcium hydroxide results in rapid fall in alkaline pH levels to neutral values and presence of resistant bacteria like enterococcus faecalis that are resistant to antibacterial action of calcium hydroxide. Enterococcus faecalis exist in colonies that make it resistant to chemical action of calcium hydroxide, as it has potential for growth within dentinal tubules and anatomical remification. There is also potential for micro leakage of temporary filling materials in between the appointments. The results of this study has shown that Ledermix paste as intracanal medicament was significantly superior to calcium hydroxide paste ($p < 0.001$) in relieving postendodontic pain after completion of the endodontic therapy. Our significant findings are consistent with the following studies.

Ehrmann *et al*¹⁵, reported that ledermix (triamcinolone and dimethylchloro-tetracycline in a water soluble paste) is indicated for direct and indirect pulp capping procedure, mechanical pulpal exposures, and as an intracanal medicament in cases with symptomatic periapical periodontitis. Study concluded that ledermix

stopped the pain associated with symptomatic apical periodontitis cases. It was investigated that relationship of postendodontic in cases of symptomatic apical periodontitis and acute periapical abscess cases or teeth with preexisting sinus tract of endodontic origin. After through pulpal debridement and biomechanical instrumentation followed by through irrigation cases in which root canal system was dressed with ledermix paste presented with decreased pain scores when compared with calcium hydroxide treated group. Kundabala *et al*¹⁶ used ledermix as an intracanal medicament in endodontic cases of continuous post endodontic pain after complete pulpal extirpation or root canal system. They reported pain relief in these cases within minutes to a few hours after the placement of ledermix.

Alferra *et al*¹⁷ compared post-operative pain using Calcium Hydroxide and Ledermix intracanal medication, in this study post operative pain was higher after mechanical preparations of root canal in calcium hydroxide and Ledermix groups. After 3 hours post-operative pain incidence was higher and statistically significant in calcium hydroxide group when compared with ledermix group. However after 24 hours, 48 hours, 7 days there was no significant difference between both groups.

Peters *et al*¹⁸ studied effects of instrumentation, irrigation and dressing with calcium hydroxide on infection in pulpless teeth with periapical bone lesions and concluded calcium hydroxide and sterile saline slurry limits but does not totally prevent regrowth of endodontic bacteria thereby leading to inflammatory response and pain.

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LIMITATION OF STUDY

Our study had limitation that it was not multi-centred and was not double blinded therefore exceptional level of accuracy could not be achieved.

CONCLUSION

In conclusion, present study revealed that calcium hydroxide is considered inferior to ledermix intracanal medicament for controlling the postoperative pain after instrumentation of the root canals.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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