COMPARISON OF INTER APPOINTMENT PAIN BETWEEN CALCIUM HYDROXIDE MIXED WITH 2% CHLORHEXIDINE AND CALCIUM HYDROXIDE MIXED WITH NORMAL SALINE; A RANDOMIZED CONTROLLED TRAIL

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ABSTRACT

Objective: The objective of this study were to determine which medium (normal saline or 2% chlorhexidine) is more efficient when mixed with calcium hydroxide in reduction of interappointment pain.

Material and Methods: Eighty subjects from Department of Operative and Endodontics, Sardar Begum Dental College were randomly divided into two groups; Group 1 had 40 subjects who received calcium hydroxide mixed with 2% Chlorhexidine while in group 2, the subjects received calcium hydroxide mixed with 0.9% normal saline after chemomechanical preparation.

Results: The mean pain experienced by the subjects was less in group 1 after 6, 12, 24 and 48 hours of the preparation.

Conclusions: As intra canal dressing, combination of calcium hydroxide and chlorhexidine was more effective than that of calcium hydroxide and saline, in reducing interappointment pain.

Key words: Interappointment pain, intracanal medicaments, calcium hydroxide, chlorhexidine, normal saline

INTRODUCTION

Inter appointment pain after endodontic procedure is an undesirable occurrence for both patient and clinician. Certain factors play vital role in the development of such pain, it includes mechanical, chemical or microbial irritation¹. In fact it has been suggested that microbial injury is probably the major source of inter appointment pain^{2,3}.

Bacteria play a vital role in the etiology of pulp and periapical diseases. Elimination of such micro-organism are important during endodontic treatment⁴, however total elimination of bacteria is difficult to accomplish^{5,6}. Chemo-mechanical preparation of root canal can reduce bacteria, however an intra canal medicament with anti bacterial action is required to maximize the disinfection of the root canal system in infected cases⁵. Bacteria will multiply and grow within

Correspondence: Dr. Yasir Khan Khattak Assistant Professor Department of Operative Dentistry Sardar Begum Dental College Peshawar. Cell: 0300-8594006 Email address: yasir2k77@hotmail.com the canals if no intracanal medicament is placed in the canal⁷. Thus, to achieve maximum disinfection of the root canals, the use of intracanal medicaments is a beneficial adjunct⁶.

Calcium hydroxide has been used widely as intra canal medicament since 1920s. It has low solubility in water, high pH (12.5 - 12.8) and insoluble in alcohol. The antibacterial action of calcium hydroxide is due to its ability to release and diffusion of OH- ions⁸. The high pH of calcium hydroxide alters the biologic properties of bacterial Lipopolysaccharides (LPS) in the cell wall of gram negative species and inactivates membrane transport mechanism resulting in bacterial cell toxicity³.

Different media, such as normal saline, distilled water and chlorhexidine, are used for the mixing of calcium hydroxide, thereby affecting its dissociation into Ca2+ and OH-. According to an in vivo study by Sjogren, calcium hydroxide mixed with saline may reduce the residual bacteria efficiently, if the dressing is placed for 7 days⁹. Due to the wider antibacterial spectrum as well as the property of maintaining the antibacterial action for a longer period of time, chlor-

hexidine is gaining popularity among endodontists as the intracanal medicament¹⁰. Different studies have shown improved antibacterial results when chlorhexidine is mixed with calcium hydroxide¹¹. However, there is still gap in the knowledge regarding the best medium to be mixed with calcium hydroxide. Therefore, this study is carried out to determine which medium (normal saline or 2% chlorhexidine) is more efficient when mixed with calcium hydroxide in terms of reduction of interappointment pain.

METHODS AND MATERIALS

Eighty subjects were selected from the outpatient pool of the Department of Operative and Endodontics, Sardar Begum Dental College, Peshawar. Approval from Ethical Board of Gandhara University was obtained. Subjects with pain in their teeth either due to irreversible pulpitis or periapical periodontitis in the age range of 16- 50 years were included in the study. Any medically compromised subject or teeth not restorable were excluded from the study. Benefits and risks of the study were explained to each subject and written informed consent was taken.

Subjects requiring root canal treatment were randomly distributed in two groups using lottery method. Subjects in group 1 received calcium hydroxide mixed with 2% chlorhexidine while group 2 subjects received calcium hydroxide mixed with normal saline as intra canal medicaments.

Medical and dental histories along with radiographs and chief complaints were obtained from all subjects participating in this study. After clinical examination both pulpal and periapical diagnosis were established. On first day of appointment the infected tooth was anesthetized, isolated and access was achieved to the root canals. Working lengths were confirmed first with apex locator (JM) and then with periapical radiograph. Canals were prepared by crown down technique and were irrigated with 1% NaOCL and 17% EDTA by using 30 gauge needles. After irrigation canals were dried by using paper points. In group 1, calcium hydroxide (0.5 g of Ca (OH)2) mixed with 1ml of 2% chlorhexidine (Haq Chemicals Pakistan) was placed as intra canal medicament. Subjects in group 2 received calcium hydroxide mixed with normal saline as intracanal medicament. Aqueous Ca (OH) 2 slurry was also prepared with saline in the same proportion. It was mixed with sterile Ca (OH) 2 Powder until smooth slurry was formed. Lentulo-spiral was used for the JKCD December 2014, Vol. 5, No. 1

placement of intra canal medicament.Cotton pellet was used in the chamber and the teeth were restored with cavit. All patients assessed their pain through a Visual Analogue scale. Patients recorded their pain intensity at 6, 12, 24 and 48 hours after cleaning and shaping. On the second visit all the patients returned their questionnaire to the operator.

RESULTS

This study included a total of 80 subjects which were divided into two groups of 40 each; in group 1, subjects received calcium hydroxide mixed with Chlorhexidine while in group 2, subjects received calcium hydroxide mixed with normal saline as intracanal medicaments. In group 1, 22 subjects were male with a male to female ratio of 1.22:1, while in group 2, the male to female ratio was 1.5:1 as shown in Table-1. The mean age of the study subjects was 28.19 ± 7.667 years (Figure-1).

Mean pain experienced was calculated for both the groups after 6, 12, 24 and 48 hours. Figure-2 shows the mean pain score after 6 hours was 3.65 ± 2.293 in group 1 while after the same period of time the mean pain score was 5.6 + 2.590 in group 2. The Differences in the mean pain score of the two groups is statistically



Figure 1: Histogram of the Age of the Patients

Table-1: Gender Distribution

Gender of the Patient	Treatment Group		
	Calcium Hy- droxide + 2% Chlorhexidine	Calcium Hy- droxide + 0.9% Normal Saline	Total
Male	22	24	46
Female	18	16	34
Total	40	40	80

 \overline{P} -value = 0.821

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significant (p Value = 0.001). The mean pain experienced by the subjects in both the groups after 12, 24 and 48 hours also showed lesser pain in group 1 subjects compared to group 2 (Figure 3, 4 & 5).



P-value (Chi-squire)= 0.001

Figure-2: Mean Pain Experienced after 6 hours



P-value (Chi-squire)= 0.077

Figure-3: Mean Pain Experienced after 12 hours



P-value (Chi-squire)= 0.000

Figure-4: Mean Pain Experienced after 24 hours



P-value (Chi-squire)= 0.755

Figure-5: Mean Pain Experienced after 48 hours

DISCUSSION

The primary goal of endodontic treatment is to reduce or eliminate microorganisms and their by products from root canal system. The presence of microorganisms in the root canals is the most important cause of postoperative pain in root canal treatment. The use of antimicrobial agent is advocated to disinfect the root canal system^{12,13}. Calcium hydroxide is the material of choice as intracanal medicament in root canal therapy¹⁴. The antimicrobial activity is related to the alkalinizing action of calcium hydroxide, which in turn is the result of its ionization into hydroxyl ions. The hydroxyl ions have an ability to inactivate bacterial lippopolysacharides, toxins produced by gram negative bacteria, which are predominantly involved in root canal infections and they enhance the sensation of pain in endodontic infections³. Calcium hydroxide has been mixed with a number of vehicles such as water, normal saline, cresatine, glycerin, propylene glycol and chlorhexidine. Chlorhexidine is bactericidal and kills microorganisms within 30 seconds to two hours. The vehicle used with calcium hydroxide influence their biological and antimicrobial properties and also affects the diffusion capability of calcium hydroxide¹⁵.

The results of the present study showed that there was significant reduction in interappointment pain when calcium hydroxide and chlorhexidine was used, as compared to calcium hydroxide and saline as intracanal medicament. In the present study reduction in pain was significant after 6 hours and 24 hours. These finding correlates with similar studies conducted by Gome et al¹⁶, de Souza-filho et al¹⁷ and Gomes et

al¹⁸. The fast and continuous action of chlorhexidine hydroxide paste is remarkable. Its effects were measurable in 6 pain. Furt term effect hours after placement even though the medication had to diffuse through the dentinal tubules. This could be due to the synergistic effect of chlorhexidine and

had to diffuse through the dentinal tubules. This could be due to the synergistic effect of chlorhexidine and calcium hydroxide. Chlorhexidine improves calcium hydroxide properties of reducing endotoxin content in root canals. Thus both the intracanal medicaments compliment their actions. This corroborates with other studies^{16,17,18}.

According to Buck et al¹⁹, chlorhexidine shows little efficacy in deactivating the biologically active portion of endotoxin lipid, which is predominantly involved in endodontic infections and sensation of pain. Luciane Dias et al²⁰, Tanomaru et al²¹ and Silva et al²² also showed in their vitro studies that chlorhexidine has low effectiveness in reducing lipoplysaccrides (LPS) after biomechanical preparation in root canals. The result of these studies are in contrast to our study, in which interappointment pain is reduced significantly. The present study showed the role of chlorhexidine in reducing the endotoxin level, thereby decreasing interappointment pain. This finding is also confirmed by the in vitro study of Signoretti et al²³, who reported that chlorhexidine improved the properties of calcium hydroxide to reduce endotoxin in the root canals.

Yoldas et al²⁴ in retreatment cases concluded that combination of calcium hydroxide and chlorhexidine resulted in less post operative pain. It may be due to addition of chlorhexidine which increases the antimicrobial properties of calcium hydroxide, while maintaining its biological characteristics and action as a physical barrier. Furthermore the contact angle of combination of calcium hydroxide and chlorhexidine is lower than the contact angle of combination of calcium hydroxide and water, thus improving the wetability which may explain increase antimicrobial effects of the chlorhexidine containing paste in the root canals. Although our study did not included retreatment cases, but our results are in accordance with the findings of Yoldas et al²⁴.

CONCLUSIONS

From this study it is concluded that as intra canal dressing, combination of calcium hydroxide and chlorhexidine was more effective than that of calcium hydroxide and saline, in reducing interappointment pain. Further studies are needed to observe the long term effects of these two intra canal medicaments on post operative pain

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