Comparison of Inter Appointment Pain Between Calcium......

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 irritation. In fact it has been suggested that microbial injury is probably the major source of inter appointment pain.

Bacteria play a vital role in the etiology of pulp and periapical diseases. Elimination of such micro-organism are important during endodontic treatment, however total elimination of bacteria is difficult to accomplish. 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 cases. Bacteria will multiply and grow within the canals if no intracanal medicament is placed in the canal. Thus, to achieve maximum disinfection of the root canals, the use of intracanal medicaments is a beneficial adjunct.

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- ions. 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 toxicity.

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 days. 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 medicament\(^1\). Different studies have shown improved antibacterial results when chlorhexidine is mixed with calcium hydroxide\(^{11}\). However, there is still a 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 intracanal medicaments.

Medical and dental histories along with radiographs and chief complaints were obtained from all subjects participating in this study. On the 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 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).

![Figure 1: Histogram of the Age of the Patients](image)

**Table-1: Gender Distribution**

<table>
<thead>
<tr>
<th>Gender of the Patient</th>
<th>Treatment Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Calcium Hydroxide + 2% Chlorhexidine</td>
<td>Calcium Hydroxide + 0.9% Normal Saline</td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Female</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

P-value = 0.821
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).

**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. Calcium hydroxide is the material of choice as intracanal medicament in root canal therapy. 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 infections. 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 hydroxide.

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 al, de Souza-filho et al and Gomes et
The fast and continuous action of chlorhexidine paste is remarkable. Its effects were measurable in 6 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 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.

According to Buck et al., 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 al., Tanomaru et al., and Silva et al. also showed in their in vitro studies that chlorhexidine has low effectiveness in reducing lipopolysaccharides (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 al., who reported that chlorhexidine improved the properties of calcium hydroxide to reduce endotoxin in the root canals.

Yoldas et al. 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 al.

**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.

**REFERENCES**

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