MDJ

# The incidence of posttreatment pain using two different intracanal medicaments

**Dr. Iman M. Al-Zaka.** B.D.S, M.Sc.

## Abstract

The purpose of this study was to compare the incidence of posttreatment pain to two medicaments placed in the root canal system. One hundred teeth belonging to 100 patients were included in this study. All teeth under went conventional root canal, which involved the instrumentation to the apices of each canal at the first visit. Canals were instrumented using a step-back technique and hand-files along with irrigant. The canals were dried and one of the following two medicaments was inserted into the canal: group I: Chlorhexidine- containing gutta-percha point; group II Calcium hydroxide- containing gutta-percha point. All teeth were temporized with intermediate restorative material. Patients' assessed posttreatment pain up to 48 hours as none, mild, moderate, or sever. The pain levels in each test group at each time period were compared statistically with Chi-square test, a significant difference was found in posttreatment pain between the two groups at 4h and 24h. No significant difference in posttreatment at 48h.

**Key words: intracanal medicaments, chlorhexidine, calcium hydroxide, Inter-appointment pain,**

## Introduction

Pain related to endodontics treatment can be annoying and perplexing problem to the patient and the endodontists. Though the pain may not indicate endodontics failure, relief of pain is more important to the patient than success or failure of treatment [(1).] Although the reason for post operative pain are numerous including (e.g. inadequate debridement, over instrumentation, over filling and debris extrusion) viable bacteria remaining within the root canal system is one of the most critical factors responsible for this problem [(1,2,3)]. Chemomechanical preparation is therefore one of the most important phases of endodontics treatment. However, it has been reported that bacteria may be survive inside the root canal even after careful chemomechanical preparation [(4)].

One suggested method of reducing intra canal bacteria is to use intracanal medicament [(5.6)]. The use of intracanal medications to disinfect the root canal system has been advocated to increase the success of root canal therapy. Intracanal medications are used to: (a) eliminate bacteria in the root canal; (b) prevent bacterial proliferation between appointments; and (c) act as a physiochemical barrier, preventing root canal reinfection and nutrient supply to the remaining bacteria [(5,6)].

Calcium hydroxide is the antimicrobial agent that recommended for different clinical situation, including apexification, apexogenesis,

after trauma to prevent or resolve external or internal resorption, and with routine root canal treatment[2]. Several benefits have been proposed when used as an intracanal medication during root canal treatment[7,8]. The one presumed advantage of Calcium hydroxide over other types is its antimicrobial properties attributed to its alkalinity [9]. Several well-controlled studies, both invivo and invitro, have shown intracanal reduction of microbial populations, or at least inhibition of bacterial proliferation [10]. To facilitate it is application, a special gutta-percha point that contain 50% calcium hydroxide have been developed.

Due to reports that cases refractory to endodontics treatment were associated with calcium hydroxide resistant bacterial strains, e.g. Enterococcus Faecalis or Candida species [11,12]. Research has been focused on alternative substances. Chlorhexidine gluconate solutions of varying concentration have been recommended as endodontics irrigants[13,14]. Chlorhexidine is a cationic bisbiguanide with optimal antimicrobial action over the pH range 5.5 to 7.5, which acts by adsorbing onto cell walls of microorganisms and causing leakage of intracellular components [15]. Further more, early reports suggest marked antimicrobial efficacy when Chlorhexidine remain in the root canal for several days [16,17]. Komorowski et al.[18] demonstrated a 7-day substantivity of Chlorhexidine in bovine incisors. These properties have lead to the possibility that Chlorhexidine may used as intracanal medication. It is also available as points have a gutta-percha matrix with 5% Chlorhexidine diacetate.

Of clinical interest, and certainly related to biological response to Calcium hydroxide and Chlorhexidine, when they used as intra canal medication, is the relation ship to pain after an appointment. It has been suggested [19] that Calcium hydroxide has pain- preventive properties because of its antimicrobial or tissue-altering effects. However Trope et al[20] advocated a study on as Calcium hydroxide related to pain (flare-ups) found no difference between Calcium hydroxide and other intracanal medication as to incidence.

The purpose of this study was to compare the incidence of posttreatment pain in teeth were dressed with either Calcium hydroxide-containing gutta-percha points or Chlorhexidine-containing gutta-percha points in reducing post treatment symptoms at different time periods.

## Materials and method

### Patient selection:

One hundred patients receiving root canal treatment were studied: 45% female, 55% male. All patients were over the age of 18 years and were taking no medications that would affect pain perception, inflammation, or infection. Patient were unable or unwilling to participate in this study were excluded from the investigation. All patient read and signed an approved from giving their consent to participate in the study. The subjects were divided into two test group: group (I) received intracanal Chlorhexidine-containing gutta-percha point (Activ point, Roeko, Germany). Group (II) received intracanal Calcium hydroxide- containing gutta-percha point (Conventional point, Roeko, Germany).

Assignment to the two groups was at random and was equal (50 per group). Diagnostically, of 100 patient, (34%) had vital pulps and (66%) necrotic pulps. These were divided approximately equally between the two

groups. As to presence/ absence of periradicular pathosis, approximately half of each group was represented in each category.

## Treatment:

Each patient was anesthetized with local anesthetic solutions, the rubber dam was placed, and conventional straight-line access preparation was performed. Chemomechanical preparation was completed using Crown-Down technique for all teeth. Briefly, the coronal two-thirds of the root canals were enlarged with Gates Glidden burs (sizes varying depending on the root anatomy). Working length was established 1mm short of the root apex and patency length coincided with the radiographic root end. The apical seat or stop was enlarged to at least #30 master apical file, depending on both root anatomy and initial diameter of the root canal. Apical patency was confirmed with a small file throughout the procedures after each larger size file. Preparation was completed using step-back of 1-mm increments for at least four sizes. Irrigation was always performed using 2.5% NaOCL solution. After cleaning and shaping, the final irrigation was followed by drying with paper points.

## The 100 patients were divided into two groups:

**Group I** (n=50 patients): chlorhexidine-containing gutta-percha-points (Activ points, Roeko, Germany) were introduced into the root canal. Sterile saline (0.01 ml) was added to wet gutta-percha and avoid dehydration [21].

**Group II** (n=50 patients) calcium hydroxide-containing gutta-percha-points (Conventional points, Roeko, Germany) were introduced into the root canal. Sterile saline (0.01 ml) was added to wet gutta-percha and avoid dehydration [21].

All clinical procedures were performed by the one endodontist who was not aware which medicament was to be used until the debridement/instrumentation had been completed, when the endodontist was informed by the dental assistant which drug was to be used [21].

Each patient was given a self-addressed, stamped post card at the conclusion of the appointment with instructions on recording his or her evaluation of the incidence and level of discomfort according to their perception [22]. At least a part of their perception would be based on the use or nonuse of an analgesic, and if used, its effectiveness. Patient were not instructed to self administer analgesics. If they chose not to do so, they were still to rate their pain perception. The four pain categories were as follows:

1. No pain
2. Mild pain: discomfort that required no analgesic
3.Moderate pain: discomfort that required and controlled by analgesics
4.Sever pain: required, but uncontrolled by, analgesics

The pain ratings were at intervals of 4, 24, and 48 h after treatment.

## Evaluation

The two groups, according to the three posttreatment time periods, were tallied as to the number of responses at each pain level at each interval. Data were statistically analyzed using the Chi-square test.

## Results

The incidence of postoperative pain are presented in tables (1), (2), and (3), which represented the incidence of pain at each time interval (4h, 24h, and

48h) in the two groups. There was a decrease in pain at each successive time period for the 100 patients. At 4-h posttreatment, 60% reported moderate-to-sever pain, whereas at 24-h 41%, and by 48-h only21% of patients indicated significant pain.

Chi-square revealed a highly significant difference ($P<0.001$) in pain within time in each group. By comparing the incidence of pain between group I and group II using Chi-square test, a significant differences ($P<0.05$) was found within 4h and 24h, and no significant difference($P>0.05$) was found between group I and II after 48 hours, table (4).

## Discussion

Post operative pain after endodontics procedure is undesirable occurrence for both patients and clinicians. One of the main factor contributing to postoperative pain discomfort is flora of infected root canals, number of intracanal medicament have been recommended after cleaning and shaping of root canals[(1)] .

In this study the use of chlorhexidine and calcium hydroxide points, as intra canal medication, has several properties that make it is clinical use more appealing compared with other intracanal medication, these points are ISO sizes and radiopaque, in completion of root canal preparation, the compatible ISO sizes is accurately applied to the working length. It is not necessary to dry the canal because gutta-percha points release the medicament in the presence of the solution; the accurate application of the points to the working length ensures antibacterial activity along the root canal and prevents extension of the medication into the periradicular tissues. Removal of the gutta-percha points in the next appointment is easy and eliminating the possibility of past remnant, on the dentinal walls, which could disturb the adhesive properties of the intra canal sealer [(23)].

All instrumentation techniques are reported to cause apical extrusion of debris [(24)]. The differences is that some technique, extrude more debris than other do. Crown down technique used in this study, have been demonstrated to extrude a lesser amount of debris[(24)], because the amount of extruded debris may influence the response of the periradicular tissue, crown-down instrumentation has theoretically less probability to induce flare-up. Further more, the overall cleanliness of the root canal system is also improved; as the preparation advances in apical direction allowing the irrigation needle to go closer to the apex, the removal of necrotic root canal contents is enhanced [(24)].

The goal of this study was to compare postoperative pain after the application of two clinical medicaments after 4h, 24h, and 48h, the result showed a highly significant reduction in pain over time for both treatment groups. These finding consistent with those of other clinical trial that have demonstrated a significant reduction in pain after application of intracanal medicaments [(22,25,26)].

Torabinejad et al.[(25)] have show that the use of antimicrobial intracanal medication could prevent postoperative pain, therefore, the use of intracanal medicament during the endodontics therapy can significantly remove microorganism from the root canal and theoretically prevent postoperative pain, provided antimicrobial substances are not highly cytotoxic and do not extrude to the periradicular tissue. Both chlorhexidine and calcium hydroxide have excellent antimicrobial activity on the common endodontics bacterial pathogen [(21,27)]. Although we

used the designation of moderate to sever pain, most of those in the sever category would not qualify as flare-ups (post-appointment emergency).

A significant difference ($P<0.05$) was found between group I and II at 4h, and 24h, in the severity of pain. This result agrees with Oberschachtsiek et al.[28], who compare the clinical performance of activ point as intracanal medicament to calcium hydroxide. He showed that the severity of clinical criteria (severity of pain and tenderness to apical palpation) was diminished between root canal preparation and root filling in activ point group than calcium hydroxide group.

Fuss et al.[29] found that chlorhexidine slow release device (activ point) had significantly larger inhibition zone than calcium hydroxide slow release device (conventional point), and had the most effective antibacterial activity, further more the activ point seems to be an effective intracanal medication with high penetration ability to dentinal tubule [23].

The antibacterial efficacy of activ point and conventional calcium hydroxide point in killing Entercoccus Feacalis bacteria was compared. These bacteria reported to play an important role in the development of symptoms during root canal therapy. Activ point group completely kill Enterococcuse Feacalis after 5 hours while the bacterial activity of conventional calcium hydroxide point was 50% at 0h and 5h. [31]. This may be give another explanation to the significant difference of pain at the first four hours between group I and II [30,31].

Although there is no significant difference ($P>0.05$) between group I and II at 48h, the incidence of significant pain is less in group I (16%) than group II (26%). The result of a study conducted by Podbielski et al.[27] showed that the combination of calcium hydroxide and chlorhexidine, killed the bacteria faster than calcium hydroxide alone. The calcium hydroxide points have a lower release of calcium ion in compared with other form of calcium hydroxide form [32].

## References


1- Jariwala SP, Goel BR: Pain in endodontics: causes, prevention and management. J Indian Endod. 2001;13:63-66.
2- Cohen S, Burns RC, eds. Pathways of the pulp 8th ed St, Louis CV Mosby Co St Louis Misso 64146, 2002.
3- Torabinejad M, Cymerman J, Frankson M, Lemon RR, Maggio JD, Schilder H: Effectiveness of various medications on post operative pain following complete instrumentation. J Endod 1994;20:345-54.
4- Bystrom A, Sundqvist G: The antibacterial action of sodium hypochlorite and EDTA in 60 cases of endodontics therapy. Int Endod J 1985;18:35-40.
5- Bystrom A, Claesson R, Sundqvsit G: The antibacterial effect of camphorated paramonochlorophenol, camphorated phenol and calcium hydroxide in the treatment of infected root canals. Endod Dent Traumatol. 1985;1:170-5.
6- Siqueira JF, de Uzeda M: Influence of different vehicles on the antibacterial effects of calcium hydroxide. J Endod 1998;24:663-65.
7- Kontakiotis E, Nakou M, Georgopoulou M: In vitro study of the indirect action of calcium hydroxide on the anaerobic flora of the root canal. Int Endod J 1995;28:285-89.
8- Fava IRG, Saunders WP: Calcium hydroxide pastes: classification and clinical indications. Int Endod J. 1999;32:257-82.
9- Gordon TM, Ranly DM, Boyan BD: The effects of calcium hydroxide on bovine pulp tissue: variations in pH and calcium concentrations. J Endod 1985;266-60.
10- Perers LB, Van Winkelhoff AJ, Buijs IF, Wesselink PR: Effects of instrumentation, irrigation and dressing with calcium hydroxide on infection in pulpless teeth with periapical bone lesions. Int Endod J. 2002;35:13-21.
11- Siqueira Junior IF, de Uzeda M: Intra canal medicaments: evaluation of the antibacterial effects of chlorhexidine,

metranidazole, and calcium hydroxide associated with three vehicles. J Endod 1997;23:176-69.
12- Siren Ek, Haapasalo MP, Ranta K, Salmi P: Microbiological finding and clinical treatment procedures in endodontics cases selected for microbiological investigation. Int Endod J 1997;30:91-5.
13- Jeansonne MJ, White RR: A comparison of 2.0% chlorhexidine gluconate and 5.25% sodium hypochlorite as antimicrobial endodontics irrigants. J Endod 1994;20:276-78.
14- White RR, Janer LR, Hays GL: Residual antimicrobial activity associated with a chlorhexidine endodontics irrigant used with sodium hypochlorite. Am J Dent 1999;12:148-50.
15- Leonardo MR, Filho MT, Silva LA, Filho PN, Ito IY: In vivo antimicrobial activity of 2% chlorhexidine used as a root canal irrigating solution. J Endod 1999;25:167-71.
16- Barbosa CAM, Goncalves RB, Siqueira JF, de Uzeda M: Evaluation of the antibacterial activities of calcium hydroxide, chlorhexidine, and camphorated paramonochlorophenol as intracanal medicament: A clinical and laboratory study. J Endod 1997; 23:297-300.
17- Schafer E, Bossmann K: Antimicrobial efficacy of chloroxylenol and chlorhexidine in treatment of infected canals. Am J Dent 2001;14:233-37.
18- Komorowski R, Grad H, Yu Wu X, Fridman S: Antimicrobial substantivity of chlorhexidine- treated bovine root dentin. J Endod 2000;26:315-17.
19- Grossman L, Oliet S, Del Rio C. Endodontics Practice. 11th ed. Philadelphia: Lea & Febiger, 1988:228-33.
20- Trope M: Relationship of intra-canal medicaments to endodontics flare-ups. Endod Dent Traumatol 1990;6:226-9.
21- Barthel CR, Zimmer S, Zilliges S, Schiller R, Roulet JF: In situ antimicrobial effectiveness of chlorhexidine and calcium hydroxide: gel and paste versus gutta-percha points. J Endod 2002;28:427-30.
22- Walton RE, Halton IF, Michelich R: Calcium hydroxide as intracanal medication: effect on post treatment. J Endod 2003;29:627-29.
23- Lin S, Zuckerman O, Weiss EI, Mazor Y: Antibacterial efficacy of a new chlorhexidine slow release device to disinfect dentinal tubules. J Endod 2003;29:416-18.
24- Al-Omari MA, Dummer PMH: Canal blockage and debris extrusion with eight preparation techniques. J Endod 1995;21:145-58.
25- Torabinejad M, Cymerman J, Frakson M, Lemonrr, Maggio JD, Schilder H: Effectiveness of various medications on postoperative pain following complete instrumentation. J Endod 1994;20:345-54.
26- Siqueira JF, Rocas IN, Favieri A, Machado AG, Gahyva SM, Oliveria JCM: Incidence of postoperative pain after intracanal procedures based on an antimicrobial strategy.J Endod 2002;28:457-60.
27- Podbielski A, Spahr A, Haller B: Additive antimicrobial activity of calcium hydroxide and chlorhexidine on common endodontics bacterial pathogens. J Endod 2003;39:340-345.
28- Oberschachtsiek H, Ebert J, Petschelt A: Prospective clinical controlled study of, active point as intracanal medicament. Int Endod J, P. 37. The10th Biennial Congress ESE 4-6 October 2001 Munich, Cermany.
29- Fuss Z, Levin L, Weiss EI, Lin S: Antibacterial efficacy of chlorhexidine and calcium hydroxide slow release device systems. Int Endod J, P.32. 11th Biennial Congress ESE October 2-4,2003 Athens, Greece.
30- Petschelt A, Ebert J, Kolowos K: Antibacterial behaviour of different 'active' gutta-percha points against enterococcus faecalis in simulated root canals. Int Endod J, P.9. The10th Biennial Congress ESE 4-6 October 2001 Munich, Cermany.
31- Schafer E, Bossmann K: Antibacterial efficacy of chlorhexidine and two calcium hydroxide formulations against enterococcus faecalis. J Endod 2004; 31:53-56.
32- Lohbauer U, Gambarini G, Ebert J, Petschelt A: Calcium release and PH-characteristics of calcium hydroxide plus points. J Endod 2005;38:683-89.

Table (1): Incidence of postoperative pain within 4 hours

| Group | None | | Mild | | Moderate | | Sever | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| **CHX** | 10 | 20% | 15 | 30% | 15 | 30% | 10 | 20% | 50 | 100% |
| **$Ca(OH)_2$** | 2 | 4% | 13 | 26% | 15 | 30% | 20 | 40% | 50 | 100% |

Table (2): Incidence of postoperative pain within 24 hours

| Group | None | | Mild | | Moderate | | Sever | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| **CHX** | 22 | 44% | 10 | 20% | 10 | 20% | 8 | 16% | 50 | 100% |
| **$Ca(OH)_2$** | 12 | 24% | 15 | 30% | 11 | 22% | 12 | 24% | 50 | 100% |

Table (3): Incidence of postoperative pain within 48 hours

| Group | None | | Mild | | Moderate | | Sever | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| **CHX** | 34 | 68 | 8 | 16% | 6 | 12% | 2 | 4% | 50 | 100% |
| **$Ca(OH)_2$** | 27 | 54% | 10 | 20% | 8 | 16% | 5 | 10% | 50 | 100% |

Table (4): Chi-square test

| Time interval | Chi-square | df | P-Value | Sig. |
|---|---|---|---|---|
| **4 hours** | 8.810 | 3 | 0.032 | * |
| **24 hours** | 4.789 | 3 | 0.0188 | * |
| **48 hours** | 2.597 | 3 | 0.458 | NS |