

Original Research

Evaluation of effectiveness of manual and ultrasonic technique for removal of Calcium Hydroxide medicament from root canals

Mubin Kutubuddin Mulla

Senior Lecturer, Department Of Conservative Dentistry and Endodontics, Vasantdada Patil Dental College And Hospital, Kavalapur, Sangli.

ABSTRACT:

Background: The choice of the optimal luting agent can be confusing, even for the most experienced clinician. Key factor to success is the choice of a proper luting agent and the cementation procedure. Hence; the present study was undertaken for comparing the impact of desensitizing agents on the retention of crowns cemented with luting agents. **Materials & methods:** A total of 40 freshly extracted mandibular molar teeth were selected. All the teeth were stored in normal saline till further use. All the specimens were divided into two study groups as follows: Group A: Glass ionomer cement (Control), and Group B: Glass ionomer cement (GC Tooth Mousse desensitizer). Crowns were fabricated and were subjected under universal force testing machine. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. **Results:** Mean tensile bond strength of group A specimens was 42.6 Kg while mean tensile strength of Group B specimens was 43.1 Kg respectively. While comparing statistically, non-significant results were obtained. **Conclusion:** Application of desensitizing agents might be designated during fabrication of crowns as it will not affect the retentive ability of the luting cements.

Key words: Luting agent, Desensitizing agent, Crown

Received: 10 May, 2021

Accepted: 20 May, 2021

Corresponding author: Dr. Mubin Kutubuddin Mulla, Senior Lecturer, Department Of Conservative Dentistry and Endodontics, Vasantdada Patil Dental College And Hospital, Kavalapur, Sangli.

This article may be cited as: Mulla MK. Evaluation of effectiveness of manual and ultrasonic technique for removal of Calcium Hydroxide medicament from root canals. Int J Res Health Allied Sci 2021; 7(3): 57-59.

INTRODUCTION

Endodontic treatment is essentially directed towards the prevention and control of pulpal and periradicular infections. Given the relevance of microorganisms in the pathogenesis of these lesions, it is clear that the outcome of endodontic therapy depends on their reduction or elimination. Chemomechanical preparation of the root canal significantly reduces the number of microorganisms in the infected root canals. However, the eradication of microorganisms from canal irregularities is enhanced by intracanal medicaments that prevent the proliferation of residual strains, as well as recontamination. Currently, calcium hydroxide is the most popular intracanal medicament. It is widely used as a root canal dressing between treatment sessions due to its well documented

antibacterial activity against most of the endodontic pathogens. Most bacteria are unable to survive the highly alkaline environment provided by calcium hydroxide.¹⁻³ Several techniques have been proposed to remove the Ca(OH)₂ dressing from the root canal system, including the use of endodontic hand files, sonic activation, passive ultrasonic irrigation, the CanalBrush System, and nickel-titanium (NiTi) rotary instruments.⁴⁻⁶ Hence; the present study was undertaken for evaluating the effectiveness of manual and ultrasonic technique for removal of Calcium Hydroxide medicament from root canals.

MATERIALS AND METHODS

The present study was conducted with the aim of assessing effectiveness of manual and ultrasonic

technique for removal of Calcium Hydroxide medicament from root canals. We included 40 freshly extracted maxillary canines in the present study. All the specimens were immersed in normal saline for one day followed by immersion in sodium hypochlorite for couple of days till further use. All the root canals were prepared using NiTi rotary files. Irrigation of the canals was done with normal saline. Removal of the smear layer was done using sodium hypochlorite (NaOCl) and EDTA as final irrigants. Drying of the canals was done using paper points. Filling of the canals was done, after preparation, with calcium hydroxide (Ca(OH)₂). Radiographs were taken for assessing the quality. Placement of the teeth was done in the incubator for one month at thirty seven degree centigrade. After removal, all the specimens were divided into two study groups with 20 specimens in each group as follows:

Group 1: Removal was done manually using flexo file and NaOCl irrigant, and

Group 2: Removal was done using ultrasonic instrumentation and NaOCl irrigant.

Radiographs were obtained afterwards for assessing the root canals. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Mann-Whitney U test was used for evaluating the level of significance.

RESULTS

Mean gray levels at the canals after analyzing the radiographs among group 1 before Ca(OH)₂ removal and after Ca(OH)₂ removal was 136.1 and 152.7 respectively. Significant results were obtained while comparing the quantity of Ca(OH)₂ removal among Group 1 specimens. Mean gray levels at the canals after analyzing the radiographs among group 2 before Ca(OH)₂ removal and after Ca(OH)₂ removal was 133.4 and 155.4 respectively. Significant results were obtained while comparing the quantity of Ca(OH)₂ removal among Group 2 specimens. However; while making inter-group comparison, non-significant results were obtained.

Table 1: Comparison of mean gray levels at canals

| Group | Mean Gray levels | | p-value |
|---------|------------------|---------------|-----------------------|
| | Before removal | After removal | |
| Group 1 | 136.1 | 152.7 | 0.00 (Significant) |
| Group 2 | 133.4 | 155.4 | 0.00 (Significant) |
| p-value | 0.28 | 0.62 | - |

DISCUSSION

Although cleaning and shaping of root canal by means of mechanical instrumentation have been shown to significantly reduce the number of bacteria in infected canals, complete disinfection of the root canal is difficult to achieve. Calcium hydroxide (Ca(OH)₂)

has been widely used in endodontic treatment as an intracanal medicament, due to its antimicrobial properties against the most of the endodontic microorganisms and its biological effects and also for their capacity to inactivate bacterial endotoxins. Removal of Ca(OH)₂ medicament from root canals are necessary because the remnant of Ca(OH)₂ on the canal walls will influence dentine bond strength and also harmfully affect the quality of root filling material. Therefore, it has to be completely removed before obturation of the root canals is suggested.⁶⁻⁹ Hence; the present study was undertaken for evaluating the effectiveness of manual and ultrasonic technique for removal of Calcium Hydroxide medicament from root canals.

In the present study, mean gray levels at the canals after analyzing the radiographs among group 1 before Ca(OH)₂ removal and after Ca(OH)₂ removal was 136.1 and 152.7 respectively. Significant results were obtained while comparing the quantity of Ca(OH)₂ removal among Group 1 specimens. Mean gray levels at the canals after analyzing the radiographs among group 2 before Ca(OH)₂ removal and after Ca(OH)₂ removal was 133.4 and 155.4 respectively. Parikh M et al summarized the outcomes of in vitro studies comparing Endoactivator irrigation and Endovac irrigation techniques for removing calcium hydroxide (Ca[OH]₂) medicament from the root canals. After study selection, 61 were assessed for eligibility. Of these, 13 met the inclusion criteria and were included in the systematic review. Since significant heterogeneity was found in the methodologies, it was not possible to conduct a meta-analysis. They determined that Endoactivator irrigation technique showed better performance in removing Ca(OH)₂ intracanal medicaments from middle third and coronal third area of the root canals and Endovac irrigation technique showed better performance from the apical third area of the root canals.¹⁰

In the present study, significant results were obtained while comparing the quantity of Ca(OH)₂ removal among Group 2 specimens. However; while making inter-group comparison, non-significant results were obtained. T Taşdemir et al compared the efficacy of several techniques for the removal of calcium hydroxide (Ca(OH)₂) from root canals. The root canals of 24 freshly extracted human mandibular premolars were prepared with ProTaper rotary instruments. The teeth were sectioned longitudinally along the length of the instrumented canals. The roots were subsequently reassembled with wires. After Ca(OH)₂ was placed into the canals, four techniques were used for its removal. In Group I, the teeth were irrigated with 5 mL of 2.5% NaOCl. Group II was treated in the same manner as Group I, but 5 mL of 17% EDTA was used in addition to NaOCl. In Group III, the teeth were irrigated with 5 mL of 2.5% NaOCl and agitated by an ultrasonic unit. In Group IV, the

teeth were irrigated with 5 mL of 2.5% NaOCl and a CanalBrush was used to remove the Ca(OH)₂. Significantly less residual material was obtained with a CanalBrush and passive ultrasonic agitation of NaOCl than the other groups ($P < 0.05$). There was no significant difference between syringe delivery of NaOCl and NaOCl+EDTA ($P > 0.05$). None of the techniques removed the Ca(OH)₂ dressing completely.¹¹ Raghu R et al compared the amount of aqueous-based and oil-based calcium hydroxide remaining in the canal, after removal with two different chelators 17% EDTA, 20% Citric acid and 0.2% Chitosan in combination with ultrasonic agitation. Combination of 0.2% Chitosan and ultrasonic agitation results in lower amount of Ca(OH)₂ remnants than 17% EDTA, 20% Citric acid irrespective of type of vehicle present in the mix.¹²

CONCLUSION

Both the techniques for removal of calcium hydroxide from the root canals are equally effective.

REFERENCES

- Dabhi M, Kishan KV, Parekh V, Rathore V. Comparative evaluation of 3 different irrigation system: 30 gauge blunt ended side vented needle, endoactivator & endovac in removal of Ca(OH)₂ from root canal system – Sem study. *IOSR J Dent Med Sci.* 2016;15:84–9.
- Faria G, Viola KS, Kuga MC, Garcia AJ, Daher VB, De Pasquali Leonardo MF, et al. Effect of rotary instrument associated with different irrigation techniques on removing calcium hydroxide dressing. *Microsc Res Tech.* 2014;77:642–6.
- Higgins JP, Green SP. Chichester, UK: John Wiley & Sons, Ltd; 2011. *Cochrane Handbook for Systematic Reviews of Interventions 5.1.0 (Updated March 2011)* The Cochrane Library.
- Wiseman A, Cox TC, Paranjpe A, Flake NM, Cohenca N, Johnson JD. Efficacy of sonic and ultrasonic activation for removal of calcium hydroxide from mesial canals of mandibular molars: A microtomographic study. *J Endod.* 2011;37:235–8.
- van der Sluis LW, Wu MK, Wesselink PR. The evaluation of removal of calcium hydroxide paste from an artificial standardized groove in the apical root canal using different irrigation methodologies. *Int Endod J.* 2007;40:52–7.
- Tasdemir T, Celik D, Er K, Yildirim T, Ceyhanli KT, Yesilyurt C. Efficacy of several techniques for the removal of calcium hydroxide medicament from root canals. *Int Endod J.* 2011;44:505–9.
- Soares JA, Leonardo MR, da Silva LA, Tanomaru Filho M, Ito IY. Effect of rotary instrumentation and of the association of calcium hydroxide and chlorhexidine on the antiseptics of the root canal system in dogs. *Braz Oral Res.* 2006;20:120–6.
- Salgado RJ, Moura-Netto C, Yamazaki AK, Cardoso LN, de Moura AA, Prokopowitsch I. Comparison of different irrigants on calcium hydroxide medication removal: Microscopic cleanliness evaluation. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009;107:580–4.
- Moher D, Liberati A, Tetzlaff J, Altman DG PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* 2009;6:e1000097.
- Parikh M, Kishan KV, Solanki NP, et al. Efficacy of Removal of Calcium Hydroxide Medicament from Root Canals by Endoactivator and Endovac Irrigation Techniques: A Systematic Review of In vitro Studies. *Contemp Clin Dent.* 2019;10(1):135-142.
- T Taşdemir, D Celik, K Er, T Yildirim, K T Ceyhanli, C Yeşilyurt. Efficacy of several techniques for the removal of calcium hydroxide medicament from root canals. *Int Endod J.* 2011 Jun;44(6):505-9.
- Raghu R, Pradeep G, Shetty A, Gautham PM, Puneetha PG, Reddy TV. Retrieval of calcium hydroxide intracanal medicament with three calcium chelators, ethylenediaminetetraacetic acid, citric acid, and chitosan from root canals: An in vitro cone beam computed tomography volumetric analysis. *J Conserv Dent.* 2017;20(1):25-29.