Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Efficacy Of The Endoactivator System With That Of Conventional Irrigation With A Syringe And Hand File Manipulation In Removing Calcium Hydroxide

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ABSTRACT:
Background: Microorganisms play major roles in pulpaland periapical diseases. The present study was conducted to compare the calcium hydroxide removal efficacy of the EndoActivator system with that of conventional irrigationwith a syringe and hand file manipulation. **Materials & Methods:** 50recently extracted human single‑rooted mandibular premolars were divided into two groups of 25 each. In group I, Ca(OH)2 was removed usingethylenediaminetetraacetic acid (EDTA) and sodium hypochlorite (NaOCl) withhand filing and irrigation and in group II, EndoActivator system was used. The presence of Ca(OH)2 remnants in the coronal,middle and apical thirds of the canals of both halveswas assessed. **Results:** The mean value score in group I was 1.54 and in group II was 1.62. The difference was significant (P< 0.05). There was significant difference in mean score recorded at coronal, middle and apical level in group I and II (P< 0.05). **Conclusion:** The use ofthe EndoActivator system did not improve the efficacy of Ca(OH)2 removal inthe middle and apical thirds.
Key words: EndoActivator system, calcium hydroxide, middle

Received: 5 August, 2021 Accepted: 16 September, 2021

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This article may be cited as: Dheeraj M, Bharti P, Bhagat N, Jandial T, Chauhan S. Efficacy of the EndoActivator system with that of conventional irrigation with a syringe and hand file manipulation in removing calcium hydroxide. J Adv Med Dent Scie Res 2021;9(10):54-57.

INTRODUCTION

Microorganisms play major roles in pulpaland periapical diseases. Root canaltreatment aims to eliminate bacteria from the rootcanal system and prevent reinfection.[1] Althoughcleaning and shaping have been shown to greatlyreduce the number of bacteria in infected canals,complete disinfection of canals is difficult toachieve. Bacteria left in the root canals maysurvive, resulting in the failure of root canaltreatment.[2]

Elimination of all bacteria from the root canal is normally accomplished by mechanical instrumentation supported by various irrigating solutions and antibacterial agents. Among these agents, calcium hydroxide, is highly recommended and widely accepted as an interappointment intracanal endodontic dressing because it demonstrates a pronounced antibacterial activity against most of the bacterial species identified in endodontic infections.[3] Calcium hydroxide removal before final obturation is routinely accomplished by either sodium hypochlorite (NaOC1) or saline and/or instrumentation in a reaming motion with a small endodontic instrument, or with the master apical file. However, the effectiveness of these procedures has not been fully documented. Residual calcium hydroxide left intracanally has been shown to interact with zinc oxide-eugenol-based sealers substituting the zinc oxide-eugenol chelate formation for calcium eugenolate.[4]

The EndoActivator system is a sonically drivencanal irrigation system that was introduced to improvethe irrigation phase. Its activation produces vigorousintracanal fluid agitation. The system consists ofa portable handpiece and three types and sizes ofdisposable flexible polymer tip.[5] Its design allows

forthe safe activation of various intracanal reagents andthe production of vigorous intracanal fluid agitation.The EndoActivator system has been shown to betterirrigate simulated lateral canals at 4.5 and 2 mm fromthe working length, compared with traditional needleirrigation alone.[6] The present study was conducted to compare the calcium hydroxide removal efficacy of the EndoActivator system with that of conventional irrigation with a syringe and hand file manipulation.

MATERIALS & METHODS

The present invitro study was conducted on 50recently extracted human single- rooted mandibular premolars.The study was approved from institutional review board. The rootcanal systems of all teeth were cleaned and shaped and filled with Ca(OH)2paste. The teeth were divided into two groups of 25 each. In group I, Ca(OH)2 was removed usingethylenediaminetetraacetic acid (EDTA) and sodium hypochlorite (NaOCl) withhand filing and irrigation and in group II, EndoActivator system was used. The presence of Ca(OH)2 remnants in the coronal,middle and apical thirds of the canals of both halveswas assessed.Each tooth was split into two halves and examined under a scanning electronmicroscope. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of teeth

Groups	Group I	Group II
Method	EDTA and NaOCl	EndoActivator system
Number	25	25

Table I shows type of method used for Ca(OH)2 removal and number of teeth selected for the study.

Table II Mean value of scores

Groups	Mean	P value
Group I	1.54	0.09
Group II	1.62	

Table II, graph I shows that mean value score in group I was 1.54 and in group II was 1.62. The difference was significant (P< 0.05).

Graph I Mean value of scores

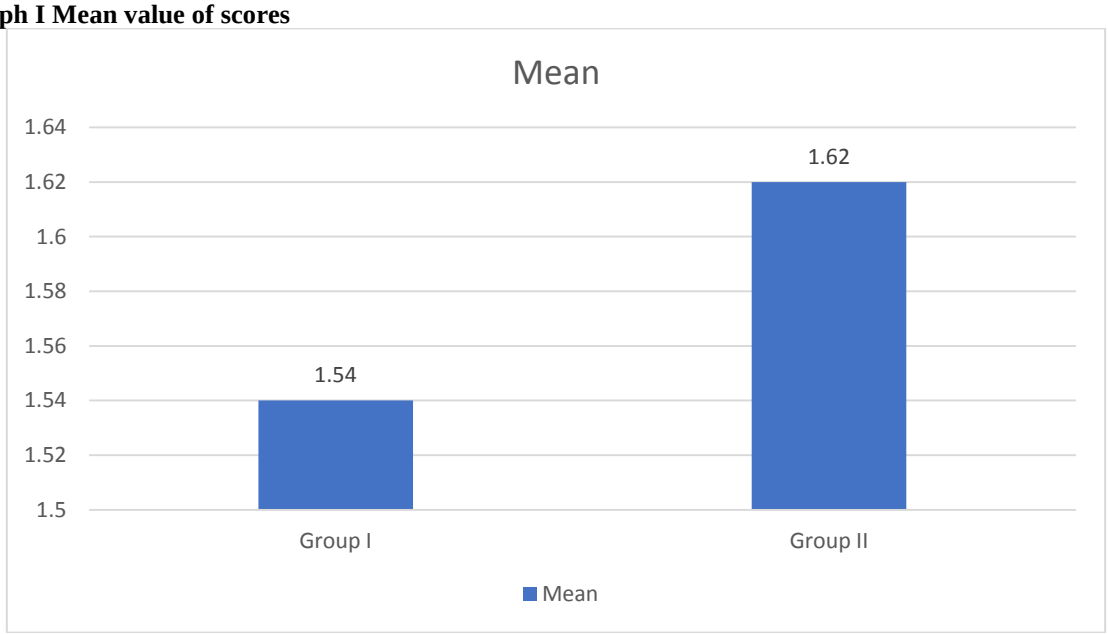

Table III mean score at various levels of tooth

Level	Group I	Group II	P value
Coronal	1.24	1.18	0.05
Middle	1.40	1.32	0.09
Apical	2.06	1.98	0.08

Table III shows that there was significant difference in mean score recorded at coronal, middle and apical level in group I and II (P< 0.05).

DISCUSSION

It is known that residual calcium hydroxide influences the setting mechanism of zinc oxide-eugenol-type endodontic sealers. The short-term clinical implications were a rapid setting reaction of the sealer that blocked gutta-percha entrance and placement to full working length.[7,8] It is also known that treatment with EDTA neutralizes calcium hydroxide residues: but, if residues are notremoved, they may interfere with the sealing efficiency from a mechanical point of view.[9] The calcium hydroxide packed apically during the removal procedure or in lacunae, regardless of the removal method used, could be of significance for the outcome of the root canal treatment.[10] Although an apical plug with calcium hydroxide has been advocated, it is preferable to remove it because it might enhance apical microleakage and jeopardize the outcome of treatment. In addition to mechanical and chemical cleansing of the root canal, perhaps a patency to file number 10 or even file number 15 should be used.[11,12]The present study was conducted to compare the calcium hydroxide removal efficacy of the EndoActivator system with that of conventional irrigationwith a syringe and hand file manipulation.

In present study, in group I, Ca (OH)2 was removed using ethylenediaminetetraacetic acid (EDTA) and sodium hypochlorite (NaOCl) with hand filing and irrigation and in group II, EndoActivator system was used. Garni et al[13]compare the calcium hydroxide (Ca(OH)2)removal efficacy of the EndoActivator system with that of conventional irrigationwith a syringe and hand file manipulation. A total of44 extracted human single‐rooted mandibular premolars were used. The rootcanal systems of all teeth were cleaned and shaped, then filled with Ca(OH)2paste. The teeth were divided into two groups: Ca(OH)2 was removed usingethylenediaminetetraacetic acid (EDTA) and sodium hypochlorite (NaOCl) withhand filing and irrigation (Group 1) or the EndoActivator system (Group 2).Each tooth was split into two halves and examined under a scanning electronmicroscope. Ca(OH)2 particles were completely removed at thecoronal level in both experimental groups. More Ca(OH)2 particles werepresent in the apical third than in the middle‐third in both groups. No significantinteraction was observed between the two experimental groups or among thethree examined levels ($P > 0.05$).

We observed that there was significant difference in mean score recorded at coronal, middle and apical level in group I and II ($P< 0.05$).Lambrianidis et al[14] in their study three Ca(OH)2 preparations were used: Calxyl, Pulpdent paste, and chemically pure Ca(OH) 2 mixed with distilled water. Fifty-one single-rooted extracted human teeth were prepared with a step-back technique and divided into groups A, B, and C. In each group, 15 teeth were assigned to each Ca(OH)2 preparation while the remaining two served as positive and negative controls. Each group of treated teeth was divided into three subgroups of five teeth each: subgroup I-- canals were irrigated with saline, filed with a #25 file, and finally flushed with saline; subgroup II--canals were irrigated with NaOCI, filed with a #25 file, and finally flushed with NaOCI; and subgroup III--canals were irrigated with NaOCI, filed with a #25 file, and finally flushed with tetrasodium EDTA. Canal sections were then photographed, and the percentage ratios of Ca(OH) 2 coated area to the total canal surface area were calculated by image processing analysis. Results revealed: (a) none of the methods efficiently removed all dressing from the walls, and (b) concentration of the paste used had little effect on the efficacy of the methods applied for the removal of the dressing. Excipients possibly effect retention of Ca(OH)2.

CONCLUSION

Authors found that use ofthe EndoActivator system did not improve the efficacy of Ca(OH)2 removal inthe middle and apical thirds.

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