

Successful Non-surgical management of a large periapical lesion using Calcium Hydroxide as an intracanal medicament- A Case Report¹Dr. Neel J Patel, Department of Conservative Dentistry & Endodontics.²Dr. Dipti Choksi, Department of Conservative Dentistry & Endodontics.³Dr. Barkha Idnani, Department of Conservative Dentistry & Endodontics.⁴Dr. Jaini Thakkar, Department of Conservative Dentistry & Endodontics.**Corresponding Author:** Dr. Neel J Patel, Department of Conservative Dentistry & Endodontics.**Citation of this Article:** Dr. Neel J Patel, Dr. Dipti Choksi, Dr. Barkha Idnani, Dr. Jaini Thakkar, “Successful Non-surgical management of a large periapical lesion using Calcium Hydroxide as an intracanal medicament- A Case Report”, IJDSIR- July - 2022, Vol. – 5, Issue - 4, P. No. 173 – 178.**Copyright:** © 2022, Dr. Laboni Ghorai, et al. This is an open access journal and article distributed under the terms of the creative commons attribution non-commercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Case Report**Conflicts of Interest:** Nil**Abstract**

The peri radicular tissues are affected by pathological disorders called periapical lesions of endodontic origin. Treatment of large peri radicular lesions involves non-surgical as well as surgical options. Many nonsurgical techniques like conservative root canal therapy using calcium hydroxide or decompression, tissue repair with lesion sterilisation, aspiration-irrigation procedure have been used. New techniques which use injectable scaffolds loaded with drugs, simvastatin, and epigallocatechin 3 gallate have been tried. Surgical option should be considered such as Peri radicular surgeries including apicectomy when intra- or extraradicular infections are persistent. The primary objective of endodontic therapy should be to restore involved teeth to a state of normalcy primarily non-surgically. Even large periapical lesions and retreatment cases where the lesion is of endodontic origin have been

successfully managed non-surgically with orthograde endodontic therapy.

This case presents management of a large periapical lesion in relation to maxillary left anterior region, which was well accessed, cleaned and shaped in the first visit followed by Calcium Hydroxide (Met apex) placement in the second visit, repeated till three months. Initial signs of healing was evident radiographically after three months hence, obturation followed by post endodontic restoration was done and a eight months follow up was also taken.

Introduction

Microorganisms are the main cause of any periapical inflammatory lesions. It has been well established that the endodontic infections are polymicrobial in nature.¹ The microorganisms most frequently isolated from the infected root canals are streptococci and micrococci hence, the main goal of any endodontic treatment is the

elimination of microorganisms in order to prevent pulpal and periradicular infections.² Complete elimination of microorganisms from the root canal system is difficult hence, numerous measures have been introduced to reduce the number of microorganisms. These measures include, various biomechanical preparation techniques, different irrigation techniques and the use of wide range of intracanal medicament placement in between appointments.³

In 1920 Hermann introduced Calcium hydroxide as an pulp capping agent ever since then it has been widely used in endodontics.⁴ Various biological properties of calcium hydroxide ($\text{Ca}(\text{OH})_2$) includes, tissue dissolving ability, antimicrobial activity, inhibition of tooth resorption and hard tissue formation that aids in healing of periradicular. Currently $\text{Ca}(\text{OH})_2$ is considered the first choice of root canal dressing material.⁵

An antibacterial intracanal medicament must have a wide spectrum of activity and a reasonable duration of action to eliminate all the bacteria in the root canal and the antimicrobial effect of $\text{Ca}(\text{OH})_2$ results from the release of its hydroxyl ions when it comes into contact with aqueous fluids.⁶

$\text{Ca}(\text{OH})_2$ has a wide range of antimicrobial effects against common endodontic pathogens, but is less effective against *Enterococcus faecalis* and *Candida albicans*. The addition of vehicles or other agents might contribute to the antimicrobial effect of $\text{Ca}(\text{OH})_2$.⁷

Case report

A 33 Years old female patient was reported to the Department of Conservative dentistry and Endodontics, Dharmsinh Desai University, Nadiad, Gujarat; with a chief complaint of pus discharge from previously initiated root canal treatment in relation to her maxillary left central incisor Fig-1



Fig 1: Periapical Radiograph in relation to Maxillary Left Central Incisor.

The patient had no significant medical history. She gave history of previously extracted maxillary right central incisor followed by crown and bridge placement extending from maxillary right central and lateral incisor and maxillary left central incisor.

Tooth No. 21 was tender on percussion. Intraoral examination revealed an open access cavity with pus discharge in relation to maxillary left central incisor. There was no sign of mobility and swelling. Electric pulp test gave no response. Radiographic examination revealed presence of radiolucency in periapical area along with loss of lamina dura and periodontal ligament widening.

Hence, A diagnosis of incomplete root canal treatment along with chronic periapical abscess was made in relation to 21. The treatment plan of a non-surgical management of 21 with Long term intracanal placement was discussed with patient and patient consent was taken.

First appointment

Under rubber dam isolation with split dam technique, the Root canal opening was modified through the prosthesis using endo access bur (Dentsply).



Fig 2: Access opening through the prosthesis in relation to 21.

Canal patency was checked with a #15 k file (Mani) and working length was determined to be 21mm using an apex locator (J Morita) and was confirmed with intraoral peri-apical radiograph. Fig-3. The canal was prepared by step-back technique using hand k files up to master apical file #60 along with 2.5% sodium hypochlorite.



Fig 3: Working length radiograph.

There was presence of Pus discharge from the canal therefore, copious irrigation with 2.5% sodium hypochlorite and normal saline was done followed by intermediate root canal dressing.

Patient was prescribed oral prophylaxis and was recalled after three days for further treatment.

Second appointment

Re. Instrumentation was done to check for pus discharge. After initial irrigation with 2.5% sodium hypochlorite and Normal saline, Calcium hydroxide paste (Meta biomed, Met apex) was placed as an intracanal medicament. Patient was recalled for follow-up after one month.

Third appointment

Radiograph was taken prior to any treatment. Radiographic examination revealed decrease in size of the peri-apical lesion. Old Met apex was removed with 2.5% sodium hypochlorite & Normal saline, followed by re-irrigation with chlorhexidine and normal saline and Re-placement of Met apex was done. Patient was recalled for follow up after 1 month. Fig-5.

Fourth appointment

Same procedure was repeated as third appointment. Patient was recalled for follow up after one month.

Fifth appointment

Radiograph was taken prior to any treatment. Decrease in the size of the lesion was evident on radiograph. Fig-4; Tooth was asymptomatic hence, Met apex was completely removed from the canal space, and canal was dried using absorbent paper points.

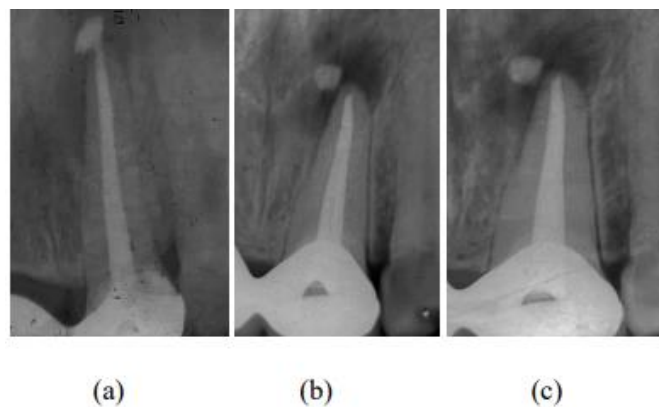
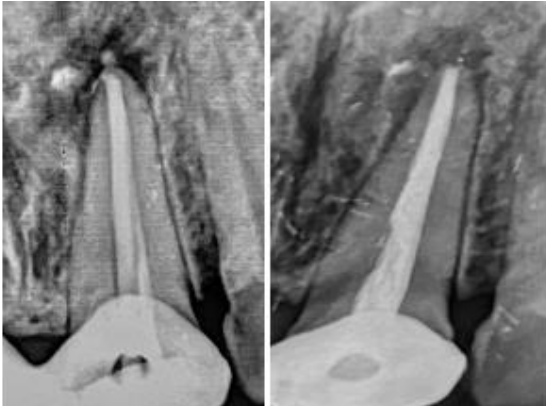


Fig 4: a-first time met apex placement, b-second time met apex placement, c-third time met apex placement.

No. #60 Master cone was selected, measured till working length and carefully placed into the canal and a radiograph was taken to confirm adaptation. Obturation was done using no. #60 gutta percha cone followed by accessory cones using Grossman's sealer. The obturation was done using lateral condensation technique. Post obturation radiograph was taken followed by post endodontic restoration in relation to 21 was done. Fig-5.



(a)

(b)

Fig 5: a - master cone iopa, b-obturation and post endodontic restoration.

An eight months follow-up was taken in relation to 21. Tooth was asymptomatic and a periapical radiograph was taken that revealed decreasing radiolucency. Fig-6.



Fig 6: Eight months follow up.

Discussion

Calcium hydroxide is widely acceptable as an intracanal medicament. Its therapeutic effect is due to its ability to break down into calcium and hydroxyl ions. Hydroxyl

ions forms an alkaline medium that aids in the destruction of lipids which further leads to structural damage of bacterial proteins and nucleic acids.^{8,9}

Calcium hydroxide is also capable of tissue restoration. It activates tissue enzymes, activates alkaline phosphatase by its high ph. 10,11,12. After activation of this enzyme, it releases inorganic phosphates from esters that is responsible for the mineralisation process. The phosphate ions further reacts with calcium ions from the blood stream and forms calcium phosphate- the molecular unit of hydroxyapatite.¹³

Various forms of calcium hydroxide are available commercially. One popular material being Met apex by Meta biomed. Met apex is an oil based, radiopaque form of calcium hydroxide. Iodoform is incorporated to improve the antibacterial properties of the material and BaSO₄ is responsible for its radio opacity in Ca (OH)₂ pastes. The oily vehicles present in Met apex are responsible for the lowest solubility and diffusion of the paste within the tissues.¹⁴

Different techniques can be used for the placement of calcium hydroxide in the canals. Tan et al. compared the use of syringe and finger spreader, syringe and lentulo spiral, paste carrier, they found that, the paste carrier was more effective than other tested techniques in the intracanal placement of calcium hydroxide.¹⁵

Cwikla et al compared calcium hydroxide mixed with water, iodine-potassium iodide, and iodoform & silicone oil (Met apex). He concluded that Met apex is the most effective dentinal tubule disinfectant.¹⁶ On the contrary, Estrela et al examined the antimicrobial efficacy of calcium hydroxide with certain vehicles and concluded that the vehicles did not influence its antimicrobial activity. Estrela et al. in another study concluded that addition of iodoform does not improve the antimicrobial efficacy of the solution hence, it is still not evident that

calcium hydroxide with or without iodoform alone against endodontic pathogens is yet to be established.¹⁷ Vehicles can speed up or slow down the ionic dissociation. Hence, substances used as antimicrobial medium and media enhance radio opacity. Various vehicles like water, saline, glycol, etc. have been tried to carry calcium hydroxide to achieve maximum efficiency but the search is still on for the most suitable vehicle.¹⁸

Conclusion

The surgical approach is not the only treatment option that remains for treating any large periapical lesions. These lesions can be successfully treated with the nonsurgical endodontic approach along with long-term calcium hydroxide therapy.

Nonsurgical management of peri-apical lesions have shown a high success rate over the years. Calcium hydroxide has a great value in Endodontics, being indicated for several clinical conditions. It has been proved to be an effective intracanal medicament and has resulted in successful resolution of periapical lesions.

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