

Management of large periapical lesion with non-surgical intervention- A Case Report

¹Bonny Paul, Professor, Hitkarini Dental College, Jabalpur.

¹Kavita Dube, Professor, Hitkarini Dental College, Jabalpur.

²Charu Kapur, Reader, Hitkarini Dental College, Jabalpur.

³Nupur Bhatnagar, Lecturer, Hitkarini Dental College, Jabalpur.

⁴Ashutosh Kumar, Post-graduate, Hitkarini Dental College, Jabalpur.

⁴Sushil Pandey, Post-graduate, Hitkarini Dental College, Jabalpur.

Corresponding Author: Kavita Dube, Professor, Hitkarini Dental College, Jabalpur.

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Abstract:

This case report describes the non-surgical management of a large periapical lesion in the mandible of a 30-year-old female with the chief complain of pain and history of trauma in that region 2 year back Radiographic lesion revealed a large periapical lesion in her mandibular right lateral incisor. An intracanal medicament of calcium hydroxide was placed and the patient was recalled after two weeks and was found to be asymptomatic. Lateral condensation obturation was done. On clinical and radiographic re-evaluations after 1 year revealed progressing bone healing.

Keywords: Calcium hydroxide medicament, Large periapical lesion, non-surgical management.

Introduction

A trauma to the tooth could possibly cause pulpal damage without any fracture of the crown or the root.

Depending on the severity of the trauma the pulp could possibly heal or undergo necrosis. Periapical lesions of endodontic origin usually develop due to an inflammatory response around the root apices of non-vital teeth¹. Usually, these lesions remain asymptomatic for years and are diagnosed by routine radiographic examination or unless they flare up.

Depending on the histological examination, chronic periapical lesions are usually classified into abscess, granulomas and cysts². Management of these large periapical lesions varied from non-surgical endodontic treatment to surgical intervention to extraction. Today with the advancements in conservative endodontic treatment procedures and with a better knowledge of healing process of periapical tissues, surgical intervention has become very rare.

Also, surgical intervention has many limitations like proximity to anatomical structures, scar formation, and psychological condition of the patient. Literature reports around 94.4% of complete and partial healing of periapical lesions following non-surgical endodontic therapy³. Keeping in mind all this, non-surgical endodontic therapy should be the first line of treatment for large periapical lesions. The following case describes the non-surgical management of considerable size periapical lesion using calcium hydroxide.

Case report

A 30-year-old female patient with a non-contributory medical history reported to the department of conservative dentistry and endodontics with pain in her mandibular anterior portion. She complained of occasional pain from the past two weeks, which aggravated on mastication. Clinical examination revealed nothing significant in her mandibular anterior teeth, however there was pain on percussion on her mandibular right lateral incisor. History revealed trauma on her mandibular incisors around two years back. Radiographic lesion revealed a large periapical lesion in her mandibular right lateral incisor (Fig 1). Vitality test with a pulp tester evoked no response. A diagnosis of pulp necrosis with chronic apical periodontitis was made and it was decided to carry out non-surgical endodontic treatment.

An informed consent was taken after explaining the treatment protocol. The tooth was isolated under rubber dam and an access was gained into the root canal. The working length was established (Fig 2) and biomechanical preparation was carried out using neo endo files. Irrigation was carried using 3 % sodium hypochlorite along with 17% Edta solution. An intracanal medicament of calcium hydroxide was placed and the access cavity was sealed with Cavit. The patient

was recalled after two weeks and was found to be asymptomatic. After removing the dressing, the canals were again irrigated with sodium hypochlorite and Edta solution. A master cone x ray was selected and confirmed by radiograph. After a final flush with normal saline the canal was dried with absorbent points. Obturation was carried out with Ah plus sealer using lateral condensation technique and a radiograph was taken to evaluate the obturation (Fig 3). A follow up radiograph after one year revealed complete resolution of the lesion (Fig 4)

Discussion

A necrosed pulp due to caries or trauma acts as a nidus for microbial growth. Microbes along with their toxins infiltrate into the periapical region and trigger an inflammatory reaction, bone resorption and eventually a periapical lesion⁴. A virile organism would be responsible for an acute response, on the other hand if the organism is not virile or is produced by the toxins of a necrotic pulp, the process would be chronic. Various surgical and non-surgical treatment options can be considered for treating the lesions of endodontic origin.

Conservative endodontic therapy without periapical surgery should be the first choice of treatment. Almost 94.4% of total or partial resolution of lesions of endodontic origin with non-surgical treatment have been reported³. This can be explained by the following points (1) Thorough biomechanical preparation and biological control. (2) Decompression of lesion by apical patency. (3) Intracanal medicaments like calcium hydroxide for its antimicrobial properties and bone repairing effects. (4) Better immune response due to patient's age.⁵

Proper cleaning and shaping are the first and foremost important factor in reducing microbial load. Irrigating solutions like sodium hypochlorite also aid in reducing microbial load due to their antimicrobial properties and

tissue dissolving properties⁶. These followed by calcium hydroxide medication renewed periodically helps in resolution of extensive periapical lesion. In young patients a high frequency of periapical healing with calcium hydroxide have been reported. The possible actions of calcium hydroxide beyond the apex probably could be anti-inflammatory activity, neutralization of acid phosphates, activation of alkaline phosphatase and anti-bacterial action⁷. Calcium hydroxide disrupts the microbial cell wall lipopolysaccharides in gram – negative organism and membrane transport mechanism, resulting in cell death. The main advantage of calcium hydroxide is its ability to kill microorganisms without direct contact by absorbing the carbon dioxide required for bacterial growth and by release of hydroxyl ions into the dentinal tubules⁸. These hydroxyl ions cause lipid peroxidation, increased membrane permeability, inactivates enzymes, protein denaturation and eventually DNA damage⁹. Caliskan and Sen et al have reported complete healing of a periapical lesion with calcium hydroxide¹⁰. Ghose et al have mentioned that there should be direct contact of calcium hydroxide with periapical tissue for osteoinductive reasons¹¹.

Periapical tissues have good blood supply, lymphatic drainage and sufficient undifferentiated mesenchymal cells due to which they have a good potential for healing¹². Trabecular formation, formation of lamina dura and increase in radio opacity of lesions are all radiological signs of good healing¹³. However long-term use of calcium hydroxide was found to be associated with weakening of root canal dentine and in turn increase the tooth fracture risk.

Studies have shown that calcium hydroxide alone may not diffuse deep into the tubules and at a depth of 250 microns significantly high number of *E. feacalis* were found. *E. feacalis* is usually killed at ph. higher than

11.5. Although calcium hydroxide has a ph. of 12, it may not be maintained high at deeper tubules due to the dentine's buffering action¹⁴. Studies have shown that a combination of metronidazole, ciprofloxacin and minocycline is effective in killing common endodontic microorganisms seen in necrotic/infected root canals in vitro¹⁵.

In our present case, the patient had a trauma and was asymptomatic for years. However, when pain developed the patient visited for dental treatment, at which stage a large periapical lesion was noticed radio graphically. Routine protocol of good biomechanical instrumentation with good irrigation helped in reducing majority if the bacterial load. A further placement of with calcium hydroxide helped in further disinfection of the canal. A minimum contact time of 7 days is required for calcium hydroxide to eradicate microorganisms, which may have survived after chemo-mechanical preparation¹⁶.

Conclusion

The clinical case documented in this article showed excellent healing of a large periapical lesion using a non-surgical approach. Thorough cleaning and shaping with proper irrigation protocols followed by a three-dimensional obturation were the key factors in the success of the treatment. Calcium hydroxide used as an intracanal medicament helped in the proper disinfection and successful healing of the lesion.

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Legend Figures

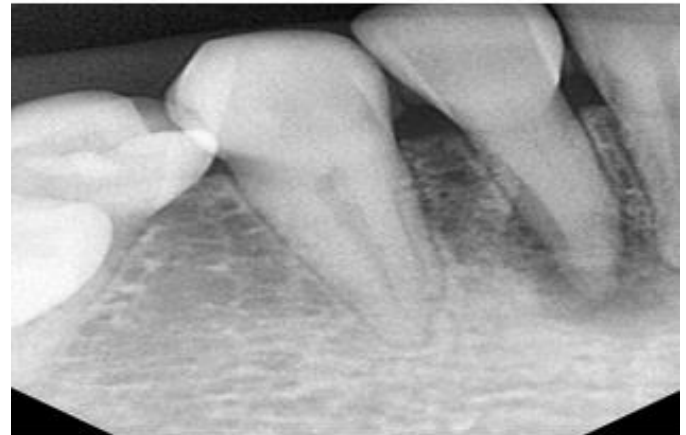


Figure 1: Preoperative radiograph

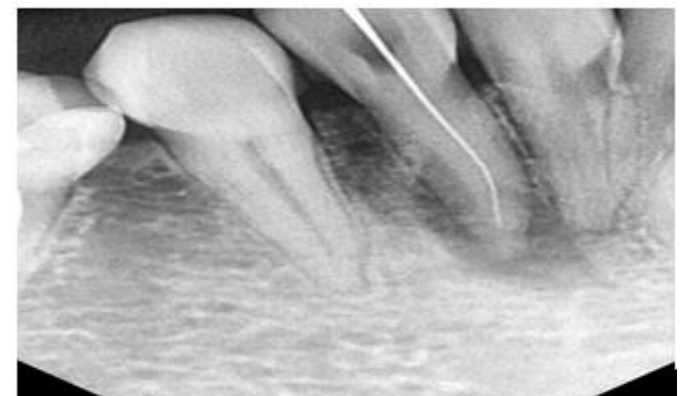


Figure 2: Working Length radiograph

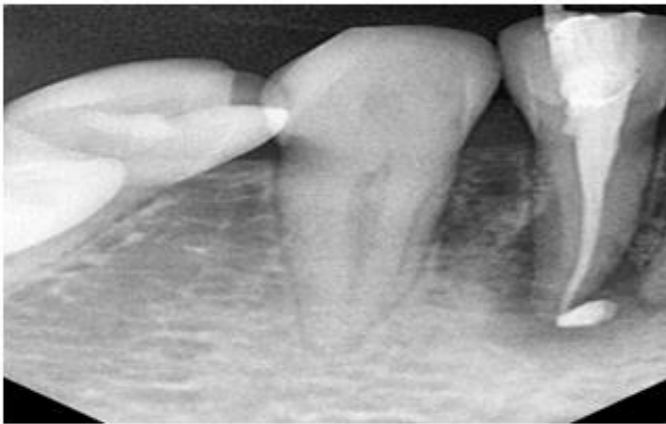


Figure 3: obturation radiograph

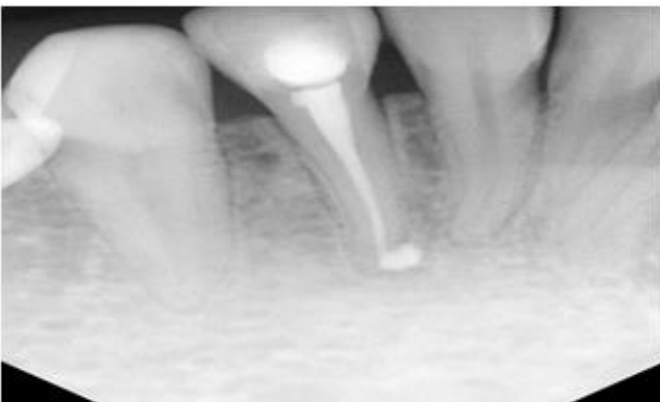


Figure 4: follow up after one year