

Non-Surgical Treatment of Periapical Lesions Using Calcium Hydroxide: A Case Report

Dr. Amal Kanti Ghosh¹, Dr. Dipto De², Dr. Rohit Miglani³, Dr. Amit Mishra⁴

¹Professor and Head, Department of Conservative Dentistry and Endodontics, Mithila Minority Dental College & Hospital, Darbhanga, Bihar, India

²Professor and Head, Department of Oral Pathology, Mithila Minority Dental College & Hospital, Darbhanga, Bihar, India

³Professor, Department of Conservative Dentistry and Endodontics, Mithila Minority Dental College & Hospital, Darbhanga, Bihar, India

⁴Tutor, Department of Conservative Dentistry and Endodontics, Mithila Minority Dental College & Hospital, Darbhanga, Bihar, India

Abstract: The success of root canal treatment is based on total elimination of root canal content, thorough cleaning, shaping and obturation of root canal system. Calcium hydroxide is recommended as intra-canal medicament because of its antibacterial properties, tissue dissolving ability, inhibition of tooth resorption and indication of tissue repair by hard tissue formation. Here we present a series of case reports, where calcium hydroxide was used as an inter appointment endodontic dressing management of large periapical radiolucency and periodically reviewed. Significant bone formation was seen at the periapical region at periodic check up visits. Thus the non surgical healing of the multiple periapical lesions provided favorable clinical and radiographic response.

Keywords: Periapical Lesion, Non Surgical Endodontic Therapy, Calcium Hydroxide.

Introduction

Periapical lesions are a sequelae to endodontic infection caused due to dental caries or trauma and manifests itself as the host defense response to microbial challenge emanating from the root canal system. It is viewed as a dynamic encounter between microbial factors and host defenses at the interface between infected radicular pulp and periodontal ligament that results in local inflammation, resorption of hard tissues, destruction of other periapical tissues^{1,2}

Most periapical lesion (> 90%) can be classified as dental granuloma, cyst / abscess^{3,4} Treatment options to manage such periapical lesions range from non-surgical root canal treatment and/or apical surgery to extraction. Various studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions.^{5,6} A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical endodontic therapy has also been reported.⁷ Large periapical lesions have been routinely treated surgically but a more conservative non-surgical approach that can be treated by calcium hydroxide can't be overlooked. The basic premise of any endodontic treatment is to have a conventional orthograde approach than to have more invasive surgical treatment modality. In view of that calcium hydroxide definitely has an edgeover, when we look at its outstanding action as an intracanal medicament in nonsurgical management of a case. However it is not a panacea. But, can still be argued to be successful in 75 % of cases.⁸ This article suggests that surgical removal of periapical lesion of pulpal origin is not mandatory, and that, irrespective of the size of the lesion, every effort should be made to treat such lesions by conservative means.

Case Report

CASE-1

A 22 year old male patient reported to the Department of Conservative Dentistry and Endodontics, mithla minority dental college and hospital darbhanga with a chief complaint of pain since 4-5 days. There was history of trauma due to fall 7 yrs

back. On clinical examination it was found to be Ellis Class II fracture in relation to 21 and discoloration in relation to 21, 22. Electric and thermal pulp testing showed no response in 21, 22 and normal response in 11, 23. Intraoral Periapical Radiograph revealed ill-defined radiolucent area surrounding apices of left maxillary central and lateral incisors of considerable size. The clinical and radiographic signs were suggestive of periapical pathology in relation to 21 and 22. Provisional diagnosis was made as Pulp necrosis with periapical lesion in relation to 21 and 22.

Hence non surgical endodontic treatment was planned with patient's consent.

On first visit, access cavity was prepared on 21, 22. Exudate drainage was obtained. Working length was determined and canals were cleaned & shaped by Kerr-files (MANI, Inc Japan) using step back technique. Irrigation was done using 3% sodium hypochlorite and metrogl. Interim dressing was given and patient was recalled next day.

Next visit, calcium hydroxide was mixed with chlorhexidine to form a paste, and was placed in canal using lentulo spiral. Access cavity was sealed with interim dressing. Patient was kept on follow up and intracanal calcium hydroxide dressing was changed periodically. Significant reduction in size of periapical lesion was seen at periodic follow ups

Discussion

Surgical treatment of all periapical pathologies is not always necessary since they may respond satisfactorily to the adequate endodontic treatment. A nonsurgical approach should always be adopted before resorting to surgery. Patients also are psychologically more anxious about surgical treatment than a non-surgical one. Also one needs to be aware of the risks and complications associated with medically compromised patient during surgical procedures. Calcium hydroxide nowadays is widely used as an intracanal endodontic material, due to its high alkalinity (Tronstad et al.1981),⁹ tissue dissolving effect, causes induction of repair by hard tissue formation and bactericidal effect (Sjogren et al.

1991, Siqueira & Lopes 1999).^{10,11} Its antibacterial actions is due to its effect on bacterial cytoplasmic membranes, protein denaturation, damage to DNA, carbon dioxide absorption, its action on lipopolysaccharides and its hygroscopic action. In the presence of large periapical lesions placement of intracanal calcium hydroxide would have a direct effect on inflamed tissue and epithelial cystic linings and in this manner would favour periapical healing and encourage osseous repair (Tronstad et al.1981). Significant bone formation was seen at the periapical region on periodic check up visits. Thus non surgical healing of the multiple periapical lesions provided favourable clinical and radiographic response.

Conclusion

Here, conventional endodontic therapy in combination with calcium hydroxide as an intracanal medicament contributed effectively in healing of periapical lesions. But, it would be necessary to observe and monitor the periapical lesions over a period of time following the non-surgical approach before the surgery is contemplated. In general, non surgical treatment or retreatment will be the preferred choice because it seems to provide the most benefit with the lowest risk. Surgical treatment is indicated only when nonsurgical treatment or retreatment is impractical or unlikely to provide the desired outcome. It is now believed that the activated macrophages in the periapical lesion are the reason for delayed healing of the lesions in the absence of bacterial antigens. The futuristic view of treating the periapical lesions include placement of biodegradable local sustained drug delivery points into the lesion before obturating the tooth to deactivate the macrophages and enhancing the faster healing of the lesions.¹²

References

- [1]. Nair P.N.R. Apical periodontitis: a dynamic encounter between root canal infection and host response. *Periodontology* 2000, 1997; 13(1) : 121-148.
- [2]. Nair P.N.R. Pathogenesis of apical periodontitis and the cause of endodontic failures. *Crit Rev Oral Biol Med* 2004; 15(6) : 348-381.
- [3]. Bhaskar SN Periapical lesion – types, incidence and clinical features. *Oral Surgery, Oral Medicine and Oral Pathology* 1966; 21, 657–71.
- [4]. Lalonde ER, Leubke RG. The frequency and distribution of periapical cysts and granulomas. *Oral surg oral med oral pathol* 1986; 25: 861-8.
- [5]. Sjogren U. Hagglund Sundqvist G. Wing K. Factors affecting the long term results of endodontic treatment. *J Endod.* 1990; 16: 31-7.

- [6]. Hali'Ikan MK, en BH, Endodontic treatment of teeth with apical periodontitis using calcium hydroxide: a long term study. *Endod Dent Traumatology* 1966 ;12:215-21.
- [7]. Murphy WK, Kaugars GE, Collet WK, Dodds RN. Healing of periapical radiolucencies after nonsurgical endodontic therapy. *Oral Surg Oral Med Oral Pathol.* 1991;71:620-4. Sjogren etal 1990, Caliskan & Sen 96—IEJ 2004.
- [8]. Tronstad L, Andreasen JO, Hasselgren G, Kristerson L, Riis I : pH changes in dental tissue after root canal filling with calcium hydroxide. *J Endod* 1981;7:17-21.
- [9]. Siqueira JF, Lopes HP: mechanisms of antibacterial activity of calcium hydroxide: a critical review. *IEJ* [10]. 1999;32:361-9.
- [11]. Sjogren U, Figdor S, Spangberg L, Sundqvist G: The antimicrobial effect of calcium hydroxide as a short term intracanal dressing. *IEJ* 1991;24:119-25.
- [12]. Zvi Metzger, Itzhak Abramovitz. Periapical lesion of endodontic origin .John I. Ingle, Leif K Bakland, Craig Baumgartner J,. *Ingles Endodontics*, 6th ED, Hamilton; BC Decker Inc: 2008: P 511.

Figures Used

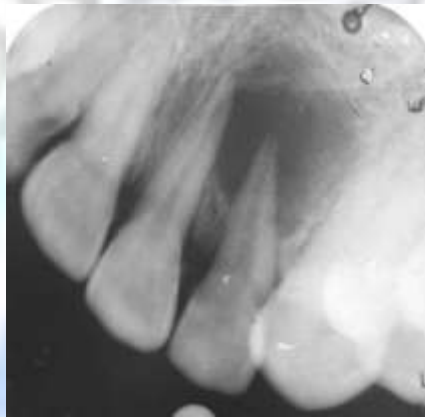


Fig. 1: Pre-operative radiograph

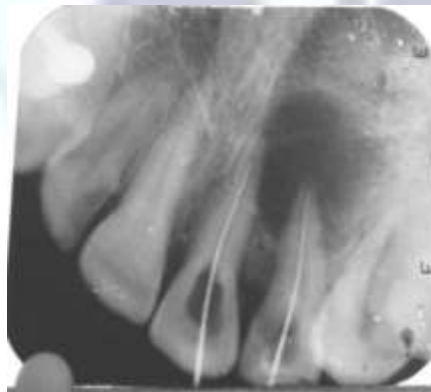


Fig. 2: Working length



Fig. 3: Master cone

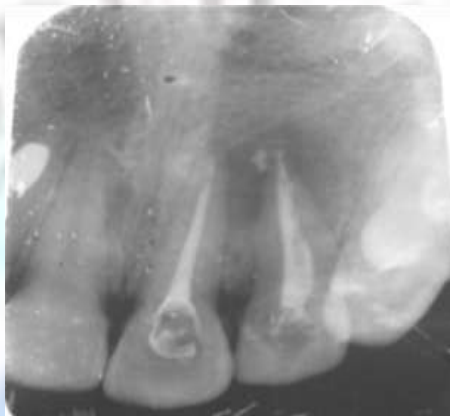


Fig. 4: Follow up after 3 month



Fig. 5: One year follow up