

Nonsurgical Endodontic Management of a Large Periapical Lesion: A Case Report

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Abstract: ***Aim and Background:** Nonsurgical endodontic management of large periapical lesions remains a clinical challenge. Successful treatment depends on effective disinfection of the root canal system and promotion of periapical healing by bioactive intracanal medicaments, such as the calcium hydroxide-iodoform combination, which possesses potent antimicrobial properties and stimulates hard tissue repair, thereby facilitating healing of periapical lesions. **Case Description:** This case report presents the conservative endodontic management of a large periapical lesion involving a mandibular left first molar. Metapex was used as an intracanal dressing with regular renewal at intervals of 2 weeks, 1 month, 4 months and 1 year to induce periapical healing. Progressive bone healing and disappearance of periapical radiolucency were seen in the follow-up radiographs, followed by obturation and post endodontic restoration. **Conclusion:** The use of Metapex for periapical healing in large lesions is a simple, cost-efficient, and minimally invasive method for managing periapical lesions, offering a practical alternative to surgical procedures in suitable clinical situations.*

Keywords: Periapical radiolucency, endodontic therapy, Metapex, Periapical lesion

1. Introduction

Periapical lesions are common pathological conditions affecting the periradicular tissues, primarily resulting from pulpal necrosis due to caries or trauma. The infected root canal system typically harbours anaerobic microbial biofilms [1].

Such cases, if not treated endodontically, may lead to chronic dentoalveolar abscess formation and further periapical bone loss. They are often detected radiographically or through clinical symptoms such as acute exacerbation of symptoms.

Periapical radiolucencies are broadly classified as radicular cysts, periapical granulomas, or abscesses depending on their symptoms and radiographic examination. Endodontic therapy alone has shown a success rate of up to 85% in managing periapical pathosis, indicating that most cases can be effectively treated without surgical intervention [2]. This success is attributed to thorough cleaning, shaping and disinfection followed by 3D obturation and effective coronal seal.

Intracanal medicaments play a crucial role in enhancing treatment outcomes. Among them, calcium hydroxide is considered the gold standard due to its antimicrobial action, high alkalinity, and ability to stimulate hard tissue formation. Metapex, a calcium hydroxide-based medicament containing iodoform and barium sulphate, has demonstrated effectiveness in eliminating resistant microorganisms such as *Enterococcus faecalis* and in promoting resolution of periapical lesions [3] [4].

2. Case Report

A 34-year-old male patient reported to the Department of conservative dentistry and Endodontics with pain in his lower left posterior teeth region for the last 2 months. The pain was spontaneous, recurring and elevated on chewing food. Clinical examination showed the presence of a deep carious lesion in 36, and periapical radiograph revealed radiolucency

involving the enamel, dentin, and pulp associated with a periapical radiolucency involving the distal root and furcation. Pulp sensibility tests failed to produce any response in the tooth. Nonsurgical endodontic therapy with Metapex was planned.

After access opening under rubber dam isolation, the working length (WL) was determined, and complete cleaning and shaping with K -files and Endo Excellence nano gold rotary files were done. All canals were irrigated with 5 mL each of 5.25% sodium hypochlorite (NaOCl) followed by saline irrigation, and a final rinse of 17% ethylene-diamine-tetra acetic acid (EDTA) was done. Calcium hydroxide intracanal dressing was given at the first visit. During the second visit, the patient was asymptomatic. Metapex was placed as an intracanal medicament. The patient was advised to report after 1 month, when healing was noted, and the intracanal dressing was replaced. The patient then returned after 1 month and subsequently after 4 months and was asymptomatic, and complete resolution of the periapical lesion in tooth no. 36 was noted. Finally, Metapex was completely removed from the canals, and obturation with gutta-percha by cold lateral condensation technique was done.



Figure 1: Pre-operative image of large periapical lesion involving distal root of 36. Access opening and biomechanical preparation were done & calcium hydroxide

intracanal dressing was given in the first visit.



Figure 2: After 2 weeks, Metapex was placed as intracanal medicament



Figure 3: The patient reported after 1 month, wherein healing was noted, and intracanal dressing was replaced



Figure 4: After 4 Months, tooth was asymptomatic, and complete resolution of the periapical lesion in tooth no. 36 was noted.



Figure 5: Metapex was completely removed from the canals, and obturation with gutta percha followed by cold lateral condensation technique was done.



Figure 6: Follow-up after 12 months

3. Discussion

Necrotic pulp acts as a nidus for microbial growth. These organisms subsequently release toxins into the periapical region that trigger the process of inflammatory reaction and bone resorption [5]. Inflammatory lesions originating from the endodontic region can range in size from 5 to 8 mm in diameter. Lesions with a diameter of up to 10 mm are classified as granulomas, while those exceeding this size are categorized as cysts. Various nonsurgical and surgical techniques can be utilized to treat lesions of endodontic origin. The essential components for achieving a successful result are the cleaning and shaping of the root canal along with the elimination of microbes [6]. In younger patients, surgical options are viewed as more drastic and undesirable compared to nonsurgical endodontic treatments. Additionally, performing a root resection could negatively affect the crown-to-root ratio. These limitations can be addressed through a nonsurgical method that encourages the healing and development of young permanent teeth [7].

Further, the less-invasive nature of such procedure reduces psychological trauma and increases patient compliance. Moreover, in the better-perfused tissue with a greater number of undifferentiated cells and excellent lymphatic drainage, the lesion can be eliminated by capitalising on the removal of the etiological factors by endodontic treatment and greater healing ability of periradicular tissues [6].

Metapex is an intracanal medicament based on calcium hydroxide that is widely utilized in endodontics for its therapeutic benefits. It releases calcium hydroxide, resulting in a high pH environment of approximately 12.5. This alkalinity is harmful to most bacteria, effectively inhibiting their growth and aiding in infection control within the canal. It is especially effective against resistant bacteria such as *Enterococcus faecalis*, which are often associated with persistent endodontic infections [8].

Metapex continuously releases calcium ions that play a vital role in several cellular processes associated with tissue regeneration. These ions stimulate osteoblast activity, promoting the formation of hydroxyapatite, which is essential for tissue repair. Over time, this helps to reduce inflammation and supports healing [9]. Metapex creates an effective seal within the canal, minimizing the risk of microleakage and reinfection. A reliable seal is crucial for safeguarding periapical tissues from external bacterial contamination. Research by Rani et al has demonstrated that Metapex offers superior sealing properties compared to conventional calcium hydroxide pastes [10].

Metapex is formulated to be biocompatible, allowing for positive interactions with surrounding tissues. Its low cytotoxicity ensures that it is a safe option for use as an intracanal medicament [11]. By managing infection and fostering an alkaline environment, Metapex may help decrease the levels of pro-inflammatory cytokines like IL-1 β and TNF- α . Reducing these mediators aids in lowering inflammation and supports the healing process [12].

Therefore, Metapex alleviates inflammation through several mechanisms, including its antibacterial properties, the promotion of an alkaline environment, the continuous release of calcium ions, the reduction of pro-inflammatory mediators, and its biocompatibility. Together, these factors help lower the inflammatory response in periapical tissues, aiding in healing and enhancing outcomes in endodontic treatment.

4. Conclusion

A non-surgical method should always be considered as the primary option prior to opting for surgery, even if it appears to take a bit more time. Frequent replacement of Metapex as an intracanal dressing during root canal therapy has demonstrated significant advantages in the complete healing of the periapical lesion in this instance.

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