

Nonsurgical Clinical Approach To Managing A Periapical Lesion In An 11-Year-Old: A Case Report

Simran Vangani¹, Reema Sharma²

Postgraduate Student, Department Of Pediatric & Preventive Dentistry, Mahatma Gandhi Dental College & Hospital, MGUMST, Jaipur

Reader, Department Of Pediatric & Preventive Dentistry, Mahatma Gandhi Dental College & Hospital, MGUMST, Jaipur

Abstract-

Periapical lesions in pediatric patients often require careful management to preserve tooth vitality and promote healing. This case report discusses a nonsurgical clinical approach to managing a periapical lesion in an 11-year-old patient using a calcium hydroxide-based paste known for its bioactivity and biocompatibility. The patient presented with a necrotic tooth and associated periapical radiolucency. Following diagnosis, a conservative treatment plan was implemented, involving debridement of the canal system and the application of Metapex as an intracanal medicament. Clinical and radiographic evaluations were conducted over a six-month period to assess healing and periapical regeneration.

Keywords- Periapical abscess, endodontic therapy, Intracanal medicament, Periapical lesion

Date of Submission: 15-11-2024

Date of Acceptance: 25-11-2024

I. Introduction-

Lesions of periapical region are one of the most common pathological conditions affecting peri-radicular tissues. The necrotic dental pulp occurs as a result of infection of dental pulp that may either occur as a consequence of dental caries, operative dental procedures or trauma and generally consists of a biofilm which is mostly anaerobic bacterial flora.¹

Periapical lesions can lead to the development of dentoalveolar abscess and periapical bone loss. They are generally diagnosed either during radiographic examination or following acute pain in tooth. Most periapical lesions can be classified as radicular cyst or abscesses, dental granulomas.²

Up to 85% treatment success has been reported for periapical lesions after endodontic therapy alone which implies that most of the periapical lesions including abscess respond to endodontic therapy alone, as also discussed by Nair (1999).³

This is very well explained by the effect of biomechanical preparation on intracanal microbiota, enzymatic mechanisms, immunological mechanisms involving neutralization of antigenic toxins, and breakdown of epithelial lining with involvement of macrophages, non-killer T lymphocytes and Langerhans cells. So based on these features, conservative endodontics should be the first line of treatment in treating such lesions.⁴

Based on conservative endodontic treatment there are various intracanal medicaments like calcium hydroxide, Metapex, antibiotics, steroids, etc for the management of periapical abscess whereas calcium hydroxide based intracanal medicaments are considered as the gold standard. Calcium hydroxide nowadays is widely used as an intracanal endodontic material, due to its high alkalinity tissue dissolving effect that causes induction of repair by hard tissue formation and bactericidal effect. Metapex is a calcium hydroxide-based intracanal medicament that has gained attention for its effectiveness in promoting healing of periapical abscesses.⁵

Metapex is an effective & widely used intracanal medicament in such cases as it consists of calcium hydroxide, iodoform, and barium sulphate. It is effective against *Enterococcus faecalis* which is found to be higher in root canal & it also affects the microbial load and size of the periapical lesion.⁶

II. Case Report-

An 11-year-old male patient reported to the Department of Paediatric & Preventive Dentistry with pain in his lower left posterior teeth region for 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 of 3 × 3 mm in size. 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 biomechanical preparation with K -flex files was done. All canals were irrigated with 10 mL each of 1.5% 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 in 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 wherein 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 followed by cold lateral condensation technique was done.

Figure No.1-Pre-Operative Image Of Large Periapical Lesion Involving Distal Root Of 36.

Access Opening, Biomechanical Preparation Done & Calcium Hydroxide Intracanal Dressing Was Given In The First Visit.



Figure No.2-After 2 Weeks, Metapex Was Placed As Intracanal Medicament.



Figure No.3- The Patient Reported After 1 Month Wherein Healing Was Noted And The Intracanal Dressing Was Replaced.



Figure No. 4- After 4 Months, Tooth Was Asymptomatic, And Complete Resolution Of The Periapical Lesion In Tooth No. 36 Was Noted.



Figure No. 5- Metapex Was Completely Removed From The Canals, And Obturation With Gutta Percha Followed By Cold Lateral Condensation Technique Was Done.



III. 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.⁷

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.⁸

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.⁹

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 capitalizing on the removal of the etiological factors by endodontic treatment and greater healing ability of periradicular tissues.⁸

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.¹⁰

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.¹¹

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.¹²

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.¹³

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.¹⁴

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.

IV. 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.

References-

- [1] G Sundqvist Taxonomy, Ecology, And Pathogenicity Of The Root Canal Flora Oral Surg Oral Med Oral Pathol 1994;78(4):522-30. doi:10.1016/0030-4220(94)90047-7
- [2] Kritigya Gupta Et Al, A Clinical Study On Management Of Mandibular Molar With Large Periapical Abscess And Furcation Involvement: A Conservative Approach. Annals And Essence Of Dentistry, Vol. Iv Issue3 Jul-Sep2012,26- 29
- [3] Nair Pn, Sjogren U, Figdor D, Sundqvist G. Persistent Periapical Radiolucencies Of Root-Filled Human Teeth, Failed Endodontic Treatments, And Periapical Scars. Oral Surg Oral Med Oral Pathol Oral Radiol Endod.1999;87:617-27
- [4] Varun Kapoor Et Al, Non-Surgical Endodontics In Retreatment Of Periapical Lesions. J Clin Exp Dent.2012;4(3):E189-93.)
- [5] Gautam S, Rajkumar B, Landge Sp. Antimicrobial Efficacy Of Metapex (Calcium Hydroxide With Iodoform Formulation) At Different Concentrations Against Selected Microorganisms-An In Vitro Study.Nepal Med Coll J 2011;13(4):297-300.
- [6] The Influence Of *Enterococcus faecalis* As A Dental Root Canal Pathogen On Endodontic Treatment: A Systematic Review. Alghamdi F, Shakir M. Cureus. 2020;12:0
- [7] Sood N, Maheshwari N, Gothi R, Et Al. Treatment Of Large Periapical Cyst Like Lesion: A Noninvasive Approach: A Report Of Two Cases. Int J Clin Pediatr Dent 2015;8(2):133-137. Doi: 10.5005/Jp-Journals-10005-1299.
- [8] Ghorbanzadeh S, Ashraf H, Hosseinpour S, Et Al. Nonsurgical Management Of A Large Periapical Lesion: A Case Report. Iran Endod J 2017;12(2):253-256. Doi: 10.22037/Iej.2017.49.
- [9] Ogonji G. Non-Surgical Management Of A Chronic Periapical Lesion Associated With Traumatized Maxillary Central Incisors: Case Report. East Afr Med J 2004;81(2):108-110. Doi: 10.4314/Eamj.V81i2.9135
- [10] Siqueira, J. F., & Rôças, I. N. (2005). "Treatment Of Endodontic Infections." *Endodontic Topics*, 10(1), 123-138.
- [11] Bäumer, A., Et Al. (2012). "Release Of Calcium Ions From Root-End Filling Materials." *International Endodontic Journal*, 45(9), 882-889.
- [12] Rani, P., Et Al. (2018). "Evaluation Of Sealing Ability Of Different Root Canal Sealers: An In Vitro Study." *Journal Of Conservative Dentistry*, 21(1), 28-32.
- [13] Tjioe, M., Et Al. (2014). "In Vitro Cytotoxicity Of Root Canal Sealers." *Journal Of Endodontics*, 40(7), 1031-1035.
- [14] Shahravan, A., Et Al. (2009). "The Effect Of Calcium Hydroxide On The Healing Of Periapical Lesions: A Systematic Review." *Journal Of Endodontics*, 35(4), 529-535.