

Non-Surgical Management Of A Large Periapical Lesion In Mandibular First Molar: A Case Report

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Abstract:

Periapical lesions develop as a sequelae to pulpal diseases and usually develop in non-vital teeth as a result of chronic aggression by the pathogenic microorganisms into the root canal which may appear as radiolucent in periapical radiographs. Treatment of such lesions usually varies from non-surgical and surgical means depending on the individual. In the era of minimally invasive, dentistry, non-surgical endodontic approach has been highly recommended in the periapical healing. The success of root canal treatment is based on thorough cleaning, shaping and obturation of the root canal system and placement of an effective intracanal medicament. The present case highlights the use of calcium hydroxide as an interappointment endodontic dressing for non-surgical management of large periapical radiolucency in mandibular molar, which resulted in favourable clinical and radiographic outcomes.

Keywords: non vital, periapical lesion, intracanal medicament, calcium hydroxide, non surgical.

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I. Introduction

Elimination of the microorganisms, in the case of large periapical lesions, has been a challenge for the clinician. The polymicrobial infection makes sterilization of the root canal system difficult. It results in failure of root canal treatment as the canal has not been adequately cleaned off intraradicular burden, thus leads to persistent infections.¹ According to in vivo and in vitro studies, the use of antimicrobial medicaments in combination with mechanical cleansing enhances the success of treatment in the achievement of sterilization and healing of infected root dentin.²

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 and trauma and consists of a biofilm which is mostly anaerobic bacterial flora.³ These can cause pulpal necrosis often which stimulate an immune response in the periapical region leading to a periapical lesion. The periapical lesions are mostly classified as periapical cyst or granuloma or abscess.⁴

The Root canal therapy may be needed for eliminating the microbial flora and also to prevent the further spread of the infection.⁵ However, the primary aim has to be making the patient painless and proceeding towards a conservative approach.⁶

Many ways of non-surgical methods of managing a periapical lesion which mainly include Ortho grade root canal therapy, decompression therapy, using calcium hydroxide as intracanal dressing, aspiration - irrigation technique, lesion sterilization and repair therapy, active non-surgical decompression technique and apexum procedure.

If the host immune response is not efficient, it does not prevent spreading of the infection in root canal.⁷ In these cases, the primary aim will be eliminating bacteria completely at the time of obturation for higher success rate and providing calcium hydroxide or metapex or any other intracanal medicament since mechanical instrumentation alone cannot completely eliminate microbes from the root canal.⁸

Calcium hydroxide mixed with inert vehicles or active substances such as chlorhexidine or metapex formulation which said to have a broad spectrum of activity against several endodontic pathogens. Favourable healing outcomes have been achieved with the necrotic teeth with apical periodontitis using calcium hydroxide or chlorhexidine or metapex as intracanal medicaments. Orthograde treatment of cyst like relations should aim at overcoming persistent intracanal infection. Recently the use of triple antibiotic paste, double antibiotic paste has also gained its interest as effective intracanal medicaments. So the use of efficient intracanal medicament is important for the successful endodontic outcome.

II. Case Report

A 28 year old female, reported to the out patient department with history of pain in the lower left back tooth since one week. Patient gave history of filling done on the same tooth few months back from an outside clinic. On clinical examination the mandibular left first molar tooth was restored with composite. The tooth was tender on percussion. Vitality test was done using electric pulp tester and cold test which revealed no response irt 36. RVG (radiovisuography) irt 36 showed deep restoration involving pulp; large periapical radiolucency was present in the mesial root (Figure 1). The tooth was diagnosed as pulp necrosis; symptomatic apical periodontitis according to diagnostic terminology approved by American Association of Endodontists and the American board of Endodontics. Non-surgical endodontic treatment was planned irt 36 followed by regular check up to assess the healing of periapical lesion.

Local anesthesia was administered and rubber dam was placed. The restoration was removed and the access cavity was prepared with round bur and Endo Z bur. The location of orifices were confirmed using an endodontic explorer [DG16, Hu-Friedy, Chicago]. Canals were negotiated using #08 and #10 size K-files. The working lengths were determined electronically with Propex II (Dentsply/Maillefer, Switzerland) apex locator. The readings of the apex locator were verified radiographically (Figure 2). Pulp space preparation was done using rotary Ni-Ti files [ProTaper, Dentsply-Maillefer] along with copious irrigation using 2.5% sodium hypochlorite solution and 17% EDTA solution. Calcium hydroxide was used as intracanal medicament for canal disinfection in the first appointment. The patient was asked to report back after one month. On the second visit, the patient as asymptomatic. RVG was taken irt 36 which showed signs of periapical healing when compared to the previous RVG (Figure 3). The canals were irrigated and calcium hydroxide intracanal medicament was repeated in the second visit to achieve a better and satisfactory periapical healing. The patient was recalled after a month. On the third visit, radiograph showed complete evidence of bone healing and the tooth was non tender on percussion. Gutta-percha master cones [ProTaper, Dentsply Maillefer] were selected (Figure 4) and obturation was completed with AH Plus sealer (Dentsply, Maillefer, Ballaigues, Switzerland) (Figure 5). After a month, the patient was advised for review and full coverage crown.



Figure 1: Pre-Operative RVG



Figure 2: Working Length Determination



Figure 3: Review After 1 Month

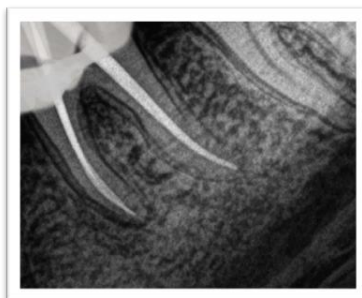


Figure 4: Master Cone

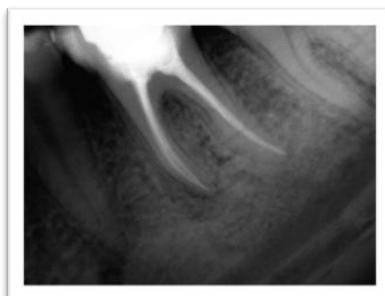


Figure 5: Post Obturation

III. Discussion

Most periapical lesions (>90%) can be classified as dental granulomas, radicular cysts or abscesses. The incidence of cysts within periapical lesions varies between 6% and 55%.⁹ There is clinical evidence that as the periapical lesions increase in size, the proportion of radicular cysts increases. However, some large lesions have been shown to be granulomas.¹⁰ The definitive diagnosis of a cyst can be made only by histological analysis.

The progression of endodontically induced periapical lesions is clearly associated with the presence of microorganisms in the root canal system. There are surgical and non-surgical methods to treat such cases. Non-surgical root canal therapy is the treatment of choice in managing teeth with large periapical lesions.¹¹ When this treatment does not succeed in resolving the periradicular pathosis, additional options must be considered, such as non-surgical retreatment or periapical surgery. The success of the non-surgical endodontic treatment is based on appropriate cleaning, shaping, asepsis and filling of the root canal. A thorough instrumentation with copious irrigation is the foundation stone of a successful root canal treatment. Although instrumentation and irrigation reduce bacterial count, an agent with bactericidal action is still needed to ensure optimum disinfection.¹² Researchers have suggested extending root canal instruments beyond the apical foramen for drainage and relieving pressure. Irrigation with NaOCl and adequate biomechanical preparation are recommended for successful root canal treatment, followed by intracanal medication. Calcium hydroxide is the most commonly used medicament for the asepsis of the root canal due to its high alkalinity and antibacterial activity.¹³

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. So, all inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures.¹¹

Various non-surgical methods have been used to treat periapical lesions. Toller proposed that the growth of the cyst may be attributable to the increased hydrostatic pressure of the confined fluid, which causes additional osteoclastic activity.¹⁴ The decompression technique and aspiration- irrigation technique aid in decreasing the hydrostatic pressure resulting in shrinkage of the lesion. The decompression technique involves placement of tubing to maintain drainage.¹⁵ However, several disadvantages such as inflammation of alveolar mucosa, persistence of a surgical defect at the site, development of acute or chronic infection of the lesion, submergence of the tube and patient cooperation limit the use of this technique.¹⁶

The aspiration- irrigation technique involves aspirating the fluid using a wide gauge needle attached to a syringe. The needle penetrates the lesion through the buccal mucosa, creating a buccal wound, and exits through the palatal mucosa creating a palatal wound that later act as a pathway for the escape of the irrigant. A disadvantage of this technique is the creation of the buccal and palatal wounds, which result in inflammation of

the alveolar mucosa and cause discomfort.¹⁷ Calcium hydroxide nowadays is widely used as an intracanal endodontic material, due to its high alkalinity, tissue dissolving effect, causes induction of repair by hard tissue formation and bactericidal effect. 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.¹⁸

In the presence of large periapical lesion such as in this case report, 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. Significant bone formation was seen at the periapical region on periodic check up visits. Thus non surgical healing of the periapical lesion provided favourable clinical and radiographic response. 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.¹⁹

Non-surgical management of periapical lesions is preferred in comparison to surgical methods and should be considered. Possible damage to the adjacent vital teeth, damage to the anatomic structures in the vicinity of the lesion and pain and discomfort associated with surgical procedures can be eliminated by non-surgical methods. Patient acceptance and apprehension towards the surgical procedure, age and medical conditions, which limit surgical procedures, are also factors that favour non-surgical approach. Surgical procedures should be considered only when conventional root canal methods fail.²⁰

IV. Conclusion

The advantage of performing non-surgical endodontic treatment with large periapical radiolucency is that it causes less psychological trauma and adds more comfort to the patient. The large periapical lesion in this case has completely resolved. The periapical tissues is said to have the regenerative potential, so the treatment should always directed towards the removal of the causative factor alone. A non-surgical approach should always be a first option before attempting a surgery although it seems to be little time consuming. Regular change of the intracanal dressing and root canal therapy has proven to be very beneficial in complete healing of the periapical lesion in this case.

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