



Management of Extensive Periapical Lesion in Mandibular First Molar with Nonsurgical Endodontic Treatment- A Case Report

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Abstract

Periapical lesions develop as a sequelae to pulp disease. They are often associated without any acute pain or discomfort and are commonly discovered on routine radiographic examination. Incidence of cyst within periapical lesion varies between 6 and 55% and occurrence of periapical granulomas ranges between 9.3 and 87.1%. The occurrence of abscesses is noted between 28.7 and 70.07%. It is recommended that all inflammatory periapical lesions should be treated initially with a conservative nonsurgical approach. This article presents a case report where an extensive inflammatory periapical lesion is treated by nonsurgical conservative therapy of a mandibular first molar. Even though the presence of large periapical changes in the bone, it was chosen not to perform a surgical procedure and to treat with conservative root canal treatment to decompress the lesion through the root canal. The 12-month observation period showed satisfactory healing of the periapical lesion.

Keywords: Nonsurgical Management; Periapical Lesion; Root Canal Treatment; Mandibular First Molar

Introduction

Pulp tissue is protected by surrounding enamel, dentin, and cementum. Significant injury of the pulp chamber can contribute towards inflammation and may result in pulp necrosis if left untreated [1]. These inflammatory changes can be acute, chronic, or chronic exacerbation of an acute condition. Many scenarios can lead to periapical radiolucencies initiated either by trauma, caries, or tooth wear [2]. If a tooth dies and proper root canal treatment is not implemented promptly, the tissue surrounding the tooth becomes inflamed, which might remain asymptomatic for many years or exhibit itself as pain, swelling, and fistula. Invasion of microorganisms and their products in pulp tissue have a vital role in the initiation, progression, and establishment of these periapical pathologies [1,2]. Teeth with improper previous root canal treatments and asymptomatic periapical lesions usually harbour obligate anaerobic microorganisms. In some cases, periapical pathologies can only become evident either during routine dental radiographic examination or following severe toothache [3].

Treatment options for periapical lesions include nonsurgical root canal therapy, periapical surgery, and extraction. Initially, a nonsurgical approach should be considered to control a large periapical lesion before commencement of apical surgery. Even some authors have reported that up to 85% of treatments can be achieved suc-

cessfully for periapical infection after endodontic therapy alone. When such nonsurgical therapy does not successfully resolve the periradicular lesion, then additional treatment options, such as curettage, apical resection, marsupialization, and tube decompression, should be taken into consideration [3,4]. The goal behind nonsurgical endodontic treatment is to concentrate on the included teeth to return them to a condition of wellbeing and their capacity [5]. This case report describes the nonsurgical management of a large periapical lesion affecting the permanent lower right first mandibular molar.

Case Report

A 32-year-old female without any history of systemic disease reported with a mild pain in the lower right mandibular region which is persistent from the last 15 days. On taking case history, she hasn't had any traumatic injury prior. On clinical examination, tooth no. #46 was sensitive to percussion with evidence of slight discoloration and without any swelling or redness in the vestibule mucosa. Intraoral periapical radiograph revealed proximal caries with tooth no. #46 extending into the pulp chamber along with a large radiolucent lesion approximately 14-15 mm in diameter, apparently involving the apices of the tooth (Figure 1). Under patient's consent, endodontic treatment started with administration of 1 ml local anaesthesia containing 40 mg articaine hydrochloride and 0.005 mg epineph-

rine (Septanest, Septodont). Access cavity preparation was done Followed by working length determination, cleaning and shaping of the tooth no.#46 performed with hand k-files (Dentsply, Mailefer, USA) and RaCe NiTi rotary files in crown down manner up to final canal size #0.06/25 in distal canals and #0.06/20 in mesial canals. The canals were irrigated with 2.5% NaOCl, 2% CHX, and 17% EDTA at the end of instrumentation. Intracanal medication (calcium hydroxide paste) was applied (Figure 2). Access cavity was closed with a cotton pellet and a temporary cement Cavit (3M ESPE). Some of the calcium hydroxide extruded beyond the apex of the tooth which had undergone resorption itself with time. Patient was scheduled for next visit after 1 week. A week later, patient was asymptomatic and received a fresh dressing of calcium hydroxide, following irrigation and drying of the canals. The same procedure was repeated again after 2 weeks and after 4 weeks.

In the next session after 4 weeks it was observed that the tooth was completely asymptomatic during the postoperative period and the temporary filling was intact. After administration of local anesthesia, temporary cement and cotton pellet was removed from access cavity. A copious amount of 2.5% sodium hypochlorite ultrasound activated irrigation with negative apical pressure by using EndoVac system used to remove CH paste from the canal. A final rinse of 17% EDTA for 1 minute was performed. Canal was dried using a paper point and obturated with appropriate Gutta-percha mastercones (Figure 3) and DIA-ROOT BIO (DiaDent) bioceramic sealer (Figure 4). The tooth was restored with Glass ionomer cement and advised to wait for 1 month for full coverage restoration. Further follow-up radiographs were taken at 1 month (Figure 5) and 12 months (Figure 6) as patient missed her follow up visit at 6 months.



Figure 1: Preoperative intraoral periapical radiograph



Figure 2: Intracanal dressing with calcium hydroxide.



Figure 3: Gutta percha Master cone.



Figure 4: Immediate postoperative obturation radiograph.



Figure 5: 1 month follow up.



Figure 6: Months follow up.

Discussion

Periapical or periradicular lesions are barriers that restrict the microorganisms and their product to prevent their spread into the surrounding tissues; microorganisms induce the periradicular lesions that may be primary or secondary. The bone is resorbed, followed by substitution by a granulomatous tissue and a dense wall of polymorphonuclear leukocytes infiltration. Such lesions can be detected radiographically only when the surrounding alveolar bone loss has been accompanied by cortical bone involvement during lesion development. Because of this early-stage lesions may not be detected on radiograph in most of the asymptomatic cases [1,4]. During root canal treatment complete disinfection by instrumentation alone is impossible. For this reason, proper irrigation and intracanal medication protocol should be followed to achieve complete three-dimensional cleaning and disinfection. To reduce the microbial load, meticulous debridement using irrigant such as sodium hypochlorite, 2% CHX as an irrigant and calcium hydroxide as an intra-canal medicament is used in this case [6]. Calcium hydroxide helps in the management of external root resorption due to its high alkalinity which increases the pH of dentin by the diffusion of hydroxyl ions through dentinal tubules. Also, conventionally it is recommended to use calcium hydroxide in long term to achieve proper disinfection and hard tissue formation in open apex cases [7]. It is also believed that calcium hydroxide has a direct effect on inflamed tissues and epithelial cystic linings and it finally results in periapical healing and repair of the bone tissue. In this case report multiple calcium hydroxide dressings were applied and it was noted that the lesion started showing shrinkage on radiograph. So, it can be concluded that calcium hydroxide medicament contributed effectively in healing of periapical lesion in this case. But, it is important to observe and monitor periapical lesions over a period of time following the non-surgical therapy before the surgery is considered [8]. Nicholls recommended surgical intervention only to consider after nonsurgical techniques have failed, or the patient will be lost to follow-up before complete healing [9]. Discussed by Nair in 1999 where they 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

cell, based on these findings it can be concluded that conservative endodontics should be the first line of treatment [10-12].

Conclusion

The present case study thus effectively managed large periapical lesion surrounding mandibular first molar using nonsurgical endodontic therapy. Periapical lesions treated non-surgically have shown high success rate in most of the cases. Hence, this report confirms that the size of periapical lesion is not a major factor in determining the conventional root canal treatment. clinical examination between sessions and periodic radiographic follow-up is very important in terms of healing the periapical lesion. 12 months follow up radiograph of this case shows satisfactory results in terms of healing the periapical lesion.

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