

Management Endodontic of Mandibular Molar with Periapical Lesion in Orthodontic Patient

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Abstract

Background: Management Endodontic with lesion periapical on teeth that will be used as anchorage must be able to remove lesion therefore periodontal tissue and alveolar bone are strong enough to withstand the pulling force of teeth from orthodontic appliance.

Aim: To describe case which manage periapical lesion in ortodontic patient by anchorage.

Case Report. A 25- year-old women patient referred from Orthodontic department for root canal treatment. Patient came with a chronic painless swelling in mandibullary posterior gingivae parallel with apical teeth # 36, the patient had a tooth filling in 2017 with resin composite, initially there was a dull pain in tooth but after taking medicine dull pain disappeared until now it never hurts again.. The Clinical examination in Teeth 36 has composite restoration in occlusal with test percussion positive, test thermal negative. The radiodraph releaved radiolusency in periapical. The diagnosis of this case was necrosis pulp in teeth # 36. The treatment planning was root canal treatment and direct onlay composite restoration. The root canal is prepared using reciproc blue and applied Calsium hydroxide in root canal medicament. Next appointment Obturation and Onlay direct preparation.

Conclusion. Evaluate normalize periodontal tissue and structure in 3 to 4 months. The anchorage requirement depend on teeth with decreased bone support or periodontally compromised teeth are easier to move as compared to healthy teeth attached to a strong periodontium.

Keywords: Periapical lesion, Endodontic-Ortodontic consideration, Anchorage

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I. Introduction

Pulpal tissue infection can occur as a result of many factors like caries or trauma which causes tissue necrosis. Periapical tissue eradication develops in response to microbial assumption and their by-products that infiltrate the periradicular tissues and activate the host's immune reaction. Incidences of radicular cysts in these lesions have been reported to be in the range of 6 to 55%. Moreover, the prevalence of periapical granuloma varies from 9.3 to 87.1%, and periapical abscess from 28.7 to 70.7%. It seems that when the radiographic size of the lesion becomes larger than 200 mm², the occurrence of the cysts is more than 92%.¹ The prevalence of fused-rooted mandibular molars varies in previous studies between 0.4% and 32.1%.²

Periapical or periradicular lesions are barriers that restrict the microorganisms and prevent their spread into the surrounding tissues; microorganisms induce the PA lesions, primarily or secondarily. The bone is resorbed, followed by substitution by a granulomatous tissue and a dense wall of polymorphonuclear leukocytes (PMN). Less commonly, there is an epithelial plug at the apical foramen to block the penetration of microorganisms into the extra-radicular tissues. Only a limited number of endodontic pathogens can penetrate through these barriers; however, microbial products and toxins are capable of penetrating these barriers to initiate and establish periradicular pathosis. Periapical radiolucencies are the most frequent clinical signs of these lesions.³

Treatment approaches to handle large periapical lesions range from non-surgical endodontic therapy with or without endodontic surgery to tooth extraction. Microbial elimination or minimization from the pulp system using efficient chemo mechanical preparation can lead to a successful treatment.¹

II. Case Report

Patients, 25 years old referred from Orthodontic department for root canal treatment. Patient came with chronic painless swelling in mandibullary posterior gingivae parallel with apical teeth # 36, the patient have done tooth filling in 2017 with resin composite, initially there was a dull pain in tooth but after taking medicine dull pain disappeared until now it never hurts again. Teeth will be used as anchorage. Clinical Examination found teeth # 36 composite restoration in occlusal. Test percussion found to be positive but test thermal negative. Pre-operative dental panoramic radiograph (DPR) examination found teeh # 36 Apical radiolucency. Patients diagnosed with necrosis pulp, chronic apical abscess then patients was planned for root canal treatment + direct onlay composite restoration.



Figure 1. Patient teeth condition.

Treatment begins with informed consent, anasthesi local and access opening. Furthermore, the root canal is prepared using reciproc blue and applied Calsium hydroxide in root canal medicament. Next appointment Obturation and Onlay direct preparation.

- Informed consent → Anast → Isolation → Access opening #36 → Canal negotiation with Kfile # 10 → Working length with apex locator → Chemomechanical preparation # 25/0.8 (reciproc blue) irrigation + Agitasi Sonic + salin + EDTA 17 % → CaOH → Cavit



Figure 2. First step treatment

- Remove CaOH → Cleaning + Sonic agitation → Cone Fitting → Irrigation + dry Canals → Obturation : Single Cone → Orifice barrier → Cavit



Figure 3. Second step treatment

- Onlay direct Preparation → Etch → Bonding → Composit restoration with fibre – reinforced → Occlusion Check.



Figure 4. Three step treatment

Control After 3 Month with IOPA (Intra Oral Periapical) Radiograph shows absense of radiolucency in periapical tissue.

III. Discussion

The dental pulp is a sterile connective tissue protected by enamel, dentin, and cementum. Significant injury of the pulp chamber leads to inflammation and may result in pulp necrosis if left untreated. Possible scenarios that can result in periapical radiolucencies are commonly initiated either by trauma, caries, or tooth wear. Pulp disease and bacterial infection of the pulp space, result in periapical lesions. The root canal walls, however, hold biofilms and bacterial aggregates forming concentrated bacterial centers. Dentinal tubules and root canal complexities are the seat of infections. These infections can be treated using endodontic procedures or extraction. The goal in endodontic treatments is preserving a healthy functional tooth without a surgical treatment.⁴

Apical periodontitis encompasses the spectrum of periapical cysts, granulomas, and abscesses. The majority of these lesions are secondary to underlying dental carries with a predictable course. Apical periodontitis/abscess usually starts as a carious tooth that eventually involves the central pulp. The infection then progresses into periapical abscess. If left untreated, osteomyelitis then develops with marrow space extension and, eventually, cortical destruction. Other causes of periodontitis include trauma, postsurgical, and rarely hematogenous spread.²

Any opening from the root canal system (RCS) to the periodontal ligament space should be thought of as a portal of exit through which potential endodontic breakdown products may pass. Consequently, the microbial aggregation or its by-products can infiltrate into periradicular tissues and stimulate the host defense system, resulting in periapical/ periradicular tissue destruction and results in various types of lesions. Periapical lesions classified into 5 main groups: Acute apical periodontitis, chronic apical periodontitis, condensing osteitis, acute apical abscess and chronic apical abscess.⁵

The majority of periradicular lesions can be categorized as dental granulomas, periradicular cysts, or abscesses, which are radiolucent. Condensing osteitis is another entity caused by chronically inflamed pulp tissue with subsequent chronic apical periodontitis with a distinct radiographic appearance. The periradicular bone seems more radiopaque than healthy bone with occasional PDL widening.³

The treatment modalities for periapical lesions include non-surgical root canal treatment, periapical surgery, or tooth extraction.³ The benefits of less invasive nonsurgical treatment of extensive periapical lesions includes minimum psychological trauma and is more acceptable for patients. It seems that the periapical lesion was completely resolved due to rich blood supply, ample undifferentiated cells, and drainage through the lymphatic system.¹

Because, endodontic treatment can approach 100% success discounting teeth that are nonrestorable, have hopeless periodontal disease. The goals of nonsurgical retreatment are to remove materials from the root canal space and if present, address deficiencies or repair defects that are pathologic or iatrogenic in origin. Nonsurgical endodontic retreatment procedures have enormous potential for success endodontic treatments.⁵

If non-surgical treatment is deemed ineffective or difficult, periapical surgery is the treatment of choice. True cysts are closed pathologic entities that are separate from the apex and have an intact epithelial lining and might have a cord of epithelium that attaches them to the root apex.³ The insertion of dental implants on the same day of tooth extraction, termed immediate implant placement (IIP), is a popular surgical procedure. Survival rates range from 94.9% to 98.4%, and success rates range from 97.8% to 100%. Lin et al. showed that the risk of inferior alveolar nerve injury was 3.8-fold higher in the mandibular second molar than the mandibular second premolar. The reported risk of lingual plate perforation was also very high: 70% in first molars and 76%

in second molars. One study reported lingual plate perforation with severe hemorrhage in the floor of the mouth in 21/25 patients (84%) undergoing IIP, leading to emergency intubation in 17.⁶

Treatment modality	Pros	Cons	Success rate
Root canal treatment (RCT)	High success rate Effective on IR infections	Not effective against ER infections	85-94%
Antimicrobial endodontic therapy	Effective on IR infections	Chance of hypersensitivity	These are used in combination with other techniques
Overinstrumentation	Providing drainage through the canal	Risk of transporting the microorganisms beyond the apical foramen	
Apexum	Effective against granulomas and cysts	Needs access through root canal space	
GentleWave	Superior tissue dissolution ability Greater ability to remove residual debris	Costly Not available worldwide	
Nonsurgical retreatment	Effective against IR infection	Lower success rate compared with RCT Costly in case of any needs for sacrificing previous restorations	74-82%
Periapical Surgery	Effective against ER infection	Risk of damage to surrounding tissues Patient discomfort	60-91%
Marsupialization, decompression, and enucleation	Management of large cyst	Time consuming Need patient cooperation	Not available

Figure 5. Positive and negative aspects of different treatment modalities.¹

Anchorage control is important in the treatment of these patients because lingual tipping of the mandibular incisors must be prevented while protracting the second molars. Recently, titanium screws have become popular for absolute anchorage during various types of tooth movement because they are more convenient than dental implants. Titanium screw anchorage is an effective means for protracting the mandibular second molars into the first molar extraction sites. Periodontal and radiographic examinations of the second molars showed minimal root resorption with no evidence of fenestration or dehiscence.⁷

In the mandible, the space between the 2nd premolar and 1st molar is the preferred site for anterior tooth retraction, and the space between the canine and 1st premolar or between the 1st premolar and 2nd premolar is often used for the mesial movement of molars. In addition, the mandibular buccal and lingual molar areas can be used for an temporary anchorage devices (TAD) to intrude the molars. The mandibular molar area is often preferred for placement of TADs, along with the maxillary midpalatal suture, palatal, and maxillary buccal areas. Therefore, determination of the cortical bone thickness of the mandibular molar region will be helpful for the selection of TAD placement sites.⁸

Large periapical lesions can heal after successful endodontic treatment without surgical intervention. The number of dressings with Ca(OH)₂ until the completion of treatment, clinical examination between sessions and periodic radiographic follow-up is very important in terms of heal the periapical lesion. Calcium hydroxide is the preferred intracanal medicament due to its beneficial effects because, 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. conventional endodontic therapy in combination with calcium hydroxide as an intracanal medicament contributed effectively in healing of periapical lesions.⁵

Conservative nonsurgical techniques should be the considered treatment of all inflammatory periapical (e.g. orthograde root canal therapy). Only after failing of nonsurgical procedures, surgical intervention is suggested. Moreover, surgery has limited use in the treatment of periapical lesions due to its many disadvantages. Treating teeth with periapical lesions following an endodontic procedure, has been reported to have a success rate of 85%. Both complete and partial healing of periapical lesions after nonsurgical endodontic therapy has an incidence of 94.4%.⁴

IV. Conclusion

Evaluate normalize periodontal tissue and structure in 3 to 4 months. The anchorage requirement depend on teeth with decreased bone support or periodontally compromised teeth are easier to move as compared to healthy teeth attached to a strong periodontium.

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