Nonsurgical Management of Periapical Lesions of Mandibular First Molar - Case Report

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INTRODUCTION

Periapical lesions develop from non-vital teeth. In teeth with non-hermetic root canal filling, the presence of microleakage bacteria will invade the root canal and reach the periradicular area and cause inflammation so that it develops into periapical lesions as a form of failure of root canal treatment. Periapical lesions should be treated with a non-surgical endodontic procedure with a fair success rate. The purpose of this case report was to evaluate conventional endodontics as nonsurgical management of teeth with a periapical lesion in previously treated teeth.

Case: A 25-year-old female patient came to a private practice with a complaint of cavity in her lower left molar. One month ago, she had a throbbing tooth pain for which she took analgesic medication. The tooth was treated by root canal treatment about 6 years ago. The patient had no history of systemic disease.

Case Management: Occlusal Adjustment, non-vital root canal treatment, the core build-up (fibre reinforced composite) and full coverage direct composite restoration.

Conclusion: Adequate root canal treatment affects the success of endodontic treatment, in this case, there was very good progress in healing of the periapical lesion.

Periapical lesions develop from non-vital teeth. In teeth with non-hermetic root canal filling, the presence of microleakage bacteria will invade the root canal and reach the periradicular area and cause inflammation so that it develops into periapical lesions as a form of failure of root canal treatment. Periapical tissue develops in response to microbial assumption and their by-products that infiltrate the periradicular tissues and activate the host’s immune reaction. A dynamic encounter between the host’s immune response and microbial infective factors at the interface of the periodontal membrane and infected pulpal tissue results in various periapical lesions.[1,2,3]

Periapical lesions should be treated with a non-surgical endodontic procedure with a fair success rate. Microbial elimination or minimization from the pulp system using efficient chemo mechanical preparation can lead to a successful treatment.[1,4,5] The aim of this case report is to evaluate conventional endodontics as non-surgical management of teeth with a periapical lesion.
Case Report

A 25-year-old female patient came to the Department of Conservative Dentistry at the University of North Sumatera, Indonesia with a complaint that she wanted to treat the cavity in her left lower molar (figure 1). A month ago, she had a throbbing tooth pain, so the patient took analgesic drugs. The tooth was root canal treated about 6 years ago. The patient had no history of systemic disease.

Teeth 36 according to Mount and Hume classification site 1 size 3, no pain on percussion, palpation and no mobility. Probing the depth of side disto labio mesial 1-1, 5-1 and side mesio oral distal 1-1, 5-1, no pain on bite test. Radiographic examination showed radiolucency in the periapical area of the mesiobuccal and distal root of about 4-5 mm, furcal lesion, orifice had been opened and non-hermetic obturation (figure 2) was done. Tooth 36 was diagnosed as previously treated teeth with asymptomatic apical periodontitis.

The treatment plan that was carried out on tooth 36 was an occlusal adjustment and nonsurgical retreatment, a core build-up with fibre reinforced composite and full coverage direct composite restoration.

The patient had problems after 2 weeks because he had gone out of town. At the second appointment four months later, the patient had no complaints of pain. Clinical examination showed that temporary restorative material was in good condition in relation to tooth 36 and there were no complaints, no pain on percussion. Rubber dam was placed, open temporary restoration, irrigation with 5.25% NaOCl, sonic activation (Eddy) 20-30 seconds, saline, 17% EDTA, then saline and dried with paper points. MAC mesial: # 40/19 mm, lingual: # 40/19 mm, distal: # 50/19 mm (reciproc blue gutta percha), confirmed with radiography (figure 5a). Obturation of the root canal done using a single cone technique with bioceramic sealer (Cereseal) and confirmed with radiography (figure 5b). Application of orifice barrier with RMGIC (GC) and covered with a temporary restoration.

Case Management

In the first appointment, informed consent was taken and occlusal adjustment with the reduced occlusal surface area was made and then tooth 36 was isolated using a rubber dam. 2% scandonest anaesthetic was given. Rubber dam placement and preparation of access cavity with endo access bur and cleaning of carious tissue with round bur were done. (figure 3). The gutta-percha was removed by using eucalyptus oil in the orifice, and then the gutta-percha in the root canal was loosened with an ultrasonic tip ESD DTE and then removed with a reciproc blue file #25 and confirmed with radiography (figure 4). Apical patency was maintained by file #10. Working length measurement: mesiobuccal # 25/19 mm, lingual # 25/19 mm, Distal # 40/19 mm (VDW) with apex locator (VDW Gold), irrigation with NaOCl 5.25%. Preparation was done with the crown down technique with blue reciprocity. MAF blue R reciproc file mesial: # 25/20 mm, lingual: # 25/19 mm, distal: # 25/19 mm. Irrigation with 5.25% NaOCl, sonic activation (Eddy) 20-30 seconds, saline, 17% EDTA, then saline. Dry the root canal with paper points. Dressing with calcium hydroxide. Cover with a temporary patch and instruct the patient to return after 2 weeks.

On third appointment, obturation control tooth 36, the patient had no pain on percussion, on palpation and no complaint. Rubber dam placement, removal of temporary restoration, core build-up with fibre reinforced composite (EverX Posterior) and full coverage direct composite restoration (Palifique A3). The rubber dam was removed and checked for the occlusion and polishing was done.
Histologically, apical periodontitis lesions consist of granulomatous tissue which includes mast cells, macrophages, neutrophils, lymphocytes, plasma cells, and polymorphonuclear leukocytes (PMNs).

Adequate conventional endodontic treatment is determined by several things that are incorporated in the endodontic triad, cleaning of necrotic tissue and bacteria from the root canal that irritates the periapical area, application of medicament materials to the root canal, hermetic obturation and good final restoration. Removal of necrotic tissue in the root canal will stimulate regeneration.\(^{[1,6,7,8]}\)

Evaluation of periapical lesion healing and periradicular tissue repair involves the regeneration of bone, periodontal ligament, and cementum. The area of mineral loss gradually fills with bone and the radiographic density increases. Various authors have stressed the importance of a long observation time for treated teeth with periapical lesions.\(^{[9,10]}\)

In this case, dental treatment on 36 was carried out with the endodontic triad concept, cleaning of necrotic tissue and bacteria from the root canal with adequate chemomechanical preparation, and adequate sterilization by administering calcium hydroxide medication in the root canal and hermetic filling of the root canal with bioceramic sealer were done.

Calcium hydroxide is a widely used material in endodontic treatment because of its bactericidal effects. It is thought to create favourable conditions for periapical repair and stimulate hard tissue formation. Souza et al. suggested that the actions of calcium hydroxide beyond the apex are: (a) anti-inflammatory activity, (b) neutralization of acid products, (c) activation of the alkaline phosphatase, and (d) antibacterial action.\(^{[1,6]}\)

In agreement with these studies, periapical bone healing occurred after four months of the endodontic treatment in this case. Radiographic evaluation demonstrated bone regeneration according to increasing density and trabecular reconstruction.

The prognosis of tooth 36 was assessed based on preoperative, intraoperative, and postoperative factors. Preoperative factors: diagnosis of pulp was previously treated teeth, the periodontal diagnosis was asymptomatic apical periodontitis, the periapical lesion was found to be about 4-5 mm, previous root canal treatment was inadequate, and the patient had no systemic disease. Intraoperative factors: good instrumentation with a good cleaning and shaping with adequate root canal preparation and irrigation techniques, obturation using a bioceramic sealer which has advantages in terms of antibacterial, biocompatibility, remineralization, and good adhesion to the root canal. Postoperative factors: restoration with core and cuspal coverage restoration with direct composite both in terms of aesthetics and biomechanics. Based on these assessment criteria, the prognosis is favourable.\(^{[9,10]}\)

Management with nonsurgical endodontics in cases of periapical lesions has shown a high success rate. Non-surgical treatment should always come first before surgery. The use of calcium hydroxide has proven to be beneficial. Periodic evaluation is essential with clinical and radiographic examination to ensure healing of the periapical lesion. If the nonsurgical treatment shows no improvement and fails, endodontic surgical treatment may be considered.
REFERENCES