

Endodontic treatment of teeth associated with large periapical lesion

Hasan MA¹, Kabir MH², Azam MG³, Manjur T⁴, Rahim MA⁵

Abstract:

Most periapical diseases are induced as a result of direct or indirect involvement of oral bacteria. The etiologic factors are oral contaminants through the root canal or degenerating pulpal tissues. Therefore, mere surgical removal of the periapical lesions without proper root canal disinfection and obturation will not result in the healing of periapical tissues. This case report describes the non-surgical management of a large periapical lesion. In this case a 27-year-old female patient presented into private practice having discolored mandibular right central and lateral incisor with periapical lesion of endodontic origin. Conservative root canal treatment was carried out for the involved tooth. The clinical and radiographic examination after 12 months revealed complete healing. The appropriate diagnosis of periradicular lesion and the treatment of the infected root canal system allowed complete healing of these large lesions without endodontic surgery. Emphasis is laid on thorough debridement and three dimensional obturation of root canal system by a simple lateral condensation technique.

Key words: *Periapical lesion, Calcium hydroxide, Root canal treatment.*

(Bangladesh Dental Journal 2014; 30: 52-55)

Introduction:

Pulpal tissue can be infected through various ways such as caries or trauma, making the pulpal tissue necrotic. The microbial aggregation or its by-products can infiltrate into periradicular tissues and stimulate the host defense system, resulting in periapical/periradicular tissue destruction. Although this defensive lesion may be helpful to prevent further progress of the microbial infection, it is not self-healing and results in various types of lesions¹

In most cases of large periapical lesions of pulpal origin, we often encounter a dilemmatic situation, such as whether to either treat these cases endodontically or surgically. However, tendency of the clinician towards non-surgical approach is increasing day by day due to advancements of scientific knowledge, development of techniques,

instruments and root canal medicaments. The general consensus is that bacterial reduction or elimination from the root canal system by effective biomechanical preparation will lead to more successful outcomes². In a series of studies showed that pulpo-periapical lesions have the potential for healing without surgical intervention³. Some clinician demonstrated successful clinical management of large periradicular lesion by the use of calcium hydroxide used as an interim dressing⁴.

Investigation have shown that large periradicular lesion may respond positively to nonsurgical endodontic treatment⁵⁻⁷ in cases where response to conservative treatment is not successful other treatment modalities like periradicular surgery or even extraction may be necessary to allow the lesion to heal⁶. The following case report describes a conventional endodontic treatment of mandibular right central and lateral incisor associated with a large periradicular lesion.

Case Report:

A 27-year-old female patient attended a private dental clinic with a chief complaint of discolored mandibular anterior teeth having sinus tract at right mandibular central and lateral incisor buccally. Patient gave a history of trauma 11 years back. The patient had no significant medical history. Extraorally, there was no evidence of swelling and intraorally, a sinus tract was present buccally. The tooth was non responsive to palpation, percussion as well as vitality test. The periodontal probing revealed a normal intact gingiva. Radiographic examination showed an evidence of large radiolucency with discontinuity of periodontal ligament and lamina dura (Figure 1). A non-surgical endodontic therapy of the mandibular right central and lateral incisor was planned.

1. Dr. Mohammad Abul Hasan, BDS, MS (Conservative Dentistry & Endodontics), Associated Professor, Conservative Dentistry & Endodontics, Shaheed Suhrawardy Medical College Dental Unit, Dhaka.
2. Dr. Md. Humayun Kabir, BDS, DDS, FICD(USA), Associate Professor and Head, Shaheed Suhrawardy Medical College Dental Unit, Dhaka.
3. Dr. Md. Golam Azam, BDS, DDS, Assistant Professor, Dental Pharmacology, Shaheed Suhrawardy Medical College Dental Unit, Dhaka.
4. Dr. Tanjiba Manjur, BDS, MPH, Senior Consultant & Head, Dept. of Dentistry, SSMC & Mitford Hospital, Dhaka.
5. Dr. Md. Abdur Rahim, Assistant Professor, Dept. of Conservative Dentistry, Dhaka Dental College, Dhaka.

Address of Correspondence: Dr. Mohammad Abul Hasan, BDS, MS (Conservative Dentistry & Endodontics), Associate Professor, Conservative Dentistry & Endodontics, Shaheed Suhrawardy Medical College Dental Unit, Dhaka. Mobile: 01911391225, E-mail: drhasan04@gmail.com

After access cavity preparation, the working length was determined on the basis of radiographs. A K file (0.8) was used to identify the canal. Individual canal instrumentation was performed sequentially by K file (Densply, Mailliefer, Switzerland) #15-35, using step-back technique, accompanying with copious irrigation with 2.5% sodium hypochlorite between instruments and recapitulation was always done to verify the working-length during biomechanical preparation. Master cone was selected (ISO# 35). Calcium hydroxide was placed into the canal with lentulospiral filler as the intracanal medicament and the access cavity sealed with zinc oxide eugenol cement. Patient was recalled after three days to receive a fresh dressing of calcium hydroxide. This procedure was repeated again after a week. Clinical evaluation was performed after seven days. Tooth was asymptomatic and

the sinus was healed. Obturation was performed with gutta-percha and sealer (Dia-Proseal, Diadent Group, Korea) by lateral condensation technique (figure 3). After two weeks of treatment, teeth were permanently restored with composite (Densply, Mailliefer, Switzerland). The patient was recalled after one, six and twelve months. The sign and symptoms, including the sinus tract, had disappeared after one month of treatment. On 6 month and one year recalls, the patient had no sign and symptom; periapical radiographic evaluation demonstrated complete bony regression of the lesion (figure 4). Clinical exam revealed no sensitivity to percussion and palpation.



Fig.-1: *preoperative radiograph showing periapical lesion*

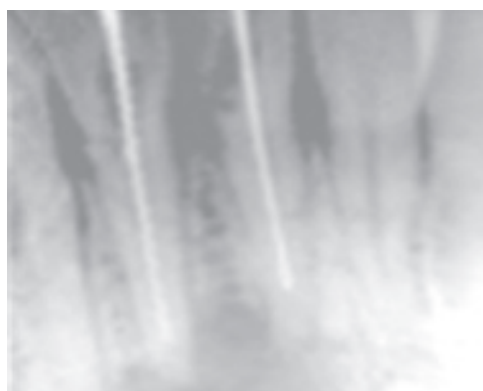


Fig.-2: *Working length determination*



Fig.-3: *Radiograph immediately after obturation*

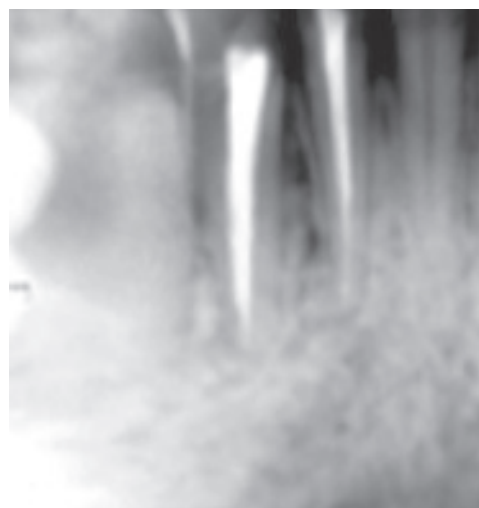


Fig.-4: *Radiograph after 12 months, revealing complete repair*

Discussion:

Radiographic evaluation is the most widely used method for detection of periapical lesions. Periapical lesions can be detected radiographically only when loss of alveolar bone is accompanied by cortical bone involvement during

the development of the periapical pathological process. For this reason periapical lesions in their earlier stages may not be visualized.⁵

As mentioned in previous studies, in the cases of periradicular lesions, sufficient biomechanical cleaning of the root canal system is the most critical factor for cleaning. It has been demonstrated that in these cases, non-surgical root canal therapy should be the first line of treatment² and approximately 74% of 42 endodontically treated teeth in one study showed bony healing within their large periradicular lesions⁷. While some studies have shown no difference between large and small lesions healing ability⁸. According to Caliskan the prognosis for large periradicular lesions is lower⁷. Caliskan stated that in approximately 70% of cases with periapical lesion, the healing was apparent within 2 years of treatment.⁹. However some authors reported that some cases with periapical lesions had completely disappeared from 1 to 12 month after treatment.⁶ In the present paper, we observed that periapical healings completed during the 12 months observation time.

When the root canal treatments are done according to accepted cleaning and shaping procedures, and are able to eliminate the entire microorganisms, necrotic tissues as well as the remnants of organic tissues from the infected root, the success rate is generally high¹. Accepted endodontic treatments may induce a favorable healing process. Recently, a study reported that programmed cell death has an important role in the entire healing process.¹⁰

Root canal treatment is based primarily on the removal of microbial infection from the complex root canal system. Irrigants and intracanal medicaments aid in reducing the microbial flora of infected root canals. In the present study, calcium hydroxide was used as the intracanal medicament. It has been shown that use of calcium hydroxide as a dressing for 1 week efficiently eliminates bacteria from the root canals.

Calcium hydroxide is an intracanal medicament that is commonly used because of its ability to predictably disinfect the RCS. The mechanisms of Ca(OH)₂ are not fully understood. Additionally its biological properties are achieved by the dissociation in Ca²⁺ and OH⁻ ions.¹¹ The antimicrobial effects of calcium hydroxide relate directly to its high pH 12.5, it has a destructive effect on cell membranes and protein structures.¹² Because it plays a major role as an inter appointments dressing in the

disinfection of the root canal system, a Ca(OH)₂ powder mixed with sterile saline water was used as an antibacterial dressing in this case.

The root canal system should be filled three dimensionally and the final hermatic coronal restorations are needed.¹

Permanent restoration within two weeks of RCT also contributed to periradicular healing, as several studies have shown that an adequate coronal restoration placed as soon as possible after RCT plays an important role in the outcome of endodontic therapy.¹³⁻¹⁵ This patient was a young healthy subject and these factors will contribute to successful healing. Previous studies have showed that the patients general health may have an influence on the healing process in periradicular lesions². Radiographic changes such as the increase in density of the lesion and trabecular regeneration, confirmed healing in addition to the absence of signs and symptoms. However it is difficult to be sure of complete healing with conventional radiographic techniques.

Conclusion:

In this case report showed excellent healing of large periapical lesion through conventional root canal treatment. Emphasis was laid on thorough debridement, disinfection, use of calcium hydroxide and three dimensional obturation of the root canal system. This report demonstrating that even large periapical lesion can respond favorable to non-surgical endodontic treatment. Non-surgical approach should be considered before attempting to surgery.

References:

1. Cohen S, Hargreaves KM, Pathways of the pulp. 9th edition. St. Louis: Mosby;2006.pp.541-2.
2. Broon NJ, Bortoluzzi EA, Bramante CM. Repair of large periapical radiolucent lesions of endodontic origin without surgical treatment. Aust Endod J 2007; 33:36-41.
3. Seltzer, Soltanoff, Bender. Epithelial proliferation of periapical lesions. Oral Surg 1969;27:111-5.
4. Cvek, Heithersay GS. Calcium hydroxide in treatment of pulpless teeth with associated pathology. J Endod 1975;8:76.
5. Ozan U, Er K. Endodontic treatment of a large cyst-like periradicular lesion using a combination of antibiotic drugs: a case report. J Endod 2005;31:898-900.
6. Oztan MD. Endodontic treatment of teeth associated with a large periapical lesion. Int Endod J 2002;35:73-8.
7. Caliskan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. Int Endod J 2004;37:408-16.

8. Sjogren U, Hagglund B, Sundqvist G, Wing Ks. Factor affecting the long term results of endodontic treatment. *J Endod* 1990;16:498-504.
9. Caliskan MK, Turkun M. periapical repair and apical closure of a pulpless tooth using calcium hydroxide. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1997;84(6):683-7.
10. Kim S, Pecora G, Rubinstein RA. Color atlas of microsurgery in endodontics. Toronto: WB Saunders; 2001. p.13.
11. Fava LR, Saunders WP. Calcium hydroxide pastes: classification and clinical indications. *Int Endod J* 1999; 32(4):257-82.
12. Pacios MG, de la Casa ML, delos Angeles Bulacio M, Lopez ME. Calcium hydroxide's association with different vehicles: in vitro action on some dentinal components. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2003;96(1):96-101.
13. Kayahan MB, Malkondu O, Canpolat C, Kaptan F, Bayirli G, Kazazoglu E. periapical health related to the type of coronal restorations and quality of root canal fillings in a Turkish subpopulation. *Oral Surg Oral Med Oral Radio Endod.* 2008;105:58-62.
14. Siqueira JF Jr, Rocas IN, Alves FR, Campos LC. Periradicular status related to the quality of coronal restorations and root canal fillings in a Brazilian population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2005;100:369-74.
15. Heling I, Gorfil C, Slutzky H et al. Endodontic failure caused by inadequate restorative procedures: review and treatment recommendations. *Prosthet Dent* 2002;87:674-8.