Research Article

Management of Apical Periodontitis with Non-surgical Endodontic Treatment: A Case Report

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Abstract

Apical periodontitis which is one of the most prevalent diseases of the teeth is an inflammatory process around the apex of a root of the tooth. It is primarily a sequel to microbial infection of the pulp space of teeth. Treatment of apical periodontitis is based on the removal of the cause, i.e., bacteria from the root canals and eliminate further infection of the canal. The objective of this paper is to report the management of apical periodontitis with non-surgical endodontic treatment. Endodontic treatment involves proper cleaning, shaping, disinfecting and sealing the canal with biocompatible sealant. Clinical and radiographic evaluation after six months showed successful results. The outcomes of this case showed that chronic periapical lesions can respond favourably to nonsurgical endodontic treatment.

Keywords: *apical periodontitis, periapical lesions, pathogenesis, endodontic treatment.*

Introduction

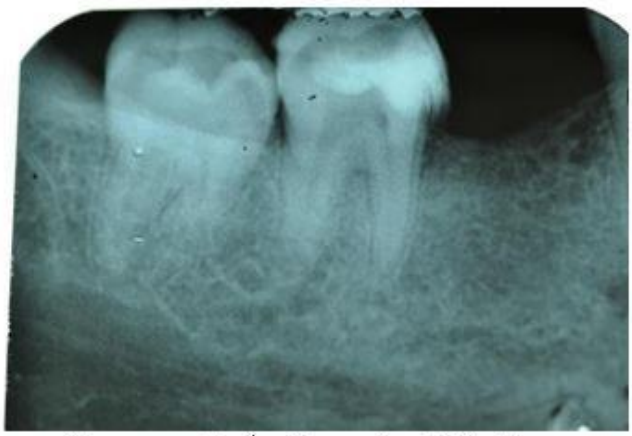
Apical periodontitis is an inflammatory condition occurring around the apex of a tooth due to necrotic pulp. Most apical periodontitis is caused by a bacterial infection and necrotic pulp, it may also be a complication of initial endodontic therapy. Other causes can include occlusal trauma due to 'high spots' after restoration work, extrusion from the tooth of root filling material, or bacterial invasion and infection from the gingiva. As apical periodontitis is caused, primarily, by bacteria in the root canal

space (1,2) therefore, a logical treatment aim is to remove as many of these bacteria as possible. If bacteria are removed to levels that are undetectable by bacteriological methods in use today, an extremely high success rate in the resolution of apical periodontitis can be expected(3,4) Endodontic treatment involves chemo-mechanical preparation of the root canal system to completely remove bacterial products and sealing with a biocompatible material... Achievement of adequate bacterial elimination is possible by proper care, diligence and rigorous treatment planning and an excellent root canal treatment. Full healing of apical periodontitis is possible after nonsurgical endodontic treatment. The diagnosis of pulp necrosis with symptomatic apical periodontitis was made for tooth 46, and the treatment plan included root canal treatment of this tooth. The success of root canal treatment in apical periodontitis cases depends on adequate cleaning, shaping, disinfection and filling of the root canals. The present study aimed to report a case of apical periodontitis and its management by nonsurgical endodontic treatment.

History of presenting complaints

A 32-year-old female came to the dental department with the chief complaint of pain in the lower right tooth which started before a week. The patient informed that the tooth had been filled previously twice. First about ten years ago with amalgam and lately one month before as it fractured and was refilled with a tooth-colored filling. After restoration, it remained asymptomatic for almost three weeks. Symptom onset occurred at the start of the fourth week, especially when chewing. After that, there were spontaneous bouts of pain which lasted from a few seconds up to several hours. Pain also aggravates on closure and biting which is worsening day by day.

Deep composite restoration on 47



Pre-operative radiographs of 47, 48

Radiograph

A periapical radiograph was taken to assess the periapical status of the tooth. 47. The 47 has a larger composite restoration in place and there appears to be widening of the periodontal ligament of the mesial and distal root but more prominent at the distal root. Radiolucency is present at the apex of the distal root. Large restoration present in the tooth, which will have undergone pulpal necrosis before the development of lesion

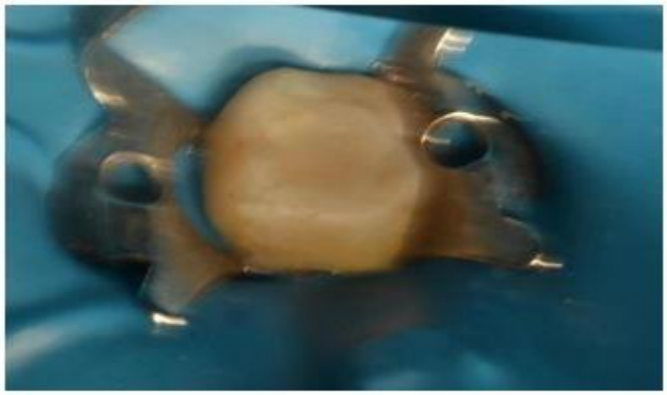
Diagnosis

Based on the patient's symptoms and clinical/radiographical assessment, the diagnosis was pulp necrosis progressing to acute apical periodontitis

Treatment Plan

The diagnosis was explained to the patient and the options of extraction vs. RCT were discussed. The benefits, complications, risks of treatment were discussed for each option, including the risks of conducting no treatment. The patient was very keen to save the tooth and requested RCT. She was made fully aware of the success rates of RCT. She was also informed that the tooth will require a cuspal coverage restoration to prevent future tooth fracture. In this case, the patient has a missing molar, so she was given the option of a fixed partial denture or removable partial denture. She was also informed about the long term regular follow-up is required to ensure periapical healing.

Sequence of treatment



Rubber dam in place

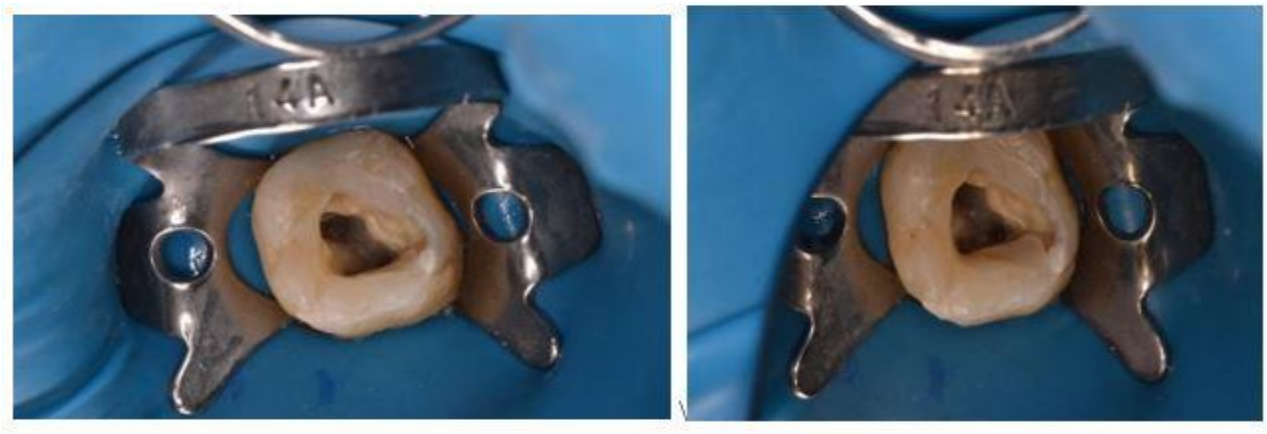
Rubber dam/Isolation/ LA:- First of all occlusal contacts were marked and local anesthesia was administered (2%lidocaine 1:80000 adrenaline). A latex rubber 6"x 6" wt. heavy powder-free rubber dam applied. A 14A winged clamp was used on tooth no. 47.

The sequence of Access:- To accomplish the access opening, composite restoration was removed and complete removal of the chamber roof was done. It included the removal of all the pulp tissue, any calcifications, and all residue or traces of old filling material. As in the posterior teeth, the floor frequently has natural grooves, at the end of which the canal orifices are located. The access cavity was slightly modified to give it the so-called "convenient shape" .

Penetration phase:- This phase was performed using a round diamond bur mounted on a high-speed handpiece.

Enlargement phase This phase was performed with a round bur mounted on a low-speed handpiece The opening created in the preceding phase was entered, and the action of the bur was applied on the way out. It is turned on while exiting the pulp chamber, working on the dentinal walls with a brushing motion. In this way, all the overhangings of dentin left behind in the preceding phase are removed. The diameter of the bur was smaller than that of the round, diamond bur used in the preceding phase.

Finishing and flaring phase This phase was done by a non-end-cutting diamond bur endo z on a high-speed handpiece. With the appropriate angulation, the same bur was used to slightly flare the most occlusal portion of the access cavity externally. The coronal flare of the canal opening was conducted using Gates Glidden size 3.



Access cavity

Access cavity after coronal flaring

Sequence of Instrumentation:- The EZ- Safe Sider Instruments for the instrumentation was used, initially, instrumentation was done manually with, a wrist-watch winding motion to engage and disengage the dentin till the length establishment. Initially, a gray 08 and purple 10 SafeSider was used to negotiate to the apex.

Determination of working length:- Recommended methods for determination of working length are electronic and radiographic. **(**5**)** Root ZX electronic apex locator **(**6,7**)** was used to estimate the working length of the root once the access cavity preparation had been completed to ensure straight-line access to each canal. The working length was found reproducibly to be 19mm in all the canals (using MB cusp ML cusp and distobuccal cusp as reference points) which corresponded to the estimated WL from the pre-op radiograph. The corresponding sized matched G.P masterpoints were then placed in each canal and seated to working length ensuring a snug fit with a degree of 'tug-back' on gentle removal. A masterpoint radiograph was taken to confirm their position. After the length was established, Sure paste calcium hydroxide was placed with lentulo-spiral as it is more effective and efficient **(**8,9,10**)**. Spinning the paste into the canal by rotating a file counterclockwise. As such, an intracanal medicament placed between the appointment appears to be necessary to predictably render the root canal free of viable bacteria. **(**11**)** and GIC dressing was placed. The patient was advised regarding the risks of post-operative discomfort and analgesic advice was given.

Master point radiograph

RCT Appointment 2

The patient returned for a further RCT appointment 4 days later. She reported that the tooth had been initially painful for 24 hours following her last treatment, but that the tooth symptoms had now completely settled. The patient was anesthetized and the rubber dam was placed in the same manner. The tooth was re-accessed and the intra-canal medicament was removed by flushing the canals and pulp chamber with sodium hypochlorite.

Endo-Express reciprocation handpiece was used because the reciprocating motion helps to eliminate binding in the canal. The white 15 and yellow 20 Safe Siders were used to the apex. The canal should always be irrigated with 2% NaOCL and instruments lubricated with EDTA;. After the yellow 20 Safe Sider, the Pleezer reamer in the kit was used to deepen and flare the canal.. The canal was then instrumented to the apex with the red 25 and blue 30 Safe Sider reamers. The orange 30/0.4 Safe Sider NiTi reamer was used with a firm pecking motion to the apex. Then, the green 35 Safe Sider reamers was used to the apex. The black Safe Sider was used 1 mm back from the apex, and the patency confirmed with the yellow 20.

Aspiration after each use was done. During rinsing, the needle was moved up and down constantly to produce agitation and prevent binding or wedging of the needle. Files were always manipulated in a canal filled with an irrigant or lubricant present. Copious irrigation was used between each instrument in the canal. Irrigation was done with 2% NaOCl throughout canal prep with EDTA and finally with NaOCl as the last rinse. Obturation was done by vertical compaction of warm guttapercha with the system b heat source. The excess GP was removed from the floor of the pulp chamber.

Obturation complete

Radiograph after obturation

Pulp chamber sealed

Post treatment core restoration

The composite restoration was placed at the time of obturation to minimize coronal leakage. The two visit root canal was done because of the time restraints and fatigue of the patient. The patient was advised about the post-operative pain and discomfort for one to two days. Pain can be due to the sealer which are slightly toxic when unset. All root canal sealers, even the so-called biocompatible sealers, are slightly toxic in their freshly mixed, unset state. This can be responsible for an 'awareness of the tooth' for 24-48 hours. If the root filling appears sound, leave it in place and reassure the patient and usually, the pain will subside within a day or two.

Maintenance: -. The patient was recalled after 6 months for clinical and radiographic evaluation and good treatment outcomes were observed.. And follow up will continue till four to five years and sometimes even more if the healing is delayed.

Prognosis

As apical periodontitis was present at the initial presentation, this compromises the long term success rate of the RCT. A study has demonstrated there is an 11% reduction in the success rate of RCT in teeth with pre-operative AP compared to those without at 4-6 years post-treatment. In teeth, with pre-operative AP the 4-6 year success rate is 82%.

Discussion

The placement of amalgam or resin restorations near the pulp precipitate irreversible inflammatory changes. It is relatively simple to unknowingly nick a pulp horn in deep preparation and unless there is hemorrhage, it may never be realized. In this case, the tooth was restored twice, amalgam restoration was done about ten years ago and recently tooth was refilled with composite restoration The larger the restoration, the greater the ratio of filling material to a tooth, the greater the number of dentinal tubuli cut and the greater the number of odontoblastic processes exposed and available for contamination. This was the cause of irreversible pulpitis with pulp necrosis and progressing to acute apical periodontitis. Nonsurgical root canal treatment is indicated primarily in cases of irreversible pulpitis and when pulp necrosis with and without periapical lesion.

This case report emphasizes that proper control of root canal infection is essential for the healing of the periradicular tissues after endodontic treatment. Selecting the correct treatment procedures and obtaining the follow-up appointments are the important steps to achieve and prolong the clinical success of apical periodontitis. Clinical and radiographic evaluation after six months showed successful results. A clean, infection-free canal can best be accomplished by mechanical instrumentation in the presence of antibacterial irrigation followed by an antimicrobial intracanal dressing, which provided elimination of bacteria**.** In conclusion, periapical lesions can respond favorably to nonsurgical endodontic treatment.

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