



## PERIAPICAL HEALING OF MANDIBULAR POSTERIORES HAVING CALCIFIC-LIKE DEPOSITS: A RARE CASE REPORT

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**Abstract:** The aim of this paper is to present an interesting case of a periapical healing of mandibular posteriors having calcific-like deposits with radiolucent lesion. A 35-year-old healthy female patient was referred to our clinic by a general dentist. A diagnosis of calcific-like deposits with apical periodontitis lesion on the root surfaces with pulp necrosis was made. The root canal was prepared using the sequential hand files and rotary files. In the first session, calcium hydroxide was applied to the root canals to treat the radiolucent lesion. A one-week break was taken between the first and second session, and finally, the canals were filled with standard cold lateral gutta-percha condensation. No clinical signs were detected in the clinical examination of the controls, and the calcific-like deposits on the root surfaces and radiolucent lesion were healed in follow-up x-rays. The cases presented showed acceptable functional and/or successful recovery without recurrence at follow-up examination.


**Keywords:** Apical periodontitis, Calcific-like deposits, Pulp necrosis, Radiolucent lesion


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### 1. Introduction

Inflammatory destruction of periradicular tissues resulting from microbial infection within the root canal system is defined as apical periodontitis (Sundqvist, 1976). To treat apical periodontitis, it is the root canal preparation with hand or rotary system files, followed by the root canal sealing to prevent re-infection after disinfection with intracanal medicaments using irrigation solutions (Park et al., 2012). When this treatment process is completed properly, the periapical lesion usually regenerates with hard tissue and heals completely and is characteristically reduced in radiolucency on follow-up radiographs (Grahnen, 1961). However, healing of the periapical lesion may not be observed in every root canal treated tooth. A clinical study with long-term follow-up showed that resistant periapical radiolucency might result from failure to eliminate the infection from its complex structure in the root canal system, inadequate aseptic control, and inadequate biomechanical preparation, or restoration leakage (Sundqvist et al., 1998). Bacterial antigens emerging into the periapical area perpetuate periapical inflammation and ultimately cause endodontic treatment failures (Nair et al., 1990). Excessive growth in the cementum layer occurs in non-

functioning teeth, and if the thickening cannot be correlated with the increased function of the tooth, then it would be appropriate to talk about calcific-like deposits. Sentient deposits of these teeth is characterized by the absence of Sharpey's fibres. It has covered every area including the bifurcation areas. In addition, excessive calcific-like deposits is seen with chronic periapical inflammations. Calcific-like tissue surrounds the tooth roots in the form of a sheath.

As a result of chronic pulpal events, the events that occur in the tissues of the periapical region cause an increase calcific like structure. It seems that calcific-like tissue develop due to the long-term excessive infections on the teeth causing periodontal damage and stimulating other cells in the area. Calcified surrounding tissue cells embedded in areas can often be seen (Kumar, 2015). Teeth with calcific deposits without lesions do not require treatment. However, the lesions present at the root tips of such teeth were healed after root canal treatment was applied in lesioned cases. Due to a thickened root, occasional problems have been reported during the extraction of an affected tooth (Pappen et al., 2011; Lorello et al., 2016).

In our study, we aimed to evaluate the effect of routine



root canal treatment on tooth with lesional and calcified extraradicular deposit on the apical root surfaces of roots. Herein, an interesting case of a periapical healing of mandibular posteriors having calcific-like deposits with radiolucent lesion is reported.

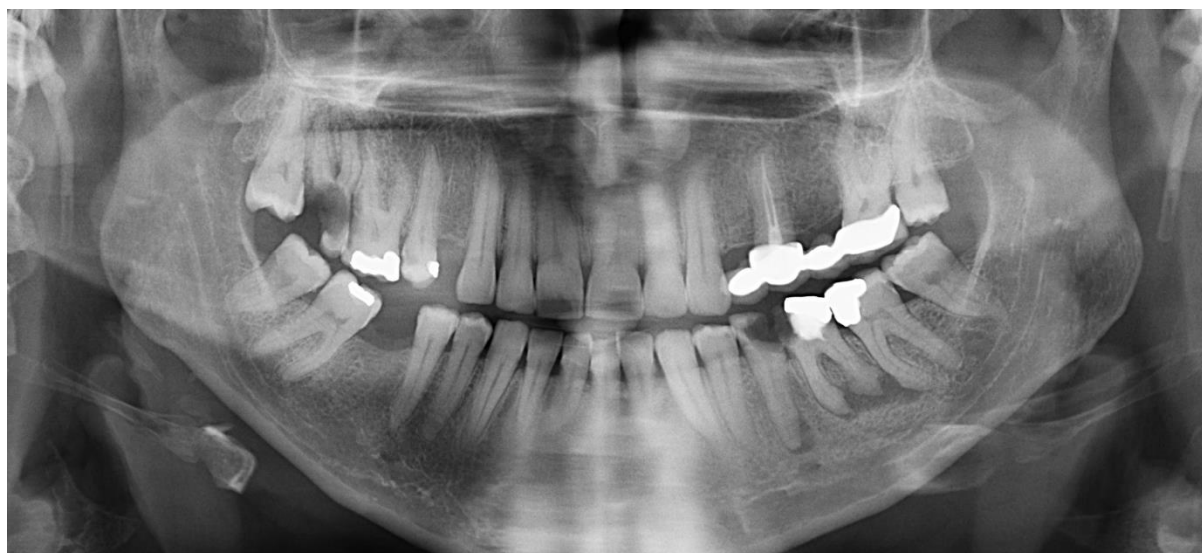
## 2. Case Report

According to the institution's guidelines, ethics committee approval is not required for individual case disclosure. Written consent was obtained from the patients allowing the use of medical information and imaging. In our study, reciprocating preparation systems were used. A 35-year-old healthy female patient was referred to our clinic by a general dentist. In the anamnesis taken from the patient, it was learned that she applied to the dentist because of caries in the mandibular left region teeth. The clinical examination observed that the left mandibular second premolar and first molar teeth had caries and the teeth were not sensitive to percussion and palpation.

A large apical radiopaque area, including the root of the mandibular first molar with calcified root canals and the radiolucent lesion, was detected in the radiographic examination (Figure 1). A negative response was obtained from both teeth in the electrical pulp test. A diagnosis of calcific-like deposits with pulp necrosis was

made. The informed consent form was obtained from the patient after explaining all treatment stages and treatment options, risks and benefits. After isolation with a Rubber dam without local anesthetic injection, the access cavity was made, and the working length was determined to be 1 mm shorter than the apical foramen with a #10 K-type hand file and apex locator, and it was checked by taking radiography. The root canals were shaped using the glide path hand file and a Reciproc R25 (VDW GmbH, Munich, Germany) file with copious irrigation with 2% NaOCl and 17% EDTA solutions, sequentially. Then, the final irrigation was done with 10 mL of 2% NaOCl, 10 mL 17% EDTA followed, 5mL of dilution, and 2% chlorhexidine solutions, respectively.

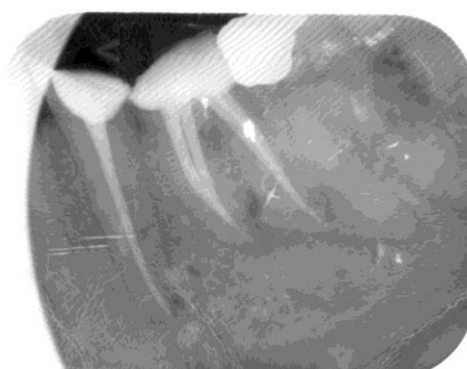
The RCT was completed in two visits. Between the visits, root canals were dressed with calcium hydroxide paste for a week (Figure 2). In the second visit, the root canals were obturated with the conventional cold lateral condensation technique (Figure 3). After the root canal treatment was completed, the tooth was filled with composite material and covered with metal-supported ceramic. The patient was called for control after six months and one year, and no clinical signs and symptoms were detected in the clinical examination of the controls, and the calcific-like deposits and radiolucent lesion were healed in follow-up x-rays (Figure 4).



**Figure 1.** Radiograph showing calcific-like deposits involving first molar tooth with radiolucent lesion around it.



**Figure 2.** Radiography after the first session of treatment and application of calcium hydroxide to the root canal.



**Figure 3.** Post obturation radiograph.



**Figure 4.** One-year follow-up radiograph.

### 3. Discussion

Each patient with periapical tissue diseases who applied to our clinic is recorded, and treatment opportunities are provided and followed up. The principal cause of failure of root canal treatment is the persistence of bacteria within the endodontic system (Nair et al., 1990). Recently, various scanning electron microscopic studies of apices of teeth with necrotic pulps with periapical lesions have demonstrated the presence of bacterial plaque on the external root surface, in lacunae of the cementum or in areas of resorption (Lomçali et al., 1996). The presence of these extraradicular bacterial biofilms has been related to refractory apical periodontitis (Noiri et al., 2002).

In the formation of dental calculus bacteria are believed to be only passively involved (Hinrichs, 2006). However, it is interesting to note that some oral microorganisms have the ability to form intracellular and extracellular apatite crystals, also referred to as microbial calcification (Streckfuss et al., 1974).

Carranza (1990) describes calculus and its formation. As calcification progresses, the number of filamentous bacteria increases and separate foci of calcification increase in size and coalesce to form solid masses of calculus.

Rud and Andreasen (1972) were the first to report a dental calculus-like filamentous material covering root ends in two cases. Calcification of extraradicular biofilms was described in several other reports (Harn et al., 1998; Ricucci et al., 2005; Ricucci et al., 2010; Yang et al., 2010; Song et al., 2011; Ricucci et al., 2016). However, descriptions of calcific-like deposits on the external surface of root tips of teeth with posttreatment apical periodontitis are sparse.

Harn et al. (1998) described a case of periapical lesion with a fistulous tract, which did not resolve after conventional root canal treatment. The sinus tract is potentially a 'corridor', a plausible route of

communication, between the periapical area and the external environment. In addition to the minerals available from tissue fluid, it is possible that the passage of minerals and salts from the oral fluids into the periapical lesion, via the sinus tract, favours the calcification of plaque found on the root surface, hence calculus formation during surgical treatment of the tooth a calcific-like structure was observed on the apical root surface. This deposit was removed with the lesion. Thereafter, the sinus tract disappeared and radiographic healing was observed at 9 months. According to the histopathological report, the diagnosis of the periapical lesion was that of a radicular cyst.

In a study of 66 endodontic failures, Andreasen and Rud described a case in which, at the surgical operation, 'it was noted that the apex was covered with concrements and these were removed' (Rud and Andreasen, 1972). The treatment failed, and histobacteriological analysis demonstrated bacteria within clefts of the cementum.

Horner et al. (2019) stated that mild traumatic occlusion might cause calcific-like tissues. Although not joint, in some cases, excessive occlusal trauma can lead to jagged calcific-like deposits following the course of Sharpey's fibers. As with resorption, a causal relationship with periodontal diseases is not proven, but calcific-like tissues is occasionally seen on teeth with bone loss. It may be a response to inflammation or the increased occlusal loading on a tooth with attachment loss (Horner et al., 2019). Spoque (1973) emphasized that the emergence of calcific-like deposits may be due to persistent stimulus with a low degree of chronic infection and possibly also has a role in repetitive occlusal trauma. Prabhakar et al. (1998) reported a case of calcific-like deposits due to the recurrence of dental abscesses. In the present study, calcific-like deposits due to inflammation was found in 24.37% of the calcific-like deposits teeth and was most seen in the mandibular molar region. In addition, it has been stated that cement accumulation in

teeth with chronic apical lesions increases around the lesion (Langlais et al., 1995; Consolaro et al., 2012; Raghavan and Singh, 2015). However, our case observed inflammation in teeth with calcific-like deposits.

Inter-appointment dressing of root canals of teeth with apical periodontitis, using calcium hydroxide, is an efficient method of root canal disinfection (Byström et al., 1985). Combined with thorough canal preparation and abundant irrigation using sodium hypochlorite, one would expect to obtain healing of a periapical lesion. However, an extraradicular bacterial plaque cannot be destroyed by conventional root canal irrigants or antimicrobial dressings. The microorganisms on the external surface of the root end remain untouched, the inflammatory periapical process continues and healing does not occur. In our study, after root canal treatment on tooth with lesional and calcified extraradicular deposit it has been shown that the healing on the apical root surfaces of roots.

In our study, in cases with periapical lesions, the follow-up period was planned to be a “minimum of one year” by the root canal treatment follow-up procedure specified in the ESE 2006 guideline. Radiographic follow-up of periapical lesions can give us instant and static information about the status of apical periodontitis; however, it has been shown that the healing process is not a static but dynamic one (Nair, 2006). Patients in this study are still followed-up routinely in our clinic.

#### 4. Conclusion

A very unusual case of calculus-like deposit on the root surface in a 35-year-old female patient is reported. The presented rare case showed periapical healing after conventional multi-visit devital root canal treatment with no additional medication or surgical intervention. In addition, the follow-ups showed no recurrence for 12 months.

#### Author Contributions

The percentage of the author(s) contributions is present below. All authors reviewed and approved final version of the manuscript.

	B.M.	A.J.	S.T.	C.Ö.	O.Ç.
C	20	20	20	20	20
D	20	20	20	20	20
S	20	20	20	20	20
DCP	20	20	20	20	20
DAI	20	20	20	20	20
L	20	20	20	20	20
W	20	20	20	20	20
CR	20	20	20	20	20
SR	20	20	20	20	20
PM	20	20	20	20	20
FA	20	20	20	20	20

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

#### Conflict of Interest

The authors declared that there is no conflict of interest.

#### Ethical Approval/Informed Consent

Written an informed consent form was obtained from the patients for the case presentation and necessary information was given to the family. The study was approved by the Clinical Research Ethics Committee and performed in accordance with the Declaration of Helsinki.

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