



Nonsurgical endodontic treatment of a large periradicular lesion

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In Endodontic, one of the most crucial problem that can result in the loss of teeth is periapical lesion. In the development of periapical lesion in periapical tissues, not only the presence of infected pulp but also the toxins, metabolic products, chemical agents, mechanical irritations, foreign substances, trauma and host defense of existing microorganisms also play a role. Radiographic findings, clinical oral examination and differential diagnosis are used in the diagnosis of periapical lesion. Even though endodontic treatment option combined with apical surgery could be an option for treatments of large periapical lesions, conventional root canal treatment should be the first choice that combined with long-term follow-up after treatment. The aim of this case report is to present a complete clinical and radiological healing of teeth relation with a large cyst-like periradicular lesion treated only with root canal treatment and without the need for a surgical treatment.

Keywords: Healing; large periapical lesion; non-surgical endodontic treatment.

Endodontic failures can be attributable to inadequacies in shaping, cleaning and obturation, iatrogenic events, or re-infection of the root canal system when the coronal seal is lost after completion of root canal treatment.^[1] Moreover, the major reason of periradicular lesions associated with infected pulpal tissue are caused by pulpal inflammation and/or degeneration through deep caries, trauma, or by a combination of these. 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.^[2] Periapical lesions classified into 5 main groups: Acute apical periodontitis, chronic apical periodontitis, condensing osteitis, acute apical abscess and chronic apical abscess.^[3] The general consensus is that bacterial reduction or elimination from the RCS by effective biomechanical preparation will lead to more successful outcomes.^[4] Investigators have shown that large periradicular lesion may respond positively to nonsurgical endodontic treatment.^[5] All inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures.^[6] 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

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Fig. 1. The initial diagnostic panoramic and periapical radiography of the patient.

are pathologic or iatrogenic in origin. Nonsurgical endodontic retreatment procedures have enormous potential for success endodontic treatments.^[7]

Case report

A 21-year-old male patient was referred to our clinic with severe pain on the left maxillary anterior region. The patient gave a history of trauma due to a traffic accident two years ago. Intraoral examination was determined a swelling in the vestibule mucosa, teeth mobility and sensitivity on percussion. Teeth 22 and 23 failed to respond to thermal and electric pulp testing; the adjacent teeth responded within normal limits. A periapical radiograph revealed a large radiolucent lesion approximately 18–19 mm in diameter apparently involving the apices of teeth 22 and 23 (Fig. 1). Following access cavity preparation, there was drainage of yellow straw-coloured fluid was aspirated from

teeth 22, 23. The apical foramen was gauged using hand K- files, and the apical width was found to be equivalent to a size #15 K- file. The apical foramen was widened to a size #40 K- file and H-type hand files under irrigation with 2.5% NaOCl, 17% EDTA, normal saline and 2% chlorhexidine respectively for final irrigation. At the next appointment after 3 days, the patient was asymptomatic with no evidence of swelling in the labial vestibule but the exudate flow in the root canals was continuing. The same procedure of aspiration through the root canal space of tooth until the exudate flow is completely done. Then, calcium hydroxide dressing was applied once per week by three weeks. The canal was irrigated, dried and temporized. Three months has elapsed from the start of treatment. The root canals were obturated with cold lateral technique using AH Plus (Dentsply De Trey GmbH, Konstanz, Germany) sealer and gutta-percha, and the access cavity was restored with composite resin (Fig. 2a). 2 months after root canals have been filled, the patient was still asymptomatic and a periapical radiograph revealed a decrease in the size of the radiolucency to approximately 9–10 mm in diameter (Fig. 2b). The patient was asymptomatic. A periapical radiograph revealed almost complete healing of the periapical lesion of canine tooth after 15 months. Furthermore, even though lateral tooth has shown a nice improvement, its healing was continuing (Fig. 2c).

Discussion

In large periapical lesions, there is a strong consensus on treatment with traditional root canal treatment or apical



Fig. 2. (a) The radiography of root canal filling that performed after 3 months. (b) The radiographic image of root canals and surrounding periapical tissues 2 months after root canal filling. (c) The radiographic image of the healing of the periapical tissue at the end of 15 months follow-up.

resection, but in many studies apical lesions of up to 20 mm have been reported to improve with conventional root canal treatment.^[8] Surgical treatment of cystic lesions has the disadvantages such as reducing bone support, destroying the inner blood vessels and nerves that feed the teeth adjacent to the surgical site, damaging of mental foramen, lower alveolar nerve branch and/or anatomical structures such as artery, nasal cavity, maxillary sinus, the formation of anatomical defects, postoperative pain, surgery in terms of cooperative was unable to pediatric patients.^[9] Because of these disadvantages, we prefer nonsurgical endodontic treatment as the treatment procedure in the cases presented. As mentioned in previous studies, in the cases of periradicular radiolucent lesions, sufficient biomechanical cleaning of the root canal system is the most critical factor for healing. It has been demonstrated that in these cases, nonsurgical root canal therapy should be the first line of treatment^[10] and approximately 74% of 42 endodontically treated teeth in a study showed bony healing within their large periradicular lesions.^[11] Nonsurgical treatment of the majority of root canals will result in complete repair of the largest periradicular lesions, including the cyst and in some cases the true cyst.^[12] Moreover, this patient was a young healthy subject and these factors will contribute to successful radiographical and clinical healing; previous studies have showed that the patient's general health may have an influence on the healing process in periradicular lesions.^[10] Furthermore, before the endodontic treatment of large periapical lesions is complete, the application of $\text{Ca}(\text{OH})_2$ as a medicament for certain periods of time has a positive effect on success to avoid the symptoms and to under control the periradicular infection.^[13] 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^[14] tissue dissolving effect, causes induction of repair by hard tissue formation and bactericidal effect.^[15] During the root canal shaping, a 5.25% sodium hypochlorite solution was used followed by a calcium hydroxide-based root canal dressing. Usage of calcium hydroxide paste was advocated for rapid and successful treatment of sinus tracts associated with necrotic teeth.^[16] The root canal dressing was applied once per week by three weeks and completed after 3 months. In this way, high alkalinity and calcium ion availability were obtained and maintained. Significant bone formation was seen at the periapical region on periodic check up visits. Thus nonsurgical healing of the multiple periapical lesions provided favourable clinical and radiographic response. Here, conventional endodontic therapy in combination with calcium hydroxide as an intracanal medicament contributed effectively in healing of periapical lesions. But, it

would be necessary to observe and monitor the periapical lesions over a period of time following the nonsurgical approach. Caliskan reported that around 70% of cases with periapical lesions were healed within 2 years.^[11] However, some authors have also informed that many cases with periapical lesions the healing of the lesion is occurred in first 1–12 months.^[17] In these presented cases, we have seen that complete healing was provided as a result of 15 months observation for lateral. In radiographic examination, change of densities in the lesion, reconstruction of the trabecular structure, lamina dura formation in apical region, asymptomatic formation of teeth in clinical examination and healthy appearance of soft tissues^[18] indicate us that the treatment has been successful.

Conclusions

This case report confirms that the size of a periapical lesion is not a major determining factor in the decision to perform conventional root canal treatment or surgical removal of the lesion. Large periapical lesions can heal after successful endodontic treatment without surgical intervention. The number of dressings with $\text{Ca}(\text{OH})_2$ until the completion of treatment, clinical examination between sessions and periodic radiographic follow-up is very important in terms of heal the periapical lesion. This case showed healing after 6 and 15 months clinical and radiographic follow-up.

Conflict of interest: None declared.

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