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3-Year Follow-Up of the Healing Process After Root Canal Treatment in a Permanent Tooth With Periapical Pathology

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ABSTRACT: Endodontic treatment, surgical treatment, and tooth extraction are treatment options for teeth with extensive periapical lesions. A 17-year-old female patient presented to our clinic with swelling and a fistula in the right lower region. Clinical and radiographic examination revealed a well-defined radiolucent lesion associated with the right lower first molar. Throughout the treatment, the canals were irrigated with 2.5% sodium hypochlorite and saline solutions, and intracanal disinfection was performed with calcium hydroxide. Healing was observed in the periapical region at 1- and 3-year follow-up visits. This case report presents the non-surgical endodontic treatment and healing pattern of a patient who developed extensive periapical lesions after restoration with resin-based filling material.

KEYWORDS: Periapical lesion, root canal treatment, resin content filling material.

INTRODUCTION

Dental pulp infections can occur as a result of deep caries, errors in dental procedures, coronal leakage, trauma, or a combination of these (1). If left untreated, infected pulp can cause reactions in the periapical tissues (2).

The tooth may remain asymptomatic until the inflammation resulting from this reaction spreads to the periradicular tissues. Then, as the inflammation begins to spread, spontaneous pain and percussion may occur. Radiographically, images ranging from widening of the periodontal space to periapical lesions can be observed in pulp infections (3). In the presence of extensive periapical lesions, treatment options include nonsurgical root canal treatment, apical surgery, or tooth extraction (4). Currently, root canal treatment is recommended as the initial treatment for such teeth. Recent studies have found relatively successful nonsurgical root canal treatment for teeth with extensive periapical lesions. The goal of root canal treatment is to eliminate microorganisms in the environment and ensure intracanal disinfection (5). Because microorganisms in the root canal have been shown to be the primary cause of periapical lesions, regardless of size. Therefore, the lesion can heal even when intracanal disinfection is achieved without surgical intervention (6,7). This also applies to true cysts (6,8). Even if the apical cyst is not directly in contact with the root apex, inflammatory cell contact is always observed in the cyst epithelium and fibrous connective tissue capsule. Therefore, apical lesions can heal completely once the causative agent, including the cyst, is eliminated (6).

In this case report, the healing of a cyst-like periapical lesion that occurred after resin-containing filling material in the lower permanent molar tooth with non-surgical root canal treatment is described.

CASE REPORT

A 17-year-old female patient presented to our clinic complaining of swelling and a fistula in her lower right region. Radiographic examinations revealed a well-circumscribed radiolucency associated with tooth 46. This was confirmed by clinical examination. The patient, who had no systemic medical history, was found to have a periapical lesion in her lower right molar due to a deep resin-based filling (Figure 1).

Figure 1: Lesion image in the relevant tooth on radiographic image

Following vertical percussion, the tooth exhibited mild sensitivity, and secondary mobility was noted. Following cavity preparation, a working length was determined approximately 1 mm from the root apex using a K-type file (number 15) under rubber dam isolation. The canal was prepared using the step-back technique using nickel-titanium rotary files (Dentsply Maillefer, Ballaigues, Switzerland). Irrigation was performed with 2.5% sodium hypochlorite (NaOCl) during shaping. At the end of the procedure, calcium hydroxide was placed in the canals, and the canal orifices were sealed with a temporary filling material (Cavitimi, Procal, Germany). A total of two calcium hydroxide implants were placed, two weeks apart. Approximately one month later, the tooth was found to be asymptomatic. The root canal was filled using AH plus root canal sealer (Dentsply De Trey, Konstanz, Germany) and gutta-percha (Gapadent, Allerhausen, Germany) using lateral condensation. Afterwards, amalgam (RubyCap High Capsule Amalgam) was used as the upper filling material. The tooth's condition was reviewed at one- and three-year follow-ups. Clinical and radiographic examinations at the end of these follow-ups revealed that the tooth was asymptomatic and that apical healing was evident (Figure 2, Figure 3).

Figure 2: Radiographic image at 1-year follow-up

Figure 3: Radiographic image at 3-year follow-up

DISCUSSION

Caries is often the primary cause of periapical lesions in the apical area of posterior teeth. However, inadequate or incorrect use of resin-based materials used in conjunction with emerging adhesive systems can also lead to extensive periapical lesions. In this case, a large periapical lesion was observed after the application of a resin-based filling material after decay removal near the pulp. Extensive periapical lesions can progress from nonsurgical root canal treatment and apical resection to tooth extraction. Root canal treatment is currently the primary treatment option for such lesions. When this option fails, additional treatment options should be explored (8,9). A review of the literature reveals that many existing lesions heal with nonsurgical root canal treatment (10). In our case, nonsurgical root canal treatment was used, supporting the literature. The length of the healing process varies in cases where root canal treatment is achieved. Some authors report that 73% of lesions heal within the first two years (11). Other authors have stated that some lesions heal within the first year (9,12). In this case, healing was observed on the three-month periapical radiograph, and complete healing was demonstrated at one-year follow-up.

CONCLUSION

Treatments performed in accordance with routine root canal procedures can eliminate large periapical lesions without any surgical intervention. The number of calcium hydroxide dressing applications and radiographic follow-up are important for lesion healing. While the treatment process can be long and challenging, the results are satisfactory for both the physician and the patient.

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