

Conservative non-surgical management of an extensive periapical lesion – a case report

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Abstract

Objectives: The most common pathologic processes of jaws with inflammatory origin from necrotic dental pulp are periapical lesions. Periradicular granuloma and radicular cyst are the most important lesions, which can be seen in the teeth with necrotic pulp or improper root canal therapy. Various clinical methods have been used in attempts to differentiate a periradicular granuloma from a periradicular cyst. The only accurate way to distinguish these two entities is by histologic examination. This study presents a clinical case of an extensive periapical lesion of endodontic origin, suggestive of peripheral radicular cyst of tooth #46.

Methods: The endodontic treatment was performed on tooth #46, the dressing with calcium hydroxide paste was renewed on a two-week basis for 2 months, followed by endodontic obturation of the root canal system.

Results: After one year of conventional endodontic treatment the patient is without any signs of recurrence.

Keywords: root canal endodontic treatment, periradicular lesion, calcium hydroxide.

Introduction

Radicular cysts are the most common degrading lesions in the oro-facial region and are most often found in the periapical region of the involved teeth or on the lateral aspects of the teeth connected with the lateral root canals. Nobuhara and del Rio showed that 59.3% of the periradicular lesions were granulomas, 22% cysts, 12% apical scars, and 6.7% other pathoses (1). Among the inflammatory type, radicular cysts comprise about 52-68% of all cysts affecting the jaws and 42-44% occurring at the apical region of tooth (2). Histologic examination of a periradicular cyst shows a central cavity lined by stratified squamous epithelium. The histologic features of periradicular cysts are very similar to those of periradicular granulomas except for the presence of a central epithelium-lined cavity filled with fluid or semisolid material. The etiology is generally associated with root canal infections caused by untreated caries lesions. Histologic examination of normal human periodontal ligament shows remnants of Hertwig's epithelial root sheath along its length (called epithelial cell rests of Malassez). Inflammation in the periradicular tissues, on the other hand, is associated with proliferation of these normally quiescent cells (3). This explains why proliferating epithelium has been found in a significant percentage of periradicular granulomas (4, 5). Many radicular cysts grow without any symptoms and are discovered when periapical radiographs are taken. The treatment of the periradicular cysts can be either non-surgical or surgical management like marsupialization or enucleation (6). In every case the treatment should be as conservative as possible.

Case Report

A 23-year-old female patient referred to the Department of Oral and Maxillofacial Surgery, FDM, Medical University-Varna by a general dentist for extraction of tooth #46. He found the presence of a radicular cyst between the roots of the tooth #46 and concluded that this lesion cannot be treated endodontically. The chief complaint was of a pain and mobility in the region of tooth #46. The oral surgeon referred the patient to our Department of Conservative Dentistry and Oral Pathology for an endodontic treatment. After that an anamnesis was conducted, as well as clinical examination, radiographic examination and testing of pulp vitality in tooth #46. Tooth #46 was non-vital. On intraoral examination, tooth #46 was found to be grossly decayed, and after excavation of caries, a pulp exposure was encountered. The periapical radiograph revealed radiolucency involving enamel, dentine, cementum and pulp in relation to tooth #46. A well-circumscribed periapical radiolucency of about 1 ½ cm in dimension, involving both the mesial and part of the distal roots of 46 along with a thin radiopaque border, suggesting a cystic lesion (fig. 1) was registered.



Fig. 1 A periapical radiograph showing periapical radiolucency involving both mesial and distal roots of 46

Based on the anamnesis, clinical examination, radiographic examination and testing of pulp vitality a treatment plan was designed to manage this case in a non-surgical conservative approach. An endodontic access on tooth #46 was made without anesthesia. The necrotic pulp tissue was extirpated followed by copious irrigation with sodium hypochlorite 5, 25%, citric acid 40% and normal saline. Working length was determined by using an apex-locator NSK and the root canals were prepared using machine files Protaper Next X2 (Dentsply Maillefer, Switzerland). After the biomechanical preparation was completed, a canal dressing calcium hydroxide paste with iodoform was used. Coronal sealing was carried out with light-curing glass ionomer cement. The dressing with calcium hydroxide paste was renewed on a two-week basis for 2 months, followed by endodontic obturation of the root canal system. The root canals were filled with a sealer Topseal (Dentsply Maillefer, Switzerland) by applying the method of warm vertical condensation (fig. 2). After 6 months, through periapical radiographs significant regression of lesions with new bone formation and no symptoms in the patient were observed (fig. 3).



Fig. 2 A periapical radiograph showing an endodontic obturation of the root canal system



Fig. 3 A periapical radiograph showing significant regression of lesions with new bone formation after 6 months

Results

After one year of the endodontic treatment the radiograph (fig.4) shows complete healing of the periapical lesion with new bone formation and no symptoms in the patient and no need for additional surgery in the periapical region.



Fig. 4 A periapical radiograph 1 year after root canal filling of tooth #46

Discussion

Removal of irritants from the root canal system and its total obturation result in repair of inflamed periradicular tissues (7). Periradicular lesions repair from the periphery to the center. If the cortical plate is perforated by resorption, the healing process is partially periosteal in nature. Boyne and Harvey, after creating cortical plate perforations in the jaws of humans, showed that labial defects measuring 5 to 8 mm in diameter healed completely within 5 months (8). When they studied apical defects measuring 9 to 12 mm, they found that these lesions had limited labial cortex formation and instead were filled with avascular fibrous connective tissue in up to 8 months. The periapical tissues have a rich blood supply, lymphatic drainage and abundant undifferentiated cells. All these structures are involved in the process of inflammation and repair. Once the causative factors are eliminated, the granuloma heals spontaneously (15).

In this case it has been shown that using calcium hydroxide as an intracanal dressing in the presence of large and chronic peripheral lesions can lead to healing and start bone repairing. Calcium hydroxide is an effective bactericidal and bacteriostatic agent because of its high pH - 12.5 (9,10).

Borisova-Papancheva T. et al. (11) found that 63% of Bulgarian dentists direct, on average, only one patient per month for surgical treatment, which shows high confidence in non-surgical treatment methods. The success rate of endodontic treatment has increased significantly, which can be explained by the development of techniques and instruments used for cleaning, shaping and root canal filling.

Conclusion

The clinical case in this study reports a successful endodontic non-surgical treatment of a big periradicular lesion. The treatment involved removing the debridement, disinfection and obturation of the root canal system. After one year the patient is without pain, with regression of the lesion and new bone formation. To achieve satisfactory periapical healing is necessary to eliminate the root canal-infection. The approach should be always complex and individual depending on clinical and radiographic examination. The treatment should be directed at removing the causative factors and saving the teeth. A future prognosis of the state of the teeth can be given after a certain observation period.

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