Treatment of Furcation Lesions in Devital Teeth with β-Tricalcium Phosphate + Hydroxyapatite Graft Material: A Case Report

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Abstract

Endoperiodontal lesions are characterized by the presence of periodontal and pulpal disease within the same dental element. Periodontal and pulpal tissues are related to each other by lateral and accessory canals, the apical foramen, and the dentinal tubules. In the dental literature, whether periodontal disease affects pulpal disease or vice versa remains controversial. Pulpal disease is often accepted to cause periodontal disease. The treatment of endodontic-periodontal combined lesions requires both endodontic therapy and periodontal regenerative procedures. The success rate of treatment comprising only an endodontic procedure for such lesions is low. Periodontal regenerative therapy has been used widely to regenerate periodontium lost due to periodontal disease. This therapy is also very successful during the management of endodontic-periodontal lesions.


Introduction

One of the main objectives of periodontal treatment, including the addition of new bone, cementum and periodontal ligament regeneration, involves ensuring the security of new attachments. Due to the complex anatomy of the furcation areas associated with multi-rooted teeth, the resulting loss of attachment area has been of intense interest for periodontists (1,2).

A tooth with both periodontal and endodontic disease is defined as having endoperiodontal lesions. Pulpal and periodontal tissues are examined at the same time as the source of these lesions, including primary endodontic, periodontal, and combination primary lesions, and are classified into three groups (3).

Dental pulp tissue is the primary carrier of coronal leakage and infection due to trauma-related injuries (4,5). If left untreated, infected pulp tissue affects the periapical region. The regions formed in these reactions are usually seen in the apex of the tooth (4). However, the root opening on the side of accessory canals in furcation areas or in multi-rooted teeth can create a periodontal pathology (6).

Anaerobic infections are common in the etiology of periodontal diseases (7). Similarly, necrotic pulp tissue in endodontic diseases is known to be affected by anaerobic infection. The similarity between the endodontic and periodontal microflora in the root canal of the periodontal pocket suggests...
occurrence of cross-infection. This idea is supported by the finding that the pulp and the periodontal ligament between the anatomical pathways (8). The main portion of pulp and periodontal tissue is located at the apical foramen. In addition, accessory canals and dentinal tubules represent potential physiological pathways allowing the passage of bacteria and their products (9); however, since other structures create a barrier against penetration of bacteria, such as physiological dentin and cementum, dentin tubule-infected pulp tissue is very unlikely to become infected through the periodontium (9).

Teeth with periapical pathology with a negative prognosis affect the amount of marginal bone loss (10,11). The guided tissue regeneration (GTR) technique, in areas difficult to treat by conventional methods, is an alternative for the treatment of these combined lesions. A limited number of cases in the literature have reported positive results (12-21). The purpose of this research was regeneration of primary teeth, using periodontal treatment and endodontic endo-perio-problematic clinical and radiographic methods to evaluate the effectiveness.

Case Report

A patient complaining of pain and bleeding of the gums in the left lower region of the mouth was admitted to our clinic. Intraoral and radiographic examination revealed that the left lower molar showed deep furcation. A periodontal pocket depth of 10 mm was observed (Fig. 1a-1b).

To eliminate tooth mobility, a splint was created with adjacent teeth. For the treatment of the root canal, the patient was redirected to an endodontic clinic. Endodontic treatment started with initial periodontal treatment. After the initial periodontal and endodontic therapy for the treatment of furcation lesions the patient decided to continue regenerative periodontal surgery. Under local anesthetic, a full-thickness flap, including granulation tissue in the furcation, was removed and the root surface was flattened. The region was then filled with β-tricalciumphosphat + hydroxyapatite graft material and sutured (Figure 2a - 2b). Twelve months after inspection, complete remission of the region was observed (Fig. 3a-3b).

Figure 1. (A) The patient presented with unsatisfactory aesthetics in the anterior gingiva and prosthesis; (B) The surgical guide was constructed of thermoforming material; (C) The seating of the surgical guide in the patient’s mouth was evaluated; (D) Vertical mini-incisions were made on the mesial and distal sides of each papilla.
Discussion

The rate of healing following non-surgical endodontic treatment of teeth with periapical lesions has been reported to be 73–90% (22,23). Real apical cysts have a reported success rate of 73.8% in teeth with large lesions. For the treatment of endo-perio lesions other than root fracture combined with endodontic treatment initiation a follow-up clinical course of at least 3 months is proposed (21) Therefore, the combined endodontic lesions will improve with conventional endodontic treatment, it has been suggested (24) scientific evidence supporting this view is quite low (25). Long-term follow-up of 35–60% of patients after endodontic treatment is possible (22,23). It is not possible to predict the outcome of treatment in patients without a follow-up being performed.

Periapical pathology in patients with periodontal destruction caused over time by periodontal pocket epithelial tissue, reduces the chances of successful endodontic treatment (26). Advanced stages of periapical pathology observed in cases of marginal periodontal destruction, bone grafts, and GTR resulted in a 27–37% chance of successful endodontic surgery (10,11). The application of regenerative periodontal surgery to endodontic therapy resulted in a success rate of 80%, consistent with the report by Dietrich et al., who reported 83% success. These findings suggest that endodontic surgery may increase the success rate, a view supported by other authors (25).

A significant decrease in cell depth was identified in the current study. The pocket depth reduction over 12 months suggests that the surgical technique was effective. Dietrich et al., discuss similar cases; a significant decrease in pocket depth was obtained using regenerative periodontal therapy (25).

Radiographic evaluation of the success of endodontic therapy reveals significant findings. However, studies using bone grafts suggest that radiopaque radiographic findings should be interpreted cautiously. Reports in the literature are inconsistent with regards to the methods used and the duration of graft resorption (27-32). Radiographic examination can identify normal bone graft in the early postoperative period; however, radiopacity may become more intense over time. A 1-year follow-up period may be adequate for the assessment of graft material used in the cases reported (33).

In actual combined endo-perio lesions, the periapical lesion is accompanied by necrotic pulp and marginal periodontitis. These lesions can
develop independently, such that one might be the precursor of another.

The primary endodontic lesion in this case report suggests the overall periodontal health of the patient to be good. Conflicting opinions exist regarding the use of antibiotics during routine endodontic surgical procedures (33). In our study, the use of antibiotics was important due to bone graft application. For this reason, we administered oral penicillin, which is frequently used in surgical procedures (34). Local antibiotics have been reported to have a negative impact on the effectiveness of the bone grafts and thus antibiotics were administered orally (35).

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The authors deny any conflicts of interest related to this study.

### References


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