

Recurrent Apical Periodontitis and Late Endodontic Treatment Failure Related to Coronal Leakage: A Case Report

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Abstract

Introduction: This article describes a case of late failure after endodontic retreatment as characterized by recurrent post-treatment apical periodontitis. **Methods:** At the time of the initial treatment, the patient presented with acute apical abscess associated with a tooth with pulp necrosis caused by trauma. Four years later, the tooth was retreated because of persistent disease. The follow-up examination 28 months after retreatment showed complete healing. **Results:** The patient returned 11 years and 7 months later for bleaching of the discolored tooth, and although the periodontal tissues were clinically and radiographically normal, a fracture line was observed on the mesial aspect of the pulp chamber. Extraction was indicated, but the patient only returned 5 years and 9 months later. Then a radiograph showed recurrent post-treatment apical periodontitis. The tooth was extracted, and histopathologic and histobacteriologic analyses revealed bacterial colonies along the fracture line and colonizing ramifications and accessory canals at the apical root canal system. **Conclusions:** Coronal leakage can be regarded as the most reasonable explanation for resurgence of the disease. However, a predisposing overlapping condition in the form of root fracture conceivably favored the penetration of bacteria from saliva and plaque biofilm along the filled root canal. (*J Endod* 2011;37:1171–1175)

Key Words

Coronal leakage, endodontic infection, post-treatment apical periodontitis, recurrent disease, root canal retreatment

Post-treatment apical periodontitis is caused by either persistent or secondary intraradicular infection (1). Persistent infections are caused by microorganisms that persisted after intracanal procedures of disinfection and managed to survive in the obturated root canal. Secondary infections, in turn, are usually caused by microorganisms introduced in the canal via a breach in asepsis during treatment or via coronal leakage in obturated root canals exposed to the oral cavity. Post-treatment disease can be classified as emergent (developed after treatment), persistent (persisted despite treatment), or recurrent (redeveloped after having healed) (1). Recurrent disease quite often represents a late failure of the endodontic treatment, and the cause is conceivably related to a new event arising years after treatment conclusion. Coronal leakage after tooth fracture or loss of the permanent coronal restoration might be an example of such a new event.

This article describes a case of late failure of endodontic treatment as characterized by a recurrent post-treatment apical periodontitis. Coronal leakage was the most reasonable explanation for resurgence of the disease. However, attempts to treat a persistent apical periodontitis lesion might have influenced the outcome.

Case Report

This case was initially published as a case report in 1997 (2). Briefly, the patient was 12 years old when she underwent endodontic treatment in tooth #8 because of an acute apical abscess (Fig. 1A). The patient had a history of trauma involving that tooth 4 years previously. Treatment consisting of instrumentation with 1% NaOCl irrigation, calcium hydroxide interappointment medication, and filling by lateral compaction of gutta-percha resulted in incomplete osseous healing as determined 4 years later (Fig. 1B). Retreatment was conducted with larger instrumentation, 1% NaOCl irrigation, 7-day calcium hydroxide medication, and filling by the lateral compaction by using gutta-percha and the same sealer as in the previous treatment. A follow-up radiograph taken 2 years and 4 months after retreatment showed complete osseous healing (Fig. 1C).

A new follow-up radiograph was taken 4 years after retreatment, and healthy periradicular conditions were confirmed. The patient returned 11 years and 7 months after retreatment because of crown discoloration of the treated tooth. She declared that the tooth had maintained the original color for all the postoperative period, but suddenly during the few previous weeks, its color turned yellowish (Fig. 1D). No symptoms were present, and percussion, palpation, and mobility tests as well as periodontal probing were all within normal limits. The patient also excluded any further traumatic injury. A radiograph taken at this point (Fig. 1E) showed normal periradicular conditions. The periodontal bone interproximal margins also exhibited normal appearance.

A decision was made to explore the pulp chamber and eventually perform internal bleaching. After rubber dam isolation, composite material was removed from the access cavity, together with the zinc phosphate cement that had been placed over the gutta-percha filling. This procedure disclosed a fracture line on the mesial wall of the pulp chamber (Fig. 1F). The patient was informed that this might have been the reason for discoloring, and that the prognosis for the tooth was poor. Extraction was indicated, followed possibly by implant placement. The patient decided to postpone this procedure for some months and requested a treatment that could bleach the crown temporarily. After removal of 2-mm-deep layer of the gutta-percha filling, the bleaching procedure was performed by using 35% H₂O₂ mixed with sodium perborate to a creamy consistency. A sterile cotton pellet was placed over this material, and the access was filled with reinforced zinc oxide–eugenol cement (IRM; Caulk Dentsply, Milford, DE).

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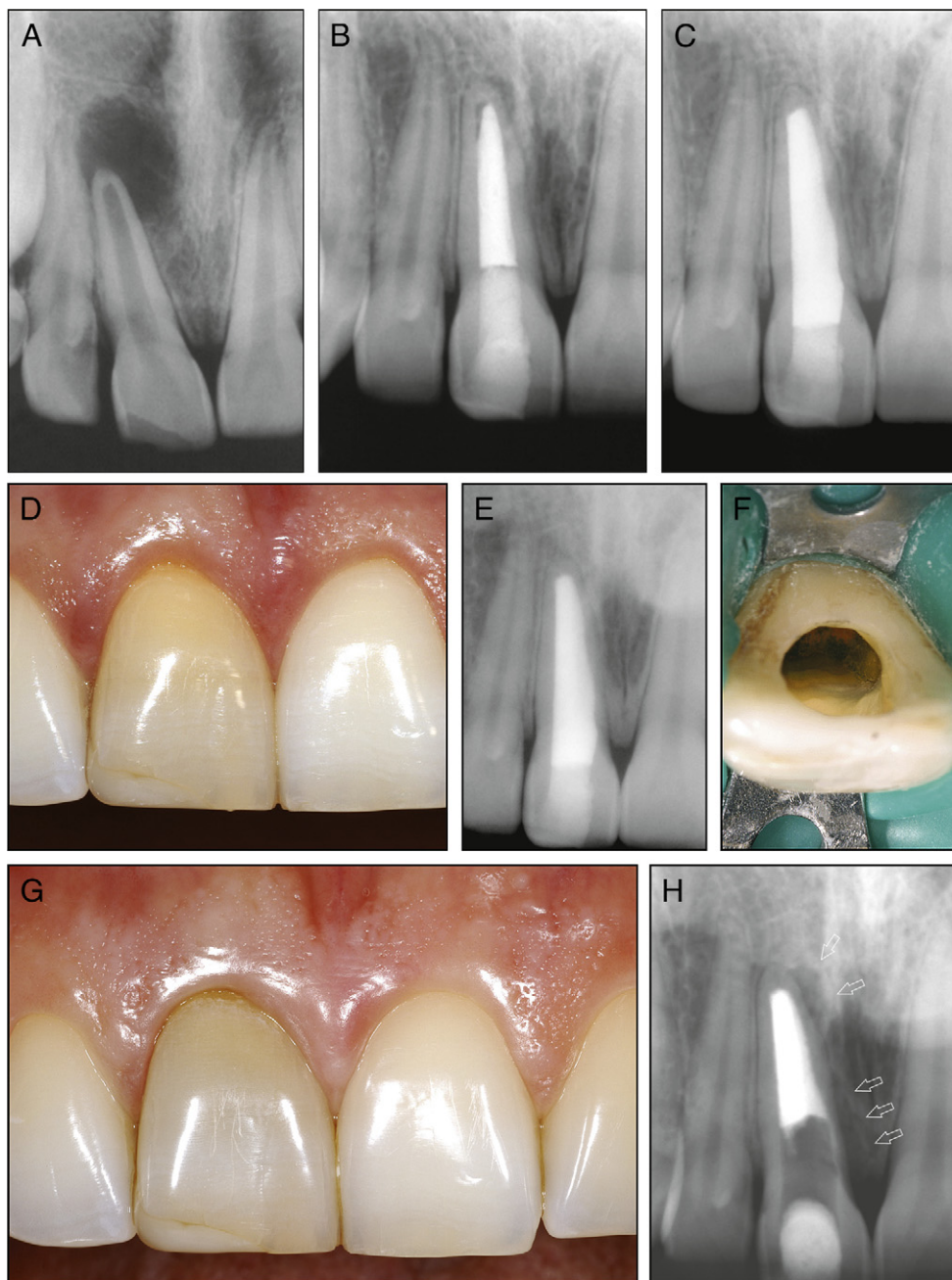


Figure 1. (A) Large periapical radiolucency associated with tooth #8. (B) Four-year follow-up radiograph. The radiolucency had considerably reduced in size, but healing was not observed. A radiolucent area is now visible apical to the root canal filling. This was not present in the postoperative radiograph and is attributable to dissolution and washing out of calcium hydroxide incompletely removed from the root canal before obturation. (C) Radiograph taken 2 years and 4 months after retreatment. Complete healing was evident. (D) Eleven years and 7 months after retreatment the tooth had suddenly turned yellowish. (E) No radiographic changes could be seen at this time. (F) Removal of restorative materials disclosed a fracture line on the mesial wall of the pulp chamber. (G) The crown was successfully bleached, but the patient returned only after 5 years and 9 months. The tooth had a grayish color. (H) The radiograph taken at this time revealed an emerging radiolucency on the mesial aspect of the apex and an angular defect in the marginal periodontal bone (arrows).

One week later the crown had regained the same color of neighboring teeth. The patient was told that this was only a temporary treatment and was invited to schedule substitution of the tooth with an implant in a reasonably short time. She did not return for treatment until 5 years and 9 months later (16 years and 9 months after completion of retreatment). The tooth now had a grayish color (Fig. 1G), and the patient declared that it started to lose its whiteness 1 year after the bleaching approach and was slowly becoming gray. The tooth was

asymptomatic, and the access filling was apparently in good condition. A radiograph taken at this point (Fig. 1H) showed that a radiolucency had formed on the mesial aspect of the root apex. A bony angular defect was also present mesially. Percussion test yielded negative response, but probing revealed a 6-mm-deep periodontal pocket limited to the mesiopalatal area. The patient then decided for extraction of the tooth.

The apicolateral lesion remained attached to the root tip at extraction (Fig. 2A and B). The tooth crown fractured during extraction,

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