

# Anatomic and Microbiologic Challenges to Achieving Success with Endodontic Treatment: A Case Report

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## Abstract

This article describes a case of persistent apical periodontitis that required several nonsurgical and surgical approaches for resolution. A 28-year-old woman presented with a large symptomatic apical periodontitis lesion associated with the maxillary left lateral incisor that persisted in spite of previous nonsurgical and surgical endodontic treatment. Root canal retreatment was accomplished, but the lesion only showed a slight decrease in size after 18 months. Forty-six months after retreatment, the patient returned because of reemergence of symptoms. Radiographically, the lesion remained relatively unaltered. Periradicular resurgery was performed, and a biopsy specimen consisting of the lesion and the apical part of the root was collected for analysis. Radiographic and clinical reevaluation after 4 years revealed complete healing. Histopathologic and histobacteriologic observations demonstrated that the lesion was a cyst, and that the probable reason for failure was the occurrence of bacteria within dentinal tubules and in a lateral canal slightly coronal to the amalgam root-end filling. This case report clearly illustrates the difficulties imposed by anatomic complexities in attaining a disinfection level that is compatible with periradicular tissue healing. (*J Endod* 2008;34:1249–1254)

## Key Words

Apical periodontitis, endodontic infection, periradicular surgery, root canal retreatment

Eradiation or at least reduction of the microbial burden in the root canal system has been regarded as essential to the success of both nonsurgical and surgical endodontic treatment (1, 2). Despite meticulous canal cleaning, shaping, disinfection, and obturation, endodontic treatment might still fail in some cases, and the causes for the unsuccessful outcome are mostly related to bacterial persistence in the apical canal in areas unaffected by treatment procedures (3, 4). In this regard, anatomic irregularities and/or pathologic entities such as calcifications might hinder the ability to achieve the desired treatment goals (4–6).

This article describes several nonsurgical and surgical attempts to treat a tooth with persistent apical periodontitis. This clinical case typically exemplifies the limitations imposed by anatomic complexities in achieving adequate disinfection during nonsurgical root canal treatment.

## Case Report

A 28-year-old woman was referred from a general clinician who had performed periradicular surgery for “removal of a cyst” around the root apices of the maxillary left lateral and central incisors. Two months after surgery, the patient presented with severe pain and swelling in the vestibule. Oral examination revealed vestibular swelling as well as a scar on the mucosa as a result of previous surgery (Fig. 1A). Radiographic analysis showed that the left lateral and central incisors had been subjected to both nonsurgical and surgical endodontic procedures. Amalgam root-end fillings were present, and a large radiolucency encompassed both root ends and extended to the adjacent left canine (Fig. 1B). The canine responded to sensitivity testing (thermal and electric pulp tests) within normal limits. Both left lateral and central incisors were tender to percussion and palpation and exhibited mobility grade 1. The patient was taking amoxicillin (2 g per day) for the current distress. Clinically, the soft tissue swelling was nonfluctuant and not amenable to incision and drainage, and continuation of the antibiotic therapy was considered. One week later, the patient was asymptomatic, and decision was made to nonsurgically re-treat the lateral incisor because the lesion was mostly centered around its root apex, whereas the apex of the central incisor was only partly involved. In addition, the quality of previous treatment in the lateral incisor was apparently low. Therefore, it appeared reasonable that the lesion was maintained by the lateral incisor.

The tooth was isolated with a rubber dam, the canal was accessed, and gutta-percha filling was removed with hand instruments. Working length was established to the root-end filling (Fig. 1C), and the canal was cleaned and shaped with Gates-Glidden burs and Hedström files. Three bigger file sizes were used after the first instrument that fit at the working length. Accordingly, the final file used for apical preparation at the working length was a #100 K-file. Irrigation was carried out with 1% sodium hypochlorite (NaOCl). The canal was then filled with chemically pure calcium hydroxide powder and temporized with IRM (Dentsply DeTrey GmbH, Konstanz, Germany).

Three weeks later, calcium hydroxide was removed, and the canal was cleaned and medicated once again as before. This approach was repeated 2 more times until the patient was symptom-free. After 75 days of calcium hydroxide medication, the canal was instrumented once again and filled with laterally compacted gutta-percha and sealer (Fig. 1D). During retreatment, a portion of the amalgam root-end filling was slightly displaced into the periradicular tissues. Finally, the tooth crown was restored with composite resin.

The patient was reexamined after 6 months, and the tooth was comfortable. At the 18-month follow-up examination, the radiolucency had slightly decreased in size and

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0099-2399/\$0 - see front matter

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doi:10.1016/j.joen.2008.07.002



**Figure 1.** Patient presenting with a flare-up 2 months after periradicular surgery “for removal of a cyst”. (A) A linear scar is evident on the mucosa. (B) Radiograph shows a large apical periodontitis lesion. Both central and lateral incisors had been apicoectomized, and amalgam root-end fillings were present. (C) Nonsurgical retreatment was performed in the lateral incisor, with the working length established at the root-end filling. (D) Root canal filling after 75 days of calcium hydroxide medication. Note that the amalgam root-end filling was slightly displaced into the periradicular tissues. (E) Eighteen-month follow-up evaluation. The lesion decreased in size but now exhibited sclerotic margins. The tooth was asymptomatic. (F) Three years and 10 months after retreatment, the patient presented with swelling and severe pain. (G) Radiograph showing that lesion size remained substantially unaltered when compared with (E). (H) Periradicular resurgery was performed, and the apical portion with the lesion attached to it was resected and submitted for further analysis. A new retrocavity was prepared and filled with amalgam. (I) Four-year follow-up radiograph shows healing of the apical periodontitis lesion.

was focused almost exclusively on the lateral incisor; however, margins of the original radiolucency were now well-delimited and accentuated with a heavy sclerotic, radiopaque line (Fig. 1E). The patient was encouraged to return for further yearly evaluations.

Twenty-eight months later (46 months after retreatment), the patient returned because of abscess formation in the previously operated region (Fig. 1F). A radiograph showed that the lesion size had remained relatively unaltered (Fig. 1G). The patient was given an additional

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