

Orthograde Endodontic Retreatment in the Context of a Chronic Apical Abscess Following Apical Surgery on Tooth 47

Introduction

A chronic apical abscess is a long-standing periapical inflammation characterized by the intermittent discharge of purulent content through a fistula into the oral cavity, and it is frequently associated with periapical bone destructionⁱ. The prolonged presence of inflammation can promote external root resorption processes, which complicates apical sealing through conventional obturation techniques using gutta-percha cones and sealerⁱⁱ.

Moreover, since the root canal filling material comes into direct contact with the periapical tissue, it should not interfere with the healing process, on the contrary, it should ideally stimulate tissue regeneration. In this context, the biocompatibility and sealing ability of gutta-percha cones and conventional sealers have been considered inferior compared to calcium disilicate- or trisilicate-based cements (e.g., MTA) ⁱⁱⁱ.

Case report

The patient, D.C., a 39-year-old male, was referred for the evaluation of tooth 47 by a prosthodontic colleague. Both the referring doctor and the patient expressed a desire to preserve the tooth on the arch, citing the risk of significant bone loss in the event of extraction, which would considerably complicate the placement of a dental implant in that area (Fig 1 and Fig 2).

The patient's history revealed multiple prior interventions on tooth 47. Approximately 12 years ago, the tooth underwent orthograde endodontic treatment, followed by the cementation of a metal core build-up and a metal-ceramic fixed dental prosthesis spanning teeth 47 to 45. Later, about 4 years ago, an apical surgery (apicoectomy) was performed due to the development of symptomatic apical periodontitis, as reported by the patient.

Clinical examination revealed that the prosthetic restoration had become decemented from tooth 47. The gingival mucosa in the area showed signs of erythema and swelling, and the presence of a sinus tract was noted (Fig 3).

Following clinical and radiographic evaluation, a diagnosis of chronic apical abscess was established. It was decided that orthograde endodontic retreatment would be performed in two sessions.

During the first session, after local anesthesia was administered, the prosthetic restoration was removed. The tooth was isolated using a rubber dam, and the walls of the access cavity were reconstructed using a bulk-fill composite material (Fig 4).

Root canal filling removal was carried out under copious irrigation with 5.25% sodium hypochlorite, using a U-File ultrasonic tip (Mani) and the XP-endo Shaper and XP-endo Finisher R rotary systems.

At the end of the session, the endodontic system was flushed with sterile saline solution (0.9% NaCl), the canals were dried using paper points, and 41% calcium hydroxide (Calasept, Directa) was placed as an intracanal medication for 21 days (Fig 5). The tooth was temporarily sealed with zinc phosphate cement (Adhesor).

During the second session, the provisional cement was removed, followed by complete elimination of the calcium hydroxide using sodium hypochlorite, EDTA solution, and the XP-endo Finisher R rotary system (Fig 6).

The root canal system was then obturated using a tricalcium silicate-based cement (MTA Angelus), as follows (Fig 7 and Fig 8):

- In the mesial canals, MTA was compacted along nearly the entire length of the canals, up to approximately 2 mm below the canal orifices, leaving space for the application of endodontic sealer (Ah Plus) and warm gutta-percha.

- In the distal canal, MTA was compacted in the apical half, allowing for the placement of sealer, warm gutta-percha, and dual-cure composite resin (Rebilda DC) used for core build-up (Fig 9). The composite was also introduced intracanal in the coronal portion of the distal canal to enhance the bonding surface to the remaining dentin.

A postoperative periapical radiograph was performed to assess the quality of the endodontic obturation (Fig 10). The patient was scheduled for follow-up after an 8-month interval.

At the 8-month recall, CBCT examination revealed signs of periapical bone remineralization, with regeneration of the buccal cortical plate and reformation of the lamina dura (Fig 11 and Fig 12).

Discussion

Orthograde endodontic retreatment, performed following the failure of a prior surgical endodontic procedure, may represent a viable therapeutic option in cases where the initial root canal obturation was inadequate or the coronal seal was compromised. This approach becomes especially relevant in clinical scenarios where extraction of a tooth affected by chronic apical abscess would result in significant alveolar bone loss, thereby complicating or even preventing future dental implant

placement. In such cases, preserving the natural tooth is a fully justified and strategically sound objective.

ⁱ Glickman, G.N., 2009. AAE Consensus Conference on Diagnostic Terminology: background and perspectives. *Journal of endodontics*, 35(12), pp.1619-1620.

ⁱⁱ Laux, M., Abbott, P.V., Pajarola, G. and Nair, P.N.R., 2000. Apical inflammatory root resorption: a correlative radiographic and histological assessment. *International endodontic journal*, 33(6), pp.483-493.

ⁱⁱⁱ Alsulaimani, R.S., 2016. Single-visit endodontic treatment of mature teeth with chronic apical abscesses using mineral trioxide aggregate cement: a randomized clinical trial. *BMC Oral Health*, 16(1), p.78.

Appendix of Figures

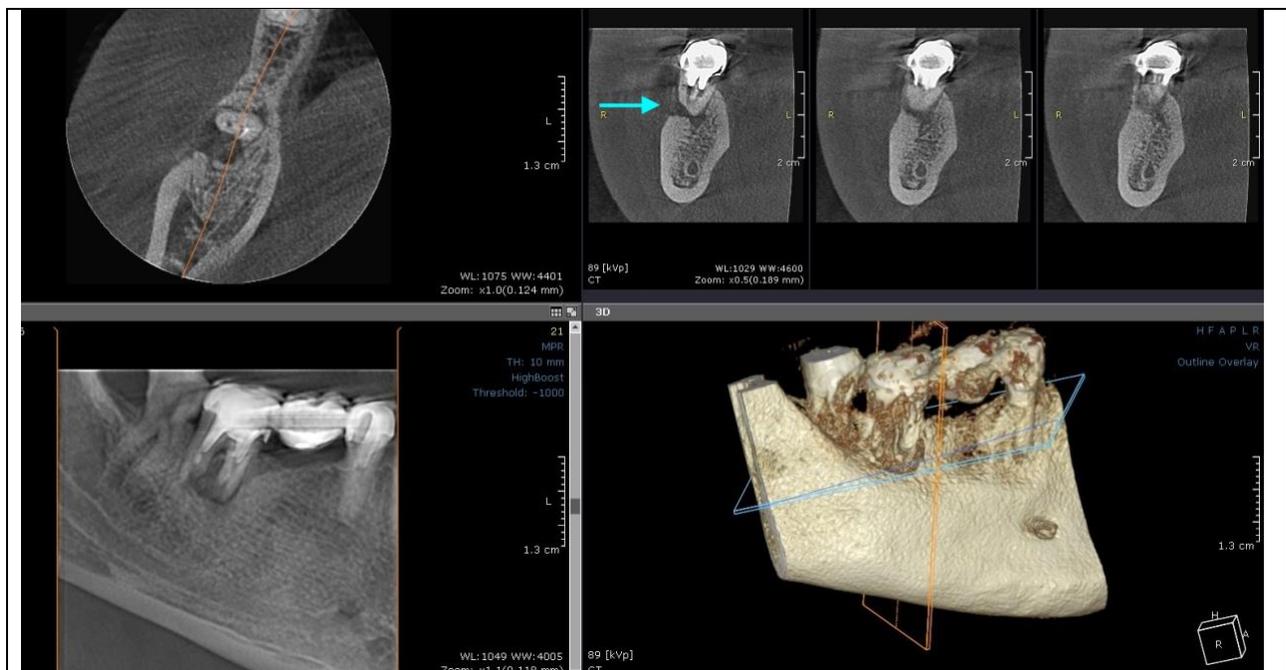


Fig. 1 CBCT image – preoperative: A CBCT scan was indicated to evaluate the bone support in order to establish a treatment plan (the arrow indicates the mesial root).

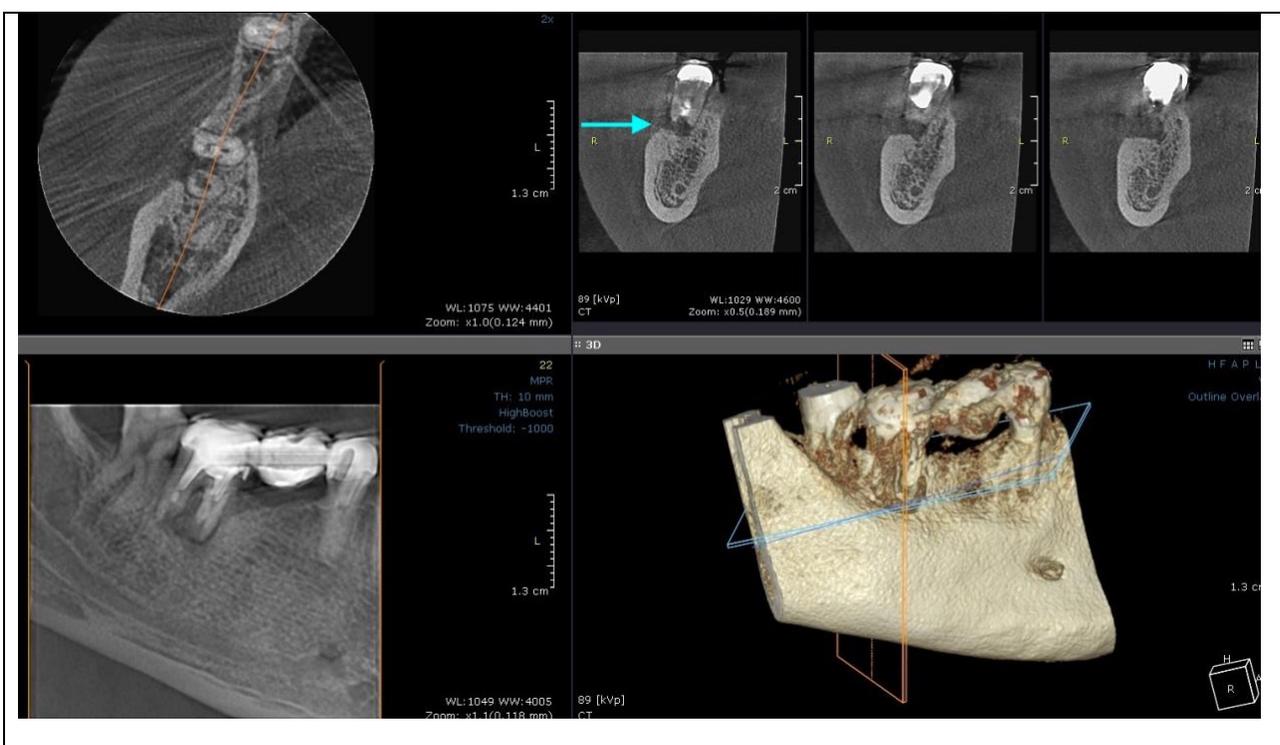


Fig. 2 CBCT image – preoperative: A CBCT scan was indicated to evaluate the bone support in order to establish a treatment plan (the arrow indicates the distal root).



Fig 3 Appearance of the vestibular mucosa and visualization of the sinus tract (arrow)



Fig 4 Pre-endodontic reconstruction of the pulpal cavity walls using bulk-fill composite



Fig 5 Calcium hydroxide as intracanal medication for 21 days

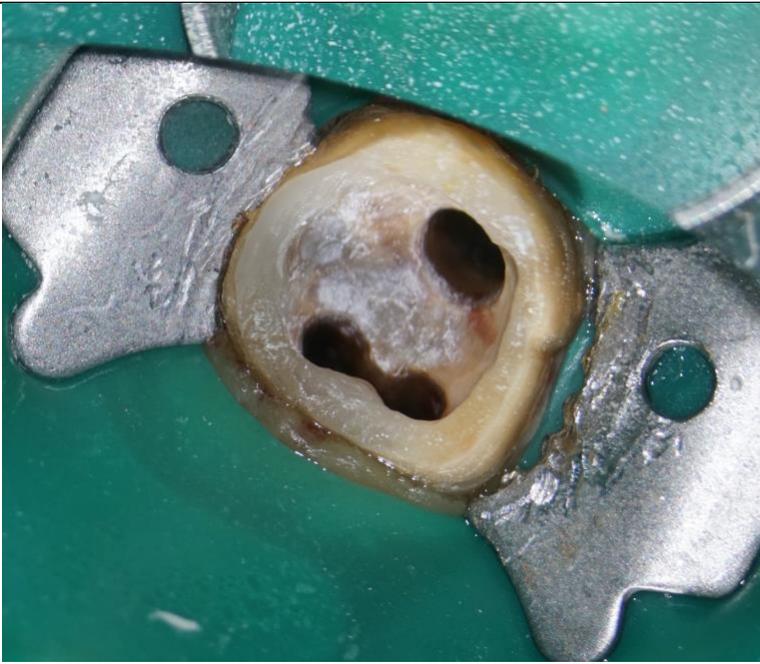


Fig 6 Appearance of the tooth before coronal restoration



Fig 7 Appearance of the root canal filling with MTA.

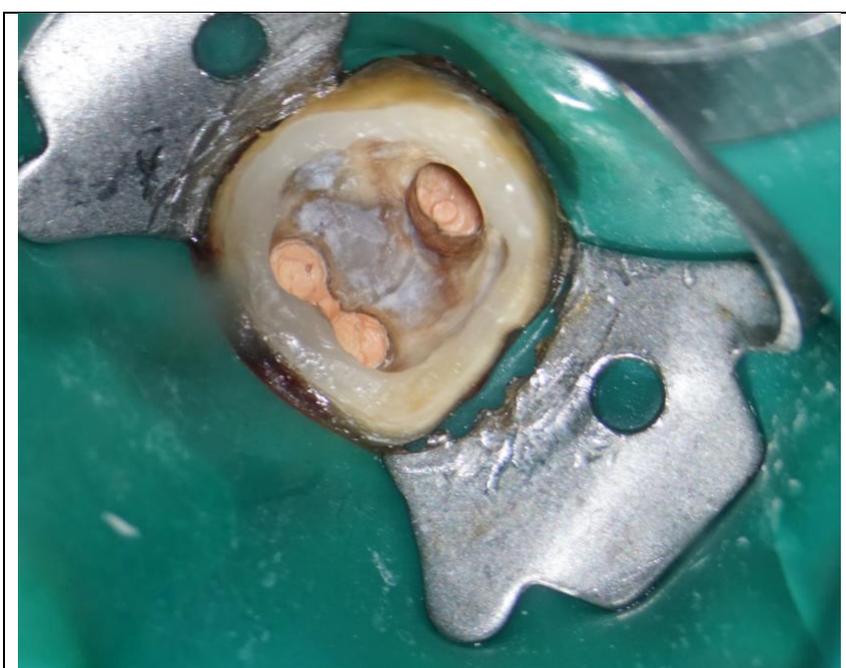


Fig 8 Final appearance of the root canal filling

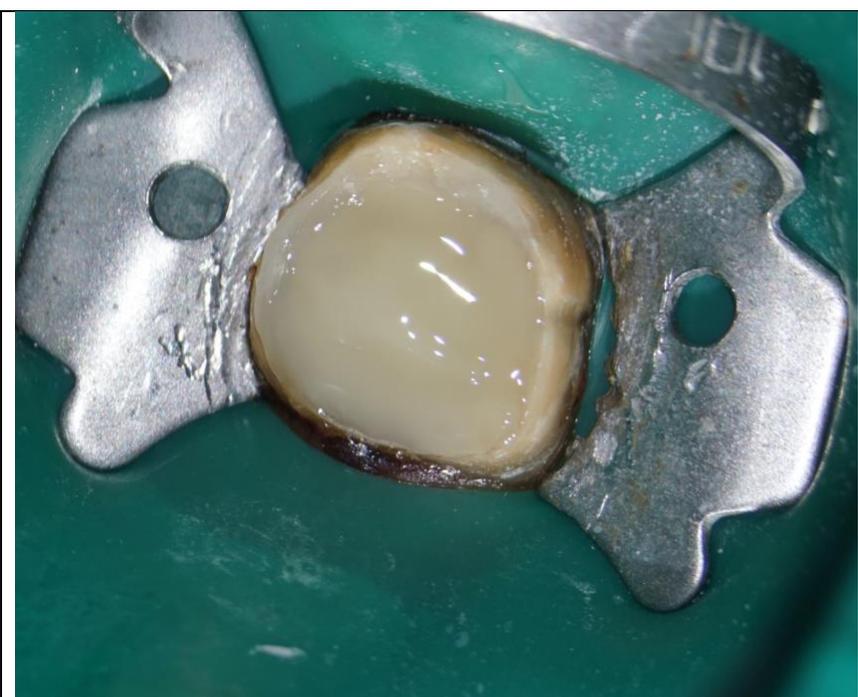


Fig 9 Appearance of the tooth after reconstruction with Rebuilda DC.

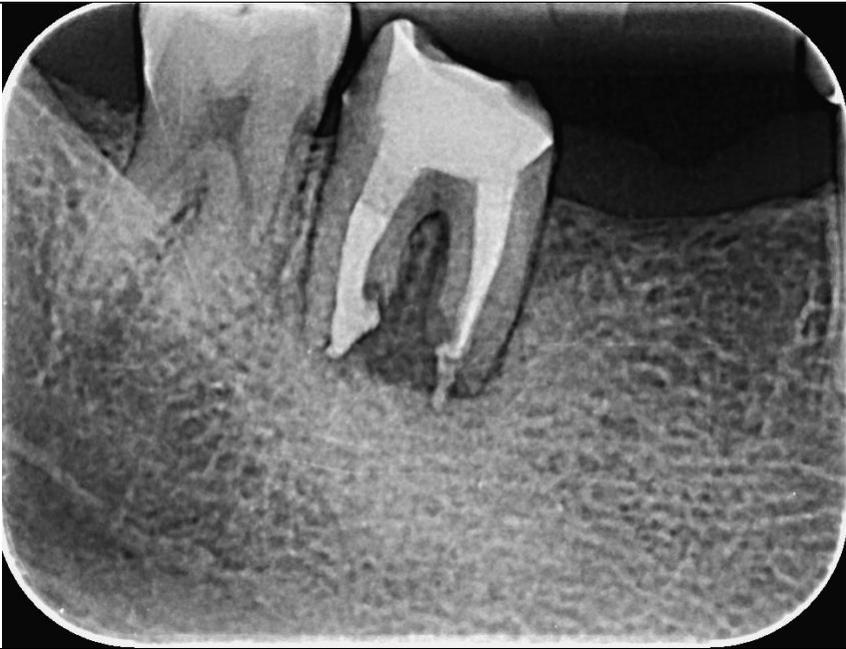


Fig 10 Postoperative periapical radiograph

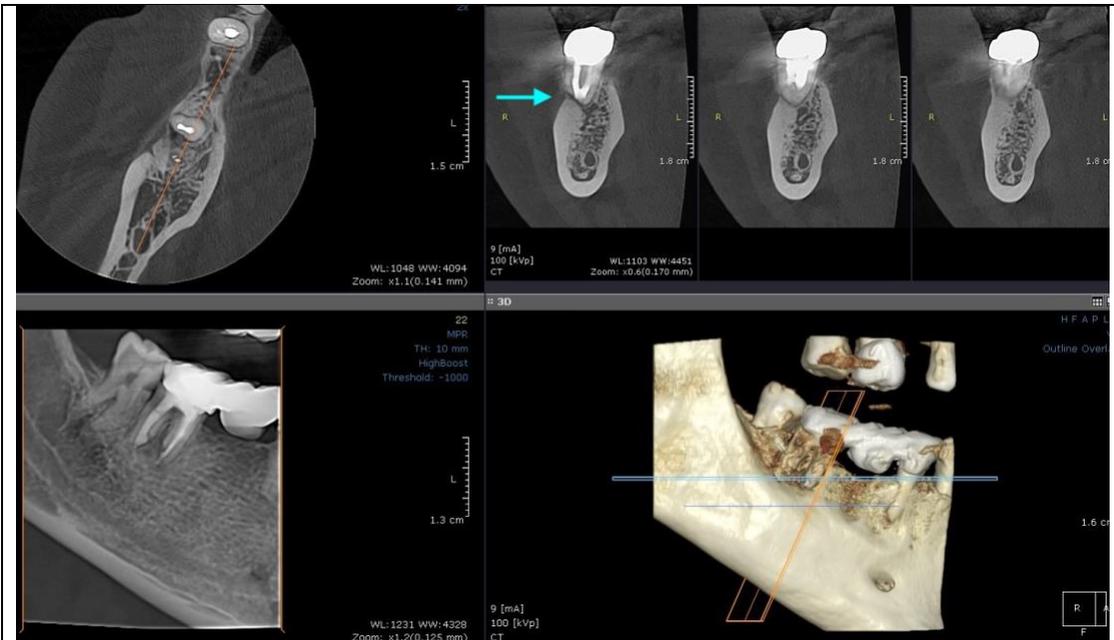


Fig 11 CBCT sections demonstrating periapical healing characterized by the restoration of the vestibular cortical bone and alveolar bone (the arrow indicates the mesial root)

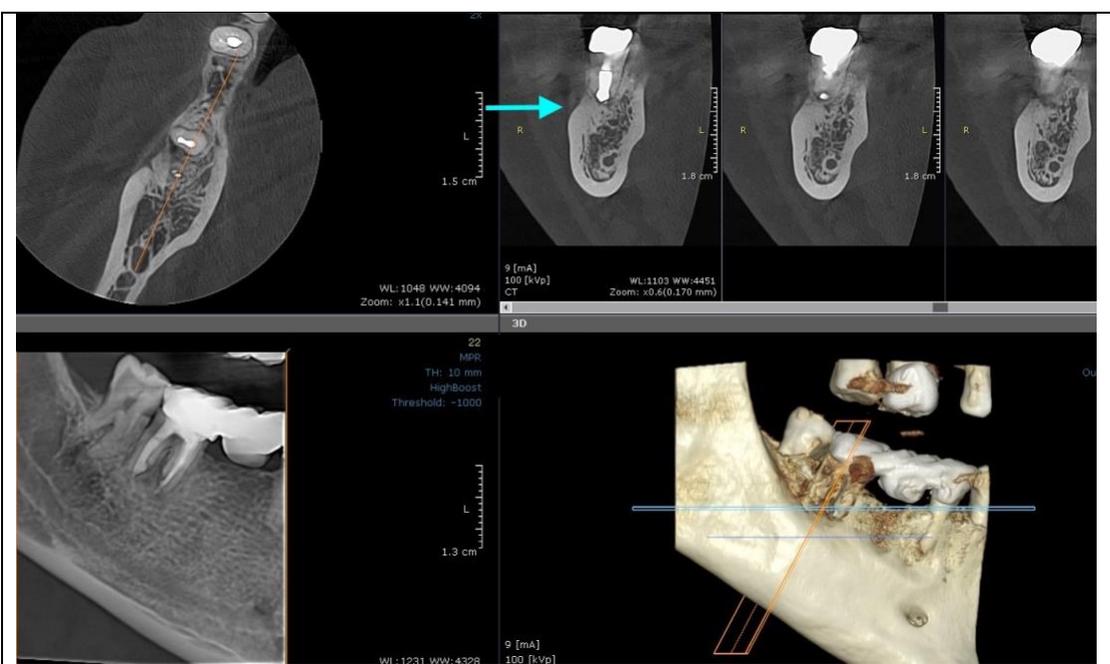


Fig 12 CBCT sections demonstrating periapical healing characterized by the restoration of the vestibular cortical bone and alveolar bone (the arrow indicates the distal root)