Use of Cone-beam Computed Tomography during Retreatment of a 2-rooted Maxillary Central Incisor: Case Report of a Complex Diagnosis and Treatment

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Abstract

A double-rooted maxillary incisor is an extremely rare anatomic variation. Only a few case reports describe this abnormal anatomy. In recent decades, cone-beam computed tomographic (CBCT) imaging has become more common for endodontic purposes. This case report describes the retreatment of double-rooted maxillary central incisors using CBCT imaging. In 2012, a 20-year-old man was referred to our department because of asymptomatic periapical lesions in teeth #8, #9, and #10. During the evaluation of a periapical radiograph, a rare anatomic variation, in the form of an additional root of tooth #9, was detected, and it was impossible to decide about the source of the lesion between teeth #9 and #10. During retreatment, after gutta-percha removal, CBCT imaging was performed; this allowed proper treatment of the additional root and a final diagnosis of normal periapical tissue of tooth #10 with no treatment needed. The 18-month follow-up revealed a healing lesion in tooth #9 and normal periapical tissue in tooth #10. During the treatment of teeth with an anatomic variation, CBCT imaging can serve as an auxiliary tool for 3-dimensional evaluation that influences treatment steps and techniques. CBCT scanning can be very useful in assessing the actual location of a periapical lesion, which influences diagnosis and treatment planning. *(J Endod 2015;41:2064–2067)*

Key Words

Cone-beam computed tomography, double rooted, retreatment, upper central incisor

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Recognizing the morphology of a root canal system is required for successful endodontic treatment (1–3). A review of literature reveals that the anatomy of maxillary central incisors is single-rooted teeth with a single canal in 100% of cases (4, 5). The prevalence of maxillary central incisors with 2 roots is extremely rare and has never been investigated; only a few clinical case reports have been published (6–13).

The evaluation of root canal morphology is based mainly on imaging techniques. The most precise technique is cone-beam computed tomography (CBCT) scanning, which is very effective for the diagnosis of anatomic variations and allows for accurate determination of the 3-dimensional location of roots and canals (14–17).

The purpose of this article was to report a rare case of double-rooted maxillary central incisor retreatment that was successfully managed by nonsurgical endodontic retreatment and supported by CBCT scanning as a diagnostic imaging technique.

Case Report

Patient Intake

A 20-year-old man was referred to the Department of Endodontics, Oral Maxillo-Facial Surgery at Tel Hashomer Medical Center, Medical Corps, Israel Defense Forces, Tel Hashomer, Israel. The reason for referral was asymptomatic periapical radiolucent areas in teeth #8, #9, and #10, which were revealed in a routine checkup.

Dental History. The initial root canal treatments in teeth #8, #9, and #10 were performed 5 years previously in a public dental clinic as a result of dental trauma.

Clinical and Radiographic Examination. The patient was not under any medical care and did not report dental pain. Tooth #9 had a composite filling in the palatal surface of the crown and a prominent labial notch (Fig. 1*A*). Soft tissue was normal, without swelling, sinus tract, or sensitivity to percussion or palpation. Periodontal probing of up to 3-mm depths and physiological mobility were measured. Adjacent teeth were within a normal mobility range and had no sensitivity to palpation or percussion. Tooth #8 had a labial notch and discoloration in the gingival third of the crown (Fig. 1*A*).

A diagnostic periapical radiograph of tooth #9 (Fig. 1*B*) revealed a main root canal with a radiopaque filling with normal radiograph density appearance and an additional mesial root that was shorter than the main one without any filling. Two radiolucent areas were detected: one of a 6-mm diameter from the mesial aspect of tooth #9 to the distal aspect of tooth #10 and one of a 5-mm diameter surrounding the mesial root. Tooth #10 had extrusion of filling material beyond the root apex. A 6-mm diameter area from the distal aspect of tooth #10 to the mesial aspect of tooth #9 was observed. In tooth #8, a 7-mm diameter radiolucent area surrounding the apex of the root was evident.

The initial diagnosis of teeth #8, #9, and #10 was determined (Table 1), and the treatment plan included the following:

1. Retreatment of tooth #8 was needed.
2. Retreatment of tooth #9: CBCT imaging was required to provide 3-dimensional evaluation of the additional root to enable the most appropriate treatment to be chosen

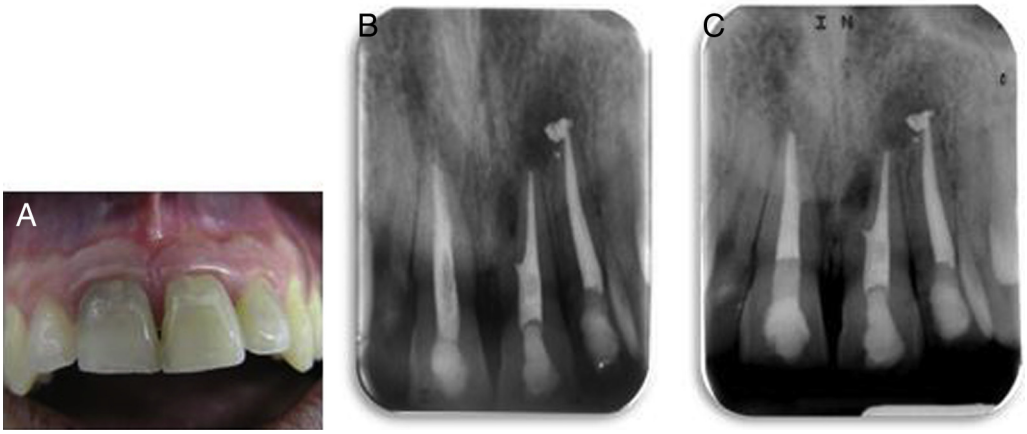

Figure 1. Anterior maxillary incisors: (*A*) preoperative clinical photograph, (*B*) preoperative periapical radiograph, and (*C*) postoperative radiograph of tooth #8.

TABLE 1. Initial Diagnosis of Teeth #8, #9, and #10

Diagnosis	Tooth #8	Tooth #9	Tooth #10
Pulp diagnosis Periapical diagnosis	Previously treated Asymptomatic apical periodontitis	Previously treated Asymptomatic apical periodontitis	Previously treated Differential diagnosis: asymptomatic apical periodontitis/normal periapical tissue

and to determine the precise location and source of the radiolucent area surrounding the apex of tooth #10. In order to reduce zinc oxide noise, the image was planned for after removal of gutta-percha (18).

3. Final diagnosis and treatment plan for tooth #10 would be determined using CBCT imaging.

After the treatment plan, tooth #8 was retreated (Fig. 1*C*).

Treatment of Tooth #9. At the first appointment, after rubber dam isolation, gutta-percha was removed from the main canal using a combination of ProFile #25/06 (Dentsply Maillefer, Ballaigues, Switzerland) at 600 rpm/2.4 Ncm and a Self-Adjusting File (ReDent Nova, Ra'anana, Israel) with chloroform (19, 20). The tooth was temporized by Cavit (ESPE, Seefeld, Germany), and the patient was referred for CBCT imaging (Carestream 9300; Carestream Health, Rochester, NY) in our department on the same floor (Fig. 2*A–D*).

CBCT imaging revealed the following:

1. Mesiobuccal location of the additional root was revealed.
2. A 17.7-mm length of additional root from the incisal edge was seen.
3. The point of separation from the main canal was located 14 mm from the incisal edge.
4. The length of the main canal was 21 mm from the incisal edge.
5. Both radiolucent areas were connected and the source of the apical radiolucent area was tooth #9.
6. Continuous periodontal ligament was around the root of tooth #10.

The final diagnosis of tooth #10 was that it had normal apical tissue and no treatment was needed. After CBCT imaging, the treatment

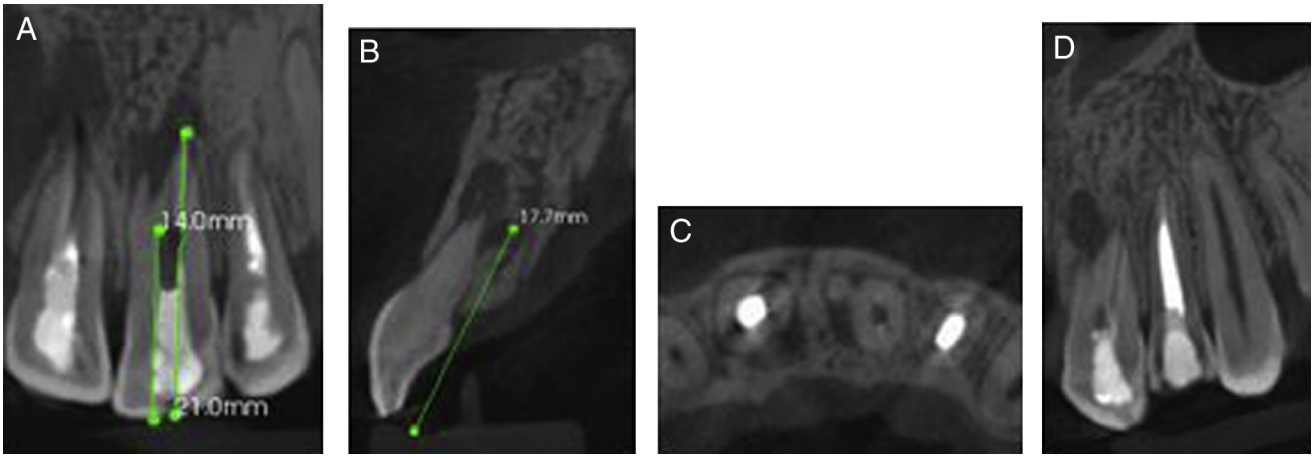

Figure 2. CBCT scan of teeth #9 and #10: (*A*) coronal slice, (*B*) sagittal slice of the additional mesiobuccal root; (*C*) cross-sectional slice at the bifurcation of roots of tooth #9, and (*D*) coronal slice of tooth #10.