Nonsurgical Endodontic Treatment of a Two-Rooted Maxillary Central Incisor

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Abstract

This case report presents an uncommon case of a two-rooted maxillary central incisor with a periapical radiolucent lesion. A 17-yr-old female patient was referred for dental consultation after a motorcycle accident. The maxillary left central incisor had a bifurcated root that was confirmed by radiographs taken at different angles. Nonsurgical endodontic therapy was performed. At the 1 yr recall examination, the tooth was asymptomatic and the radiograph showed that the periapical radiolucent lesion had healed. *(J Endod 2006; 32:478–481)*

Key Words

Two-rooted maxillary central incisor

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A thorough knowledge of root canal morphology is a prerequisite for endodontic therapy. Treatment may be unsuccessful because the dentist failed to recognize the unusual canal configurations. It is well known that maxillary central incisors are usually single-rooted teeth with a single canal (1, 2). The presence of an additional canal in the maxillary central incisor is rare. Most examples in the literature were case reports (3–13). The purpose of this article is to report a two-rooted maxillary central incisor with a periapical radiolucent lesion that was successfully managed by nonsurgical endodontic treatment.

Case Report

A 17-yr-old female suffered from a motorcycle accident and trauma to her midface in July 2003. She was referred to the Dental Department of Taipei Veterans General Hospital for dental consultation in August 2003. Her medical history was noncontributory. Tooth #8 was extracted at the time of the emergency treatment because of an unrestorable crown-root fracture. Clinical examinations revealed that the soft tissue was normal but tooth #9 had a crown fracture with caries involving the pulp. Tooth #9 was sensitive to percussion but responded normally to palpation. The periodontal probing depths of tooth #9 were within 3 mm. The mobility was within normal limits. Preoperative periapical radiograph showed a 4×7-mm radiolucency apical to the tooth #9. A bifurcated root was suspected because periapical radiograph showed double periodontal ligament spaces extending from the coronal to the apical portion at both side of the root of tooth #9 (Fig. 1). An additional palatal root became obvious after taking distal radiograph (Fig. 2). Based on the above examinations and tests, tooth #9 was diagnosed having a necrotic pulp and chronic apical periodontitis. A nonsurgical endodontic therapy was decided after discussion with the patient.

After rubber dam application, endodontic access was gained. Two canal orifices (facial and palatal) were located with an endodontic explorer (DG-16). The palatal canal was difficult to negotiate because of an initial palatal curve at the entrance and a second facial curve at the apical area. The working length, of facial and palatal canals, was determined radiographically (Fig. 3). The root canals were cleaned and shaped using hand instruments and Gates Glidden drills #2, #3, and #4 with passive step-back technique. The facial canal was instrumented to a master file size of 60 and palatal canal to size of 35. The root canals were copiously irrigated with 2.5% sodium hypochlorite solution. Calcium hydroxide/distilled water paste was then placed as an intracanal medicament. After 2 wk, the tooth was asymptomatic. The root canals were obturated with gutta-percha and Roth's 801 sealer (Roth International, Chicago, IL) using a lateral compaction technique (Fig. 4).

The patient returned 1 yr later. Tooth #9 was asymptomatic. A bridge from tooth #7 to tooth #9 made by a general dentist was noted. Clinical examination showed that the soft tissue looked normal. Tooth #7, tooth #9, and tooth #10 responded no tenderness to percussion or palpation tests. The periodontal probing depths of tooth #7 and tooth #9 were within depth of 3 mm. Radiographic examinations showed complete periapical bony healing of tooth #9 (Figs. 5 and 6). Post restoration without root canal filling of tooth #7 and deep filling involving the pulp of tooth #10 were disclosed. Periradicular radiolucencies at teeth #7 and #11 were also noted. Root canal treatment on teeth #7, #10, and #11 was suggested. The patient decided to have root canal therapy by a nearby general dentist.

Figure 1. Preoperative radiograph of tooth #9.

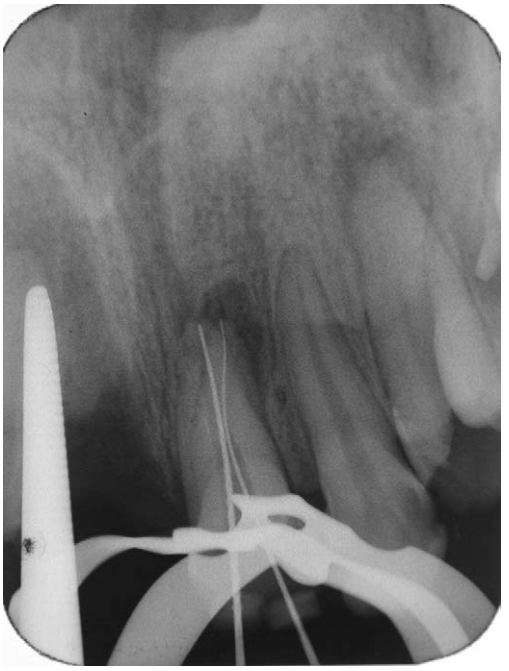

Figure 3. Working length radiograph demonstrated two canals.

Discussion

Maxillary central incisors are generally considered to have one root and one canal. Vertucci (1) has reported that maxillary central incisor presents single root and single canal in 100% of the cases. There were few case reports describing an additional canal in the maxillary central incisor (3–13). However, some of the cases that have been mentioned were germination or fusion teeth (7, 11). The maxillary central incisor with more than one root is a rare condition. Only few case reports have been mentioned in the literature (Table 1). Patterson (3), Heling (4), and Mader and Konzelman (5) observed two-rooted maxillary central incisors in routine radiographic examinations. Sinai and Lustbader (6) reported a case manifesting both two roots and two canals that was managed with an apexogenesis procedure. Michanowicz et al. (8) performed apical surgery on a two-rooted maxillary central incisor, but radiographs suggested the possibility of germination. Lambruschini and Camps (10) managed a two-rooted maxillary incisor with nonsurgical endodontic retreatment. In 2003, Genovese and Marsico (12) reported a maxillary central incisor with two roots treated with endodontic retreatment. Periradicular surgery was performed to eliminate excess filling. Gonzalez-Plata and Gonzalez-Plata (13) presented a

Figure 2. Radiograph of tooth #9 taken from a distal angle.

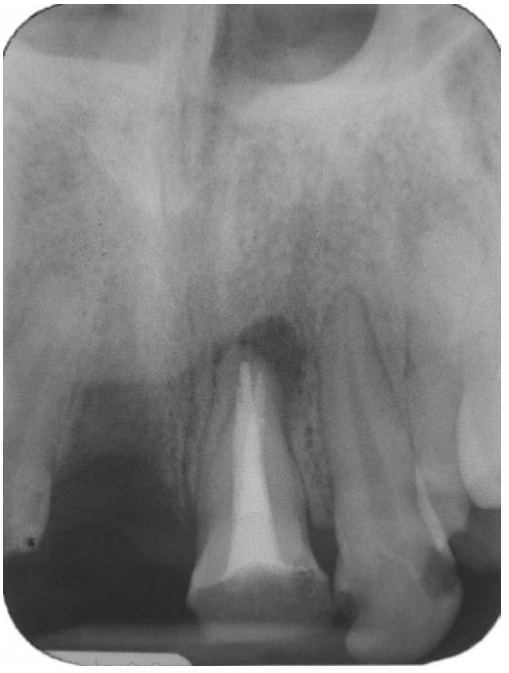

Figure 4. Postoperative radiograph.

Figure 5. 1-yr recall radiograph demonstrated complete bone filling.

Figure 6. Radiograph taken from distal angle at 1-yr recall.

case of two-rooted maxillary incisor. Anatomical complexity of the tooth lead to perforation in the distal root during conventional treatment, thus a surgical approach was taken. In the present case, we noted the uncommon morphology of two-rooted maxillary central incisor in the initial evaluation. Nonsurgical endodontic treatment was performed carefully. The 1-yr recall showed the treatment was successful.

Sabala et al. (14) reported that aberrations occurring less than 1% of the time were 90% bilateral. However, more than half of the case reports of two-rooted maxillary central incisors we reviewed were unilateral (Table 1). In the present case, we did not know whether the right maxillary central incisor had two roots or not because it was extracted at the time of the emergency treatment.

Cautious interpretation of radiograph is important in clinical endodontics. The first radiograph of this dual-rooted maxillary central incisor had double radiolucent lines around the root surface (Fig. 1). It had been read as an oblique fracture line especially when this patient had a history of traumatic injury. After taking a different angle radiograph, the correct diagnosis of two roots was made. Brynolf (15) stated that correct endodontic diagnosis was obtained 74% of the time with one radiograph and 90% of the time with three radiographs that included an angled view. Therefore, the clinician should take more than one radiograph from different angulation. Tracing the outline of the root surface cautiously can also help in the diagnosis. An endodontic microscope may be useful to detect fracture lines and locate the additional canal orifices.

The experience from the present case demonstrates the variability of root canal morphology of maxillary central incisor. The clinician should be careful that even the most routine of cases might deviate from the usual.

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TABLE 1. Summary of case reports of the maxillary central incisor with more than one root

Authors	Year	Bilateral or Unilateral	Number of Root/Canal	Treatment
Patterson	1970	Unilateral	2/2	None
Heling	1977	Unilateral	2/2	None
Mader and Konzelman	1980	Unilateral	2/2	None
Sinai and Lustbader	1984	Unilateral	2/2	Apexogenesis
Michanowicz et al.*	1990	Unilateral	2/2	Surgery
Lambruschini and Camps	1993	Not mentioned	2/2	Conventional RCT
Genovese and Marsico	2003	Not mentioned	2/2	Conventional RCT + Surgery
Gonzalez-Plata and Gonzalez-Plata	2003	Not mentioned	2/2	Conventional RCT + Surgery
Present case		Unknown	2/2	Conventional RCT

*Possible germination.

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