

# Maxillary Central Incisor With Two Root Canals: A Case Report

Emílio Carlos Sponchiado, Jr, DDS, MD,\* Hanan Awwad Abdel Qader Ismail, Ac,<sup>†</sup>  
Márcia Raquel Lima Braga, DDS,<sup>†</sup> Fabrício Kitazono de Carvalho, DDS, MD,<sup>†</sup>  
Cláudia Andréa Correa Garcia Simões, DDS, MD\*

## Abstract

The success of endodontic therapy requires a knowledge of the internal and external dental anatomy and its variations in presentation. The internal anatomy of the maxillary central incisor is well known and usually presents with one root and one radicular canal system. This case report describes an endodontic treatment of a maxillary central incisor with two roots and two canal systems, demonstrated by radiography and computerized tomography examinations. (*J Endod* 2006;32:1002–1004)

## Key Words

Maxillary central incisor, pulp vitality, root canal



Figure 1. Right maxillary central incisor for root canal treatment.

From the \*Department of Dentistry, State University of Amazonas-UEA, Manaus, Amazonas, Brazil; <sup>†</sup>Dentistry School of Amazonas-CIEC, Manaus, Amazonas, Brazil.

Address requests for reprint to Dr. Emilio Carlos Sponchiado Jr, Department of Biotechnology, State University of Amazonas, s. carvalho leal 1777, Manaus, Amazonas, Brazil. E-mail address: [spemilio@ig.com.br](mailto:spemilio@ig.com.br) 0099-2399/\$0 - see front matter

Copyright © 2006 by the American Association of Endodontists.

doi:10.1016/j.joen.2006.03.022

One of the main objectives of nonsurgical endodontic treatment is the elimination of infections from the root canal system and the prevention of reinfection of the root canal system (1). However, endodontic treatment can fail for many reasons, such as diagnostic errors, persistence of the infection in the root canal system, errors in debridement and shaping of the root canal systems, instrument fractures, and poor restorations. Thus, the knowledge of the internal dental anatomy is of great importance for correct endodontic treatment. Therefore, it is important that dentists consider the anatomical variations of root canal systems. These variations can also be found in the maxillary central incisors, as shown in the literature. This group of teeth rarely presents with two root canal systems (1–4).

The objective of the present study is to present a clinical case of endodontic treatment of a maxillary central incisor with two roots and two root canals, demonstrated by radiography and computed tomography (CT) examinations.

## Case Report

A 27-year-old female Caucasian was referred to the clinic of Endodontics of the Amazonia Institute of Superior Education-CIEC/IAES, Manaus, Amazonas, for root canal treatment of the right maxillary central incisor (Fig. 1). After the pulp vitality tests and radiographic examination the tooth was diagnosed with an irreversible pulpitis and normal periradicular tissue. The tooth was isolated with a rubber dam and disinfected. After the initial radiographic examination the presence of two roots and two root canals was evident, with one mesial and the other distal (Fig. 2). The access surgery was performed with high-speed round diamond burs No. 1015 (KG-Sorensen, Barveri, SP), under continuous irrigation with water spray. Compensatory wearing was carried out with a high-speed Endo-Z stainless steel bur (Maillefer, Dentsply, Brazil), under continuous irrigation with water spray. The root canals were irrigated with 1% sodium hypochlorite solution. After this procedure, the root measurement was carried out and chemomechanical preparation by the Crown-Down technique with Pro-File system (Dentsply-Maillefer, Rio de Janeiro, RJ, Brazil), up to file number 40 for mesial canal system, and #35 for the distal canal system. The right permanent maxillary central



**Figure 2.** Presence of two roots and two root canals.

incisor was obturated by using the hybrid thermo-mechanic technique with AH Plus cement (Dentsply, Rio de Janeiro, RJ, Brazil). **Figure 3** shows the final X-ray after root canal therapy. A postoperative CT examination was carried out to confirm the obturation (Figs. 4 and 5). The patient was observed for 3 months through clinical and radiographic examination and the tooth remained asymptomatic.

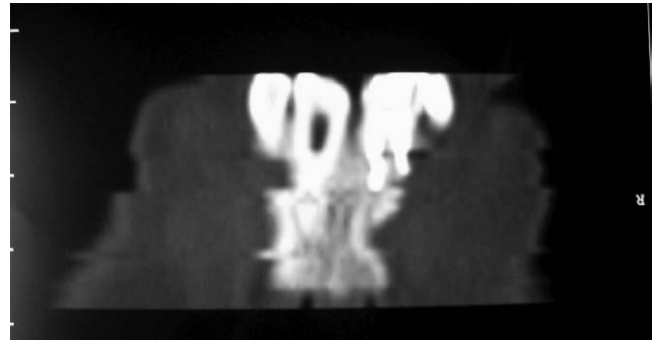
**Discussion**

The present report illustrates a rare case of maxillary central incisor with two root canals, without morphological anomaly of the crown. According to the literature (5), there are no limits for the morphological variability of the root canal. This emphasizes the need for practitioners to take into consideration anatomical variations in number and architecture of the root canal systems.

Finding more than one canal in maxillary central and lateral incisors is rare. In fact, according to the literature (6), 100% of these teeth show single canals, although the survey of (1) reported that 3% of maxillary lateral incisors may have two canals. The description of multiple canals in these teeth is limited to case reports of anomalies known as fusion, gemination or *dens invaginatus* (7–15).



**Figure 3.** The final X-ray after root canal therapy.



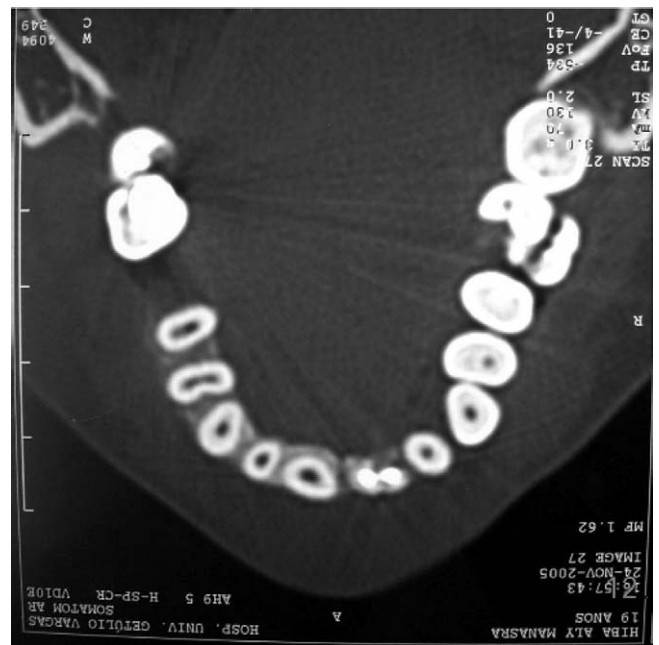
**Figure 4.** CT examination; longitudinal.

There are few cases of maxillary central incisors with two canals reported in the literature (2, 4) and most of them present morphological alteration, such as macrodontia and fusion (4). It was reported an endodontic treatment of a maxillary central incisor with normal clinical crown and two root canals, one buccal and one lingual (2).

In the present clinical report, it was possible to visualize the canals through the evaluation of the initial X-ray. The access surgery was extended mesiodistally to improve the visibility and the access for the endodontic instrumentation that was carried out with rotating instruments, considering the canal curvature. For the same reason the tooth was obturated using the hybrid thermo-mechanic technique. The CT was performed with axial and coronal sections to verify the limits of the filling and the root canals detachment.

**Conclusion**

The lack of knowledge about all possible root canal anatomical configurations and the nonuse of different diagnostic resources can lead dentists to leave remaining necrotic tissue and toxic products used during endodontic procedures in the interior of the nontreated canal, resulting in an unsuccessful endodontic treatment. Thus, this study demonstrated the importance of a correct diagnosis for the endodontic practice.



**Figure 5.** CT examination; transversal.

### References

1. De Deus QD. Endodontia, 5<sup>th</sup> ed. Medsi: Rio de Janeiro, 1992.
2. Genovese FR, Marsico EM. Maxillary central incisor with two roots: a case report. *J Endod* 2003;29:220–1.
3. Cabo Vale M, Gonzales JM. Maxillary central incisor with two root canals: an unusual presentation. *J Oral Rehabil* 2001;28:797–8.
4. Cimilli H, Kartal N. Endodontic treatment of unusual central incisors. *J Endod* 2002;28:480–1.
5. Slowey RR. Radiographic AIDS in the detection of extra root canals. *Oral Surg* 1974;37:762–72.
6. Vertucci F. Root canal anatomy of the human permanent teeth. *Oral Surg* 1984;58:589–99.
7. Goldberg JM, Gross M, Rankow H. Endodontic therapy involving fused mandibular second and third molars. *J Endod* 1985;11:346–7.
8. Thompson BH, Portell FR, Hartwell GR. Two root canals in a maxillary lateral incisor. *J Endod* 1985;11:353–5.
9. Reeh ES, Eldeeb M. Root canal morphology of fused mandibular canine and lateral incisor. *J Endod* 1989;15:33–5.
10. Wong M. Treatment considerations in a geminated maxillary lateral incisor. *J Endod* 1991;17:179–81.
11. Mangani F, Ruddle CJ. Endodontic treatment of a “very particular” maxillary central incisor. *J Endod* 1994;20:560–1.
12. Peyrano A, Zmener O. Endodontic management of mandibular lateral incisor fused with supernumerary tooth. *Endod Dent Traumatol* 1995;11:196–8.
13. Beltes P. Endodontic treatment in three cases of dens invaginatus. *J Endod* 1997;23:399–402.
14. Hülsmann M. Dens invaginatus: aetiology, classification, prevalence, diagnosis, and treatment considerations. *Int Endod J* 1997;30:79–90.
15. Walvekar SV, Behbehani JM. Three root canals and dens formation in a maxillary lateral incisor: a case report. *J Endod* 1997;23:185–6.