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# Maxillary Central Incisor with Two Root Canals and Two Separate Roots: A Case Report

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## Abstract

**Background :** Maxillary central incisors have been reported as presenting with only 1 root canal and a single root in 100% of cases. Variations in the number of roots or canals in the upper central incisors are rare. Therefore, to achieve a technically satisfactory endodontic outcome, the clinician must have adequate knowledge of the internal canal morphology and be aware of the possible variations.

**Case Presentation :** The purpose of this paper was to report a clinical case with a varying number of roots in a right maxillary central incisor.

**Conclusion :** After the appropriate cleaning and shaping of the missed root canal, it was filled using the Cold lateral compaction technique. Follow up radiograph showed complete healing of the lesion after 36 months.

## Key words

Cold lateral compaction; Dental Operating Loope; Internal Anatomy; Maxillary Central Incisor.

## Introduction

The success of root canal treatment is highly dependent on the cleanliness and shaping of the root canal system. The aim is to removal of the pulp tissue and bacteria and their by-products, while the canal is shaped in preparation to receive the filling material<sup>1</sup>.

To achieve cleanliness and decontamination of the canal, adequate knowledge of the internal anatomy of the teeth and possible variations is essential. The use of a dental operating microscope with adequate instruments that permit visualization and negotiation of the root canal system is also important<sup>2</sup>.

Since the first report by Hess in 1925, the maxillary central incisor has been reported as presenting with 1 root canal and a single root in 100% of cases<sup>3</sup>. In 1975, De Deus studied the internal dental anatomy of 1137 teeth. Among them were 37 maxillary central incisors and all of them had 1 root canal in a single root<sup>4</sup>. Further studies such as Vertucci in 1984 have also evaluated the internal anatomy of the teeth and reported the same findings<sup>5</sup>.

Despite these findings of 1 root canal in a single root being presented in the vast majority of cases, some variations have been reported. Reid and his colleague reported 2 cases of

maxillary permanent incisors with 2 root canals in a single root<sup>6</sup>. In 2003, Genovese reported a maxillary central incisor with 2 separated roots<sup>7</sup>.

In addition, Sponchiado and with his associate reported a case with this variation to the anatomy in a tooth with coronal

macrodontia<sup>8</sup>. In 2009, Gondin reported an upper incisor presenting 3 root canals<sup>9</sup>.

## Case Report

A 24 years old female visited DKRC smile design & Orthodontics on 6<sup>th</sup> March 2018 for endodontic evaluation of right maxillary central incisor. Previously, 3 months ago the tooth got RCT done by a dental surgeon for the complain of pain. Now the chief complain of the patient is a tiny sinus tract on the root area and masticatory discomfort. Clinical examination showed almost normal number, size and color of all teeth in the jaw. A sinus tract identified as tiny red swelling on mesial aspect of the root area with slight percussion pain of the tooth. The size and shape of the right maxillary central incisor were identical to the left (Fig 1) and there was no periodontal problem. As history reveals previous endodontic treatment so no further advanced vitality test done.

Initial radiographic examination revealed that the tooth had 2 separated roots (Fig. 2). The palatal root exhibited radiopaque material, and the buccal supernumerary root showed a narrow canal and an apical radiolucent area. Sinus tract seems to be associated with the supernumerary.

After local anesthetization with 2% Lidocaine with 0.0005% Epinephrine the tooth was isolated, all the provisional cement was removed and the pulp chamber was irrigated with 2.5% sodium hypochlorite solution (i-dental Lithuania). Using a 3.5x magnification on a surgical loop, the gutta percha present in the palatal canal was assessed. The entrance of the buccal supernumerary root was obliterated. Using TRA 01 and TRA 24D ultrasonic tips (Dental Trinks, São Paulo, Brazil) and with the illumination and magnification provided by the loope, the buccal root was

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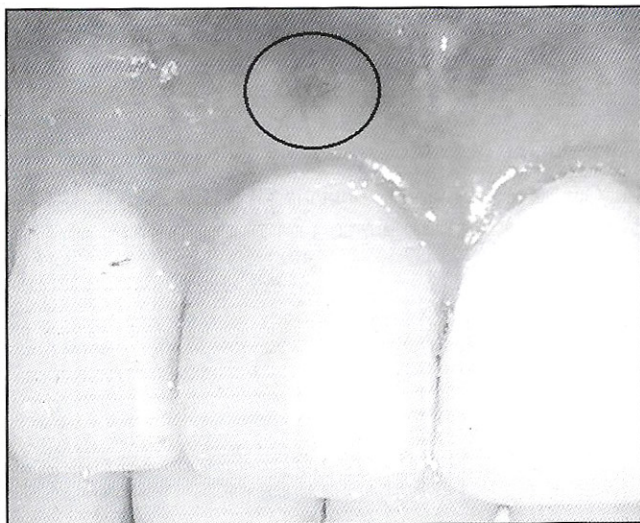
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located and negotiated. Existing Gutta percha was removed with Gutta solvent 'Eucalyptol' (Dentsply, France). The working length was established using the initial radiograph and a radiograph was taken to confirm the patency of the canal. No treatment was performed on the palatal canal.

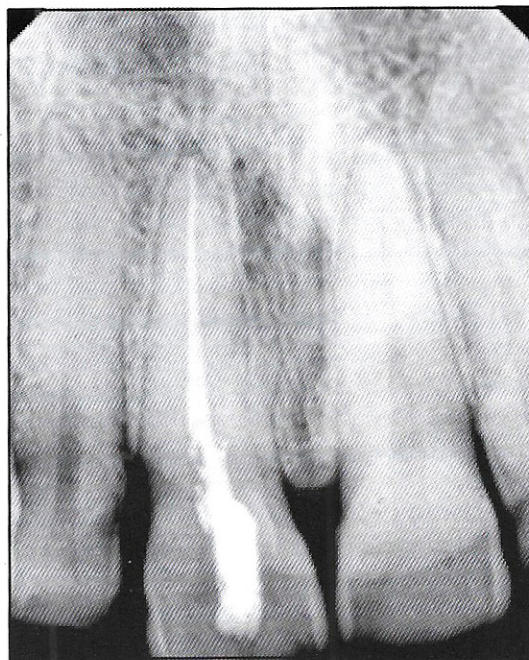
Chemical and mechanical instrumentation was performed with Gates Glidden burs (Dentsply Maillefer, Ballaigues, Switzerland) and manual files (Flexofile, Dentsply Maillefer, Ballaigues, Switzerland). At every change of instrument, the canal was thoroughly irrigated with sodium hypochlorite; after preparation, it was flooded with 17% EDTA ((i-dental Lithuania) for 3 min. Passive ultrasonic irrigation (PUI) was used for 20 sec to activate the hypochlorite (Endo activator, Dentsply, Ballaigues, Switzerland); this procedure was repeated 2 more times. After final hypochlorite irrigation, the root canal was dried with paper points. A dressing of calcium hydroxide with saline solution was left inside the canal for 14 days.

At the following appointment, the patient was asymptomatic with the disappearance of 'sinus tract'. After anesthesia and isolation the root canal was again accessed. The calcium hydroxide dressing was removed, the canal was irrigated with sodium hypochlorite then EDTA, and passive ultrasonic irrigation was performed using the same protocol as for the first visit, and finally the root canal was dried with paper points. Sealapex (SybronEndo, USA) cement and cold Gutta percha with lateral condensation technique were used to complete the root canal obturation. Final radiographs were taken from the ortho, mesial, and distal aspects. At the end a final restoration with composite resin was given.

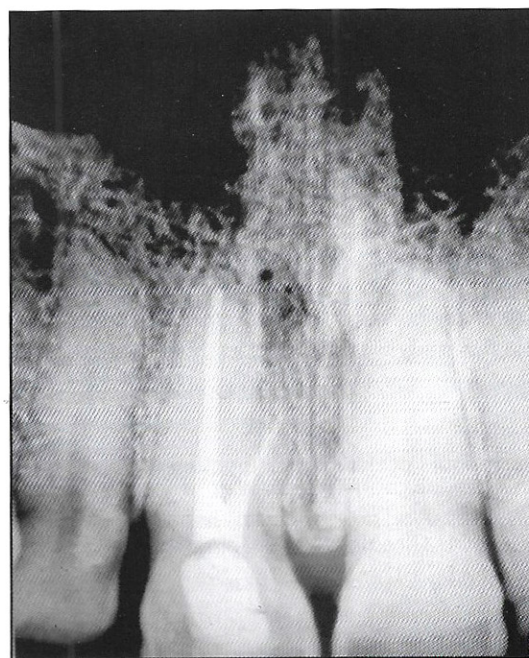
Three years after treatment, the patient was asymptomatic; the probing test was normal. Radiographic examination (fig. 3) revealed that the radiolucent area had become normal with characteristics of a healing area. The original lesion was completely healed, and there was no perforation at the buccal root.



**Figure 1** Identical central incisors with a sinus tract on the root area of right maxillary central incisor



**Figure 2** Initial radiograph showing an additional root which was split from main root



**Figure 3** Three years after treatment. Patient was asymptomatic, the lesion was completely healed

### Discussion

Conventional endodontic treatment, particularly in cases of anatomic variation, must be performed efficiently to ensure functionality of the tooth. Substantial coronal destruction may jeopardize prosthetic rehabilitation and encourage patients to reconsider prosthesis on implant. Teeth with a small coronal remnant and apical radiolucency may have a favorable outcome in cases where the root canal system is properly negotiated and filled. Root canal retreatment is

usually more cost-effective than an implant-supported restoration<sup>10</sup>. Considering that the buccal root had no canal obturation, performing apical surgery in this case would have been unlikely to be successful<sup>11</sup>.

Variations in the anatomy of the root canal may be associated with coronal aberrations such as dens invaginatus, talon cusp fusion, or germination, even with a clinically normal crown.<sup>12,13,14</sup> In this case, the patient had no natural crown, precluding the assessment of the original morphology. The case reported herein exhibited a rare situation of a maxillary central incisor with 2 independent root canals, classified as a class IV as described by Vertucci.

The success in this case was largely dependent on the localization, negotiation, and proper treatment of the buccal root. In spite of having had previous appointments with a dental surgeon, the complete domain of the internal anatomy was not achieved. It is believed that the use of magnification and illumination may increase the success of accessing "calcified" canals or those with an uncommon morphology<sup>15</sup>.

It is important to use ultrasonic tips with different shapes when removing calcifications, pulp nodules, or materials that obliterate the canal entrance. The utilization of microsionics is a safe way to deal with difficult anatomies by minimizing the risk of perforation or other adverse events<sup>16</sup>. Modern endodontic practice must involve not only knowledge of the internal anatomy, but also the technology necessary to adequately negotiate the entire root canal system.

### Conclusion

The use of dental operating loops and the appropriate ultrasonic tips can be considered an important armamentarium to locate root canals. The root canal treatment of the tooth reported in this study was effective, less invasive and cost effective in comparison with an implant-supported single crown.

### Disclosure

Both the authors declared no competing interest.

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