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Maxillary Central Incisor with Two Canals (Vertucci Type II configuration): A Case Report

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Abstract

The success of endodontic therapy involves a knowledge of both internal and external dental anatomy, as well as its variances 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 presents the endodontic treatment of a maxillary central incisor with single root and two canals, as confirmed radiographically.

Keywords: Maxillary Central Incisor, Vertucci Type II, Aberrant internal anatomy, Two canal system

Introduction

Eliminating infections from the root canal system and preventing reinfection of the root canal system are two of the primary goals of nonsurgical endodontic treatment.[1] Successful root canal therapy requires thorough cleaning and shaping, followed by complete obturation of the canal system. Therefore, for proper endodontic therapy, a thorough understanding of the internal and external anatomy of teeth is crucial.[2] For non-surgical root canal treatment, the maxillary central incisor is thought to be the least challenging tooth. This tooth is typically thought of as having a single root and a

single root canal system. Nonetheless, there can be numerous variations in the internal anatomy of the tooth; these are very uncommon and are typically linked to anomalous tooth development, such as dens invaginatus, fusion, gemination, or the existence of an extra root.3 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.[4, 5]

The present case study describes an endodontic treatment of right maxillary central incisors with two canal systems and without morphological anomaly of the crown.

Case Report

A 29-year-old female patient reported to the Department of Conservative Dentistry & Endodontics, Vydehi Institute of Dental Sciences & Research Centre, Bangalore with the chief complaints of pain and sensitivity in the upper front region of the jaw for the past 1 week. On elaborating, she gave a history of trauma that had occurred 1 month back after a fall in her upper front teeth. On examination, the tooth #11 was tender on percussion and was discoloured. Electrical pulp test and cold test revealed delayed response in relation to 11. Intraoral periapical (IOPA) X-ray revealed periapical changes in relation to 11. The presence of two canals was evident in both maxillary central incisors [Figure 1]. This case lies under Type II canal morphology (2-1) according to both Weine and Vertucci type of classification that is two separate canals leave the pulp chamber and join short of the apex to form one canal. After the pulp vitality tests and radiographic examination, the teeth were diagnosed as symptomatic apical periodontitis in relation to 11. The proposed treatment was endodontic treatment of 11 followed by restoration with crown.

Clinical Procedure

Under local anesthesia, the tooth was isolated with a rubber dam and disinfected. The access cavity preparation was done using high-speed Endo access bur # 2(Maillefer, Dentisply, Brazil) under continuous irrigation with water spray. A 15-size K file (Mani files, Japan) was used to negotiate the distal canal which was the master canal. The access cavity was enlarged slightly mesially, and the mesial canal orifice was explored using a no. 10 size K file (Mani files, Japan). A solution of 5% sodium hypochlorite (Septodont Parcan, India) was used to irrigate the root canals. The intraoral image demonstrates the central incisor having two canal orifices located mesial and distal. [Figure 2]. Working length determination was done following this process [Figure 3]. The working length of tooth # 11 was 23 mm in the distal canal and 18 mm in the mesial canal, where it joined the distal canal. Chemo-mechanical preparation was done by using Protaper Gold System (Maillefer, Dentisply, Brazil), up to file number F5 for distal canal system, and F4 for the mesial canal system. Master cone fit was checked with the RVG (Carestream 5200, Kodak) [Figure 4]. The tooth was then obturated by using F5 and F4 Gutta-percha (Dentsply Ballaigues, Switzerland) and AH plus sealer (Maillefer, Konstanz, Germany) in distal and mesial canals respectively. The post-operative RVG was taken to confirm the obturation quality [Figure 5 and 6] and access cavities were sealed with temporary material (MD-temp, Meta Biomed). After a week, light cure composite (Tetric N ceram, Ivoclar Vivadent) was used for post endodontic restoration. Finally, the tooth was restored with Porcelain fused to metal crowns. Patient was asymptomatic during the 1year follow-up period.

Discussion

The rare instance of a maxillary central incisor with two root canals and no crown morphological abnormality is depicted in this study. The literature states that the root canal's morphological diversity has no boundaries.[6] This highlights the necessity for practitioners to account for anatomical variations in number and architecture of the root canal systems.

It is unusual to have more than one canal in the maxillary central and lateral incisors. According to literature, 100% of these teeth have single canals.[7] However, a survey found that 3% of maxillary lateral incisors may have two canals.[1]

When a maxillary incisor has several roots or root canals, it's important to evaluate circumstances like fusion, gemination, dens in dente, palatogingival or distolingual groove, and variations in Hertwig's epithelial root sheath development.[8]

The clinical examination and pretreatment radiograph revealed no indications of enamel or dentinal invagination, indicating that dens in dente or dens invagination were unlikely to be the cause.

Before treating teeth with atypical anatomy, it's important to diagnose and evaluate them accurately. When seeing a worrisome image, it is recommended to perform a radiographic inspection from multiple angulations. The pre-operative radiographic examination allowed for visualisation of canals in this clinical report. The access cavity was expanded mesiodistally for better visibility and access during endodontic instrumentation, taking into account the curvature of the canal.

Clinicians must be mindful of unexpected root canal morphology when doing root canal therapy on the maxillary central incisor, despite having just one canal. Surgical loupes, endodontic endoscopes, and dental operating microscopes are commercially available equipment that can assist doctors in achieving these goals.[9]

Conclusion

This case report raises awareness among clinicians about abnormal root canal morphology in maxillary central incisors, emphasising the importance of taking extra care to detect and treat such instances.

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Legend Figures:

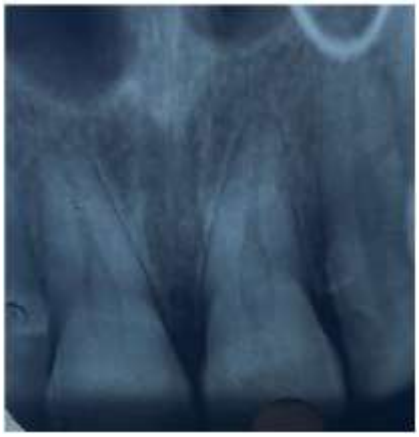

Figure 1: Pre-operative radiograph

Figure 2: Intraoral image demonstrates the central incisor having two canal orifices located mesial and distal

Figure 3: Working Length determination

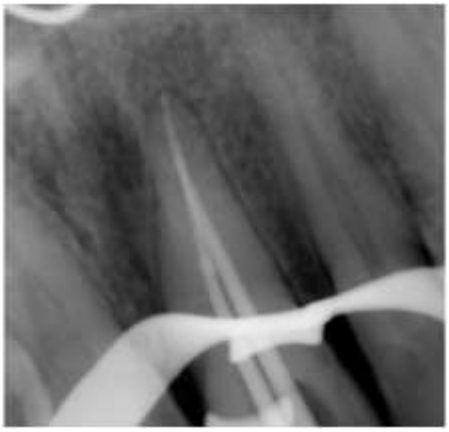

Figure 4: Master Cone fit

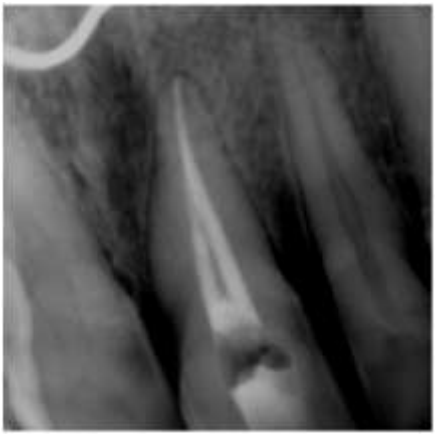

Figure 5: Post-obturation radiograph