

A Case of Successful Retreatment of a Maxillary Lateral Incisor with a Supernumerary Root

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Abstract

Knowledge about the morphology of the root canal system is a pre-requisite for achieving a successful outcome in root canal treatment. In this report, a patient with a maxillary lateral incisor which had previously undergone orthograde endodontic retreatment for two times is discussed. The tooth had been misdiagnosed with a palatal groove or a root fracture, its prognosis had been determined to be poor and extraction was advised by a practitioner. During our evaluation, an unrecognized supernumerary root and root canal were detected and the tooth was maintained successfully with orthograde endodontic retreatment. The use of cone beam computed tomography (CBCT) and magnification were of significance in the treatment process of this case.

Key words: Tooth, Supernumerary; Incisor; Maxilla; Root Canal Therapy

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INTRODUCTION

Achieving a successful outcome in endodontic treatment requires comprehensive knowledge about the tooth anatomy and root canal morphology [1]. Practitioners should always be aware of the possible anatomical variations in the root canal system of teeth, which may be correlated to ethnicity [2]. For instance, Vertucci [3] reported that in the United States, 100% of the maxillary lateral incisors had only one root canal, while Caliskan et al. [4] reported a 4.9% incidence for maxillary lateral incisors with two root canals in the Turkish population. Few case reports exist about two rooted maxillary lateral incisors [5,6]. Negligence and lack of knowledge regarding

variations in root canal morphology can lead to complications in the cleaning and shaping of the entire root canal system during endodontic treatment and subsequently unfavorable treatment outcomes. This paper reports a case of retreatment of a permanent maxillary lateral incisor with two separate roots and root canal, which was not recognized during two previous endodontic treatments.

CASE REPORT

A 43 year-old female with a non-contributory medical and family history was referred to our private clinic with a history of a buccal abscess and fistula in the upper right lateral incisor region.



Fig. 1. Preoperative radiograph

Dental history revealed root canal treatment done by a general practitioner 2.5 years ago and orthograde retreatment done one year ago by an endodontist due to persistent symptoms. A periodontal consultation done two months earlier yielded a differential diagnosis of a palatal groove or a root fracture. A periodontist suggested a poor prognosis and recommended extraction of the tooth.

Clinical examination showed a swelling and a fistulous tract in the palatal aspect of the right maxillary lateral incisor with localized symptoms. The tooth had been restored with composite resin. The maxillary right lateral incisor did not respond to thermal and electrical pulpal tests but was sensitive to palpation and percussion. The maxillary right central incisor and canine (controls) reacted normally to thermal and electric tests, palpation and percussion. The maxillary right lateral incisor exhibited a periodontal pocket depth of 10 mm only in one point in the palatal side; whereas in other areas and in the control teeth the probing depth was within the normal range.

Radiographic examinations (Fig. 1) revealed periapical rarefaction extending to the distal aspect of the root of the right maxillary central incisor and a small supernumerary root. Overall, the final diagnosis was chronic apical abscess due to a previous faulty root canal treatment. Initially, the maxillary right lateral incisor was anesthetized (2% lidocaine with 1:80,000 epinephrine; Daroupakhsh, Tehran, Iran) and after access cavity preparation, it was isolated with rubber dam. Gutta-percha was removed from the coronal-third of the root canal using #2 and #3 Gates Glidden drills. In this appointment, the location of the second orifice was detected with the aid of x2.5 magnification binocular loupes (Heine® HR, Heine Optotechnik, Herrsching, Germany) but we failed to negotiate this root canal. Irrigation was done using 0.2% chlorhexidine (Najo, Tehran, Iran) and subsequently the root canal was dressed with a mixture of calcium hydroxide and 2% chlorhexidine (Consepsis, Ultradent, South Jordan, UT) and sealed coronally with temporary filling material (Zonalin, Kemdent, ADP, Swindon, UK). Since the attempt to negotiate the second root canal was unsuccessful, a surgical approach

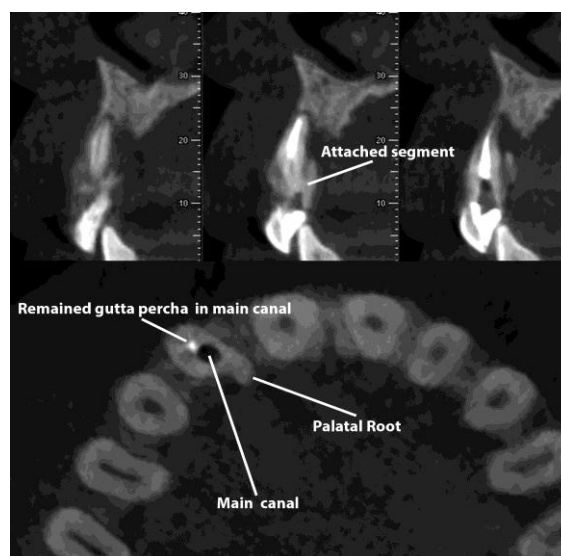


Fig. 2. Cone beam computed tomography scans, cross sectional and axial planes

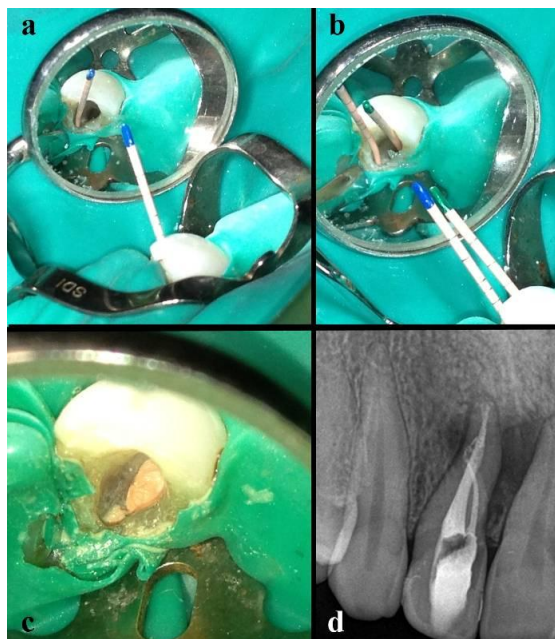


Fig. 3. (a), (b) Location of the supernumerary root canal in the palatal aspect of the tooth. (c) Tooth pulp chamber after obturation of the two root canals. (d) Post-operative radiograph.

was considered; therefore, regional CBCT scans were obtained to evaluate the root bifurcation site, area where the two roots were fused to each other and the proximity of the two roots and to decide about the appropriate flap design and surgical approach (Fig. 2).

The CBCT scans revealed an untreated palatal root, which was fused to the main root at the cervical level for which an envelope flap would be adequate for surgical palatal root amputation. Twenty days later, in the second appointment, the second root canal was negotiated and working length determination was done by an electronic apex locator (iPex, NSK, Tochigi, Japan) and confirmed radiographically. The remaining gutta percha in the main root canal was removed by a hand #20 K-file (Dentsply Maillefer, Ballaigues, Switzerland) and #30 H file (FKG Dentaire, La Chaux-de-Fonds, Switzerland). Cleaning and shaping of the palatal root canal was accomplished by #10.04, #15.05 and #20.06

Two rotary instruments (VDW, Munich, Germany); 0.2% chlorhexidine solution was used as an irrigant during the procedure. Again, the canals were dressed with a mixture of calcium hydroxide and 2% chlorhexidine and sealed coronally with temporary filling material (Zonalin, Kemdent, Wiltshire, UK). One week later, root canal obturation was performed using lateral compaction technique with gutta-percha (Ariadent, Tehran, Iran) and AH26 sealer (Dentsply, DeTrey, Konstanz, Germany) and the tooth was temporarily restored by Zonalin (Fig. 3).

The patient was referred for permanent restorative procedures. In the follow up appointment, eight months later, the tooth was restored with composite resin, no signs and symptoms were detected and resolution of the periapical pathology was observed (Fig. 4). Subsequently, on the 16-month follow up radiograph, healing was apparent and the patient had no sign or symptoms (Fig. 4).

DISCUSSION

Possible anatomical variations in the number of roots and root canals must be considered by every practitioner. Failure to discover the additional root canals can result in non-healing apical pathosis, exacerbation of pre-existing apical pathosis or uprising of new apical pathosis [7].



Fig. 4. (a) Eight-month follow up radiograph. (b) Sixteen-month follow up radiograph

Careful interpretation of preoperative radiographs, examination of the pulp chamber floor, use of magnification and illumination are very important for the detection of supernumerary and/or missed roots and root canals. In cases with complex root canal anatomy, CBCT can be used as an additional diagnostic tool [8]. This imaging technique exhibits high diagnostic value and limited radiation exposure and the additional diagnostic information provided by it in selected cases justifies the risk associated with the patient radiation dose [8,9].

Maxillary lateral incisor teeth are generally considered to have a single root with a single root canal [1,3]. Cases of maxillary lateral incisors with two [10] three [11] and four root canals [12] and two separate roots [6,13] have been reported. In this case, previous practitioners failed to diagnose the presence of a second root and root canal and only considered root fracture and the presence of a palatal groove as the differential diagnosis for this tooth; whereas, the presence of a single deep narrow sulcular pocket occurring in the absence of periodontal disease may indicate pathosis with endodontic origin such as presence of an additional root canal [14]. In these cases, if appropriate endodontic treatment with consideration of the etiology is accomplished, good prognosis can be expected [14].

Therefore, when confronting a case with a single deep narrow pocket in a tooth with a seemingly efficient root canal treatment, the presence of an additional root and/or root canal, although rare, should be considered before making a decision for extraction.

CONCLUSION

In conclusion, the clinicians should enhance their knowledge about the anatomical anomalies and variations in the root canal morphology of teeth undergoing endodontic treatment particularly with regard to the presence of additional root canals and

supernumerary roots. Detection of these variations has a significant impact on the long-term outcome of endodontic treatments and keeping in mind these variations may prevent unnecessary tooth extractions.

REFERENCES

- 1- Ingle J, Backland L, Baumgarthner J, Cleghorn B, Goodacre C, Christie W. Morphology of teeth and their root canal system. Hamilton, Ontario, BC Decker, 2008:151-70.
- 2- Aminsobhani M, Sadegh M, Meraji N, Razmi H, Kharazifard MJ. Evaluation of the root and canal morphology of mandibular permanent anterior teeth in an Iranian population by cone-beam computed tomography. *J Dent (Tehran)*. 2013 May;10(4):358-66.
- 3- Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol*. 1984 Nov;58(5):589-99.
- 4- Caliskan MK, Pehlivan Y, Sepetcioglu F, Turkun M, Tuncer SS. Root canal morphology of human permanent teeth in a Turkish population. *J Endod*. 1995 Apr;21(4):200-4.
- 5- Singh Matta M. Two rooted maxillary lateral incisor: a case report. *Iran Endod J*. 2012 Fall;7(4):215-8.
- 6- Dexton AJ, Arundas D, Rameshkumar M, Shoba K. Retreatment of maxillary lateral incisor with supernumerary root. *J Conserv Dent*. 2011 Jul;14(3):322-4.
- 7- Nair PN. On the causes of persistent apical periodontitis: a review. *Int Endod J*. 2006 Apr;39(4):249-81.
- 8- Ball RL, Barbizam JV, Cohenca N. Intraoperative endodontic applications of cone-beam computed tomography. *J Endod*. 2013 Apr;39(4):548-57.
- 9- American Association of Endodontists; American Academy of Oral and Maxillofacial Radiology. Use of cone-beam computed tomography in endodontics Joint Position Statement of the American Association of Endodontists and the American Academy of

- Oral and Maxillofacial Radiology. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2011 Feb;111(2):234-7.
- 10- Thompson BH, Portell FR, Hartwell GR. Two root canals in a maxillary lateral incisor. J Endod. 1985 Aug;11(8):353-5.
- 11- Jung M. Endodontic treatment of dens invaginatus type III with three root canals and open apical foramen. Int Endod J. 2004 Mar;37(3):205-13.
- 12- Kottoor J, Murugesan R, Albuquerque DV. A maxillary lateral incisor with four root canals. Int Endod J. 2012 Apr;45(4):393-7.
- 13- Shokouhinejad N, Sheykhrezaee MS, Assadian H. Endodontic treatment of two-canal maxillary central and lateral incisors: a case report. Iran Endod J. 2009 Spring;4(2):79-80.
- 14- Ingle JJ, Bakland LK, Baumgartner JC. Endodontic-periodontal inter relationships. Ingle's endodontics, 6th edition. Hamilton, Ontario, BC Decker, 2008: 638-59.