



MAXILLARY LATERAL INCISOR WITH THREE ROOT CANALS: A RARE CASE REPORT

Rajendra Daule¹, Nilima Landge², Kalpana Kanyal³, Darshan Hiremutt⁴
and Sachin Katwe⁵

^{1,3}Department of Conservative Dentistry & Endodontics, Bharati Vidyapeeth
Deemed University Dental College & Hospital, Pune

²Department of Periodontics, Bharati Vidyapeeth Deemed University
Dental College & Hospital, Pune

⁴Department of Oral Medicine & Radiology, Bharati Vidyapeeth
Deemed University Dental College & Hospital, Pune

⁵Private Practitioner, Pune

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ABSTRACT

Maxillary lateral incisors usually exhibit a single root with a single canal. Anatomical variations of a tooth are occasionally encountered and can occur in any tooth, including maxillary lateral incisors. This makes it imperative for the clinician to be able to identify the variation in the internal anatomy of the tooth being treated. These cases of variable root canal anatomy can be treated well by nonsurgical endodontic methods. This case report presents the endodontic management of permanent maxillary lateral incisor with three root canals which could be differentially diagnosed as fusion, gemination, dens invaginatus or a combination of these.

INTRODUCTION

Accurate knowledge of the internal anatomy of teeth is essential before performing any endodontic procedures. Studies have shown that failure of root canal treatment can be caused by complex internal anatomy preventing adequate removal of bacterial biofilm from the root canal system.^{1, 2} Thus, to ensure the long-term prognosis of a tooth undergoing root canal treatment, it is imperative that the morphology of the root canals and their numerous variations are assessed before initiating root canal treatment.³

Maxillary lateral incisor teeth are generally considered to be single-rooted teeth with a single canal.⁴ Independent studies consistently reported that all maxillary lateral incisors have single root canal.⁵ This may not be true in 100% of cases as case reports have advocated maxillary lateral incisors showing two roots with two or three root canals.^{6, 7, 8} There are reports of maxillary lateral incisors in fusion with a supernumerary tooth or an adjacent central incisor, gemination, dens invaginatus, dens evaginatus, a combination of dens invaginatus and dens evaginatus.^{9, 10, 11, 12} This case report presents the endodontic management of maxillary lateral incisor with three root canals.

Case Report

A 19 years old female patient reported to the outpatient department of Conservative Dentistry and Endodontics of our institution with the chief complaint of pus discharge in upper right front region of jaw since 3 days. Clinical examination revealed the tooth to be somewhat larger size compared to its left counterpart tooth with deep carious lesion on the palatal aspect of maxillary right lateral incisor (Tooth 12) associated with a draining sinus on the palatal aspect. The tooth did not respond to electric and thermal pulp vitality tests while the contra-lateral and adjacent teeth responded within normal limits. Based on the above clinical findings the following possibilities of differential diagnosis were made i.e. (i) Fusion of the lateral incisor tooth with a supernumerary tooth; (ii) 'Dens in dente'; (iii) Multiple root canals in a bulbous root; and (iv) Diffuse apical root lesion. CBCT was advised which revealed diffuse periapical radiolucency w.r.t 12 (Fig 1).

Correlating clinical and radiographic findings, diagnosis of chronic periapical abscess was established. Root canal treatment was planned and patient consent was obtained.

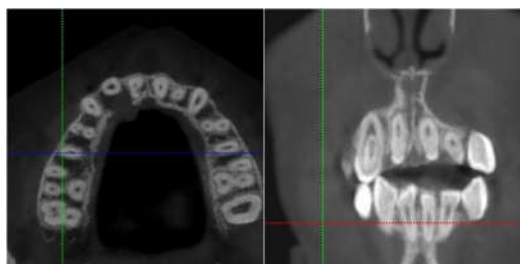


Figure 1 Axial & Coronal Sections of CBCT

After administration of local anaesthesia, under split rubber dam isolation, conventional access preparation was done. After removing pulp tissue, exploration with DG-16 revealed three orifices: one orifice in centre and other two orifices in mesial and distal direction. Radiograph was taken placing the K file in the centre orifice (Fig 2). Radiographically, two radiolucent lines mimicking missed root canals were noticed on either side of the K-file. To locate the orifices of the mesial and distal canals, the access cavity was modified in a mesio-distal direction. (Fig 2)



Figure 2 Working Length Radiograph

Working lengths were determined with an apex locator (Root ZX; Morita, Tokyo, Japan) and confirmed radiographically placing the files in mesial and distal orifice (Fig. 2). Under copious irrigation with 5% sodium hypochlorite and 17% EDTA, root canal preparation was completed with protaper system till size F2 for all the three canals. The canals were dried with sterile paper points (Dentsply Maillefer, Ballaigues, Switzerland), and calcium hydroxide paste (Calciur; VOCO, Cuxhaven, Germany) was placed as an inter-appointment medicament. The access cavity was sealed temporarily with Cavit. Patient was recalled after 3 wks.

In second visit, no pus discharge was evident and sinus tract showed healing. Master cone radiograph was taken with corresponding protaper gutta-percha (Fig 3), followed by obturation with AH plus sealer. (Fig 3)



Figure 3 Obturation Radiograph

Access cavity was restored with composite. Patient was asymptomatic in the follow up period.

DISCUSSION

Maxillary lateral incisor teeth usually exhibit single root with a single canal.⁴

The present case report demonstrates a rare case of maxillary lateral incisor with three root canals, without exhibiting any morphological anomaly of the crown.

On the contrary, there are reports of maxillary lateral incisors with two (Christie et al. 1981, Friedman et al. 1984, Thompson et al. 1985)¹³ and three root canals (Peix-Sanchez & Min~ ana-Laliga 1999, Jung 2004)¹⁴. All these cases are thought to be the result of abnormal development of the tooth and the root. They often manifest clinically as gemination, fusion, concrescence or dens invaginatus (Indra et al. 2006)¹⁵. Amongst these morphological defects, dens invaginatus presents with the utmost diagnostic, treatment and prognostic challenges. In dens invaginatus, maxillary lateral incisors are most affected and are usually associated with complex root canal systems (Hulsmann 1997).¹⁶ The clinical appearance of dens invaginatus may vary from a routinely observed trapezoidal form to more unusual forms such as peg-, barrel- or conical-shaped crowns with wider labio-lingual or mesio-distal diameters, with talons cusps or grooving of the palatal enamel coincident with the entrance of the invagination (Bishop & Alani 2008)¹⁷.

However, neither a cervical lingual groove (clinically) nor a deep invagination of the enamel into the interior of the root (radiographically) were observed in this particular case.

Some degree of confusion can occur over the classification of gemination and fusion. In fact, attempts to distinguish differences between the two anomalies have no clinical relevance. Although three individual canals may lead to diagnosis of fusion, the diagnosis of gemination can also be made, because there were no missing teeth and the tooth had only one root. In this case report, the nature of the condition as fusion, gemination or dens invaginatus could not be established.

Endodontic success in teeth with a extra number of canals above that normally found requires a correct diagnosis and careful clinico-radiographic examination. Morphological variations in pulpal anatomy must be considered before the treatment. Though conventional radiography has some pitfalls, its importance cannot be underestimated. Recently introduced newer diagnostic aids such as Cone Beam Computed Tomography (CBCT), Computed Tomography (CT), and Spiral Computed Tomography (SCT) have overcome the disadvantages of conventional radiography by producing three dimensional images. CBCT scans can be an useful diagnostic tool in endodontic practice since it could help to speculate the location of the canal to the anatomical structures.¹⁸

CONCLUSION

A lack of knowledge about the various complexities of internal dental anatomy can lead the clinician to perform insufficient treatments. The frequency of maxillary lateral incisor with 3 root canals is rare; however, each case should be investigated carefully both clinically and radiographically, to detect the possible presence of anatomical anomalies.

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