

Endodontic treatment of single rooted maxillary central incisor with two canals: A case report

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Abstract:

Introduction: The success of endodontic therapy requires a knowledge of the internal and external dental anatomy and its variations in presentation. Abnormal morphology of the root canal may exist in any tooth even a maxillary central incisor. Knowledge of anatomic variations aid in preventing treatment failures.

Case Report: This case report presents non-surgical endodontic treatment of maxillary central incisor with two canals.

Conclusion: Clinician should be careful that even the most routine of cases might deviate from the usual.

Keywords: maxillary central incisor; unusual anatomy; two canals

I. Introduction

Variation in the number of roots or in canal configuration may impact endodontic treatment. Thus, in-depth knowledge of the morphological variations of root/canal is must for the success of any endodontic procedure [1].

It has been documented in several studies that in 100 % of the cases, maxillary central incisors had one root and one canal (2, 3, 4, 1, 5, 6, 7). The presence of an additional root/ canal in maxillary central incisors is rare but lateral canals are common [8]. However, 3 % of maxillary central incisors have been reported with two separate and distinct root canals [9].

The purpose of this article is to present a case report of maxillary central incisor with two canals.

II. Case Report

A 46 year old male in good health was referred to our private practice for endodontic treatment of left maxillary central incisor (Tooth No. 21). Clinical examination revealed, fractured pin retained Class-4 composite restoration with 21. The tooth 21 was darker in color than the adjacent teeth. Tooth 21 did not respond to thermal and electrical vitality tests, palpation and percussion. Radiographic evaluation revealed complete obliteration of root canal space (calcific metamorphosis) (Figure 1). However, this does not confirm the absence of pulp/ canal space clinically. Based on the above examinations and tests, nonsurgical endodontic treatment of tooth 21 was planned.

The tooth 21 was anesthetized and isolated with rubber dam; dental floss and wooden wedges were used to stabilize rubber dam. Access opening was done using high speed round diamond point (Mani, Japan). The canals were explored (a buccal and a palatal one). The working length, of both the canals, were determined radiographically (Figure 2) and also by using Root ZX electronic apex locator (J Morita Corp., Kyoto, Japan). The root canals were cleaned and shaped using #1, #2 and #3 Gates-Glidden drills (Dentsply, Maillefer, Switzerland) and hand instruments (K file, Mani, Japan) with passive step-back technique. The buccal canal was instrumented to master file size of 60 and palatal canal to size of 40. The root canals were copiously irrigated with 2.5% sodium hypochlorite solution. After drying with paper points, calcium hydroxide (Meta Biomed Co. Ltd., Korea) was then placed as an intracanal medicament and sealed coronally with cavit (ESPE, Germany). After one week, canals were filled using lateral condensation with gutta-percha points and AH plus sealer (Dentsply, Germany) (Figure 3). In the same appointment pre-fabricated post was placed and composite core was built-up. Impression was taken and after 2 days porcelain fused to metal crown was cemented using dual cure resin cement.

III. Discussion

It is extremely uncommon to have aberrant canal morphology in maxillary central incisor. However, some cases have been reported in the literature with dramatical variations in the root canal anatomy. When encountered, such unusual morphology may complicate conventional treatment [1].

In the present case, we noted the uncommon root canal anatomy of maxillary central incisor with one root and two canals, without morphological anomaly of the crown. The pulp was also greatly obliterated (Figure1), the extended shank round bur in a miniature handpiece was used to extend the depth of cut to find a thin orifice. Repeated radiographs were taken to verify the depth and direction of the cut. In order to achieve complete control over the direction and motion of the instrument occlusal opening must be enlarged.

Disturbances during morpho-differentiation of tooth germs are rare in the permanent dentition. However, there are a few case reports describing endodontic treatment of such teeth in the literature. In the present case the size and shape of maxillary central incisor appears to be normal. Therefore, there are no chances of any condition, like fusion, germination, dens in dente, palate-gingival or disto-lingual groove.

Sabala et al [10] reported that aberrations occurring less than 1 % of the time were 90 % bilateral. However, 88.9% of the case reports of maxillary central incisors with two roots/ two canals, we reviewed were unilateral. Incidence of maxillary central incisors with two roots/ two canals is more common in females (72.7%) and in 72.7% of the cases it is found on the right side. Also, the cases we reviewed with two roots/ two canals, the root canals were located mesio-distally in 46.1% cases and bucco-palatally in 38.4% cases. Among all the cases, only 23.5% of the maxillary central incisor with more than one canals are single-rooted and only 11.7% cases has three canals (table 1).

Thus, aberrant root canal anatomy can be found even in the normal appearing crown and radiograph. Therefore, in order to locate extra root/ canal certain points should be followed -

1. Cautious interpretation of radiograph [5].
2. Take more than one radiograph at different angulations. With one radiograph correct endodontic diagnosis was obtained only 74% of the time and with three radiographs taken at different angulations it was increased to 90%. [5].
3. The use of electronic apex locator is recommended for working length determination to avoid mistakes that might occur as a result of superimposition of files in root with multiple canals [9].
4. An endodontic microscope should be used to examine the pulp chamber, including the walls and the floor, as well as the root canals to detect access openings of additional root canals that might not be found easily [9].
5. The absence of mobility in the presence of a remarkable probing depth could be due to the presence of an extra root [4].

IV. Conclusion

For successful endodontic treatment dentist should have good knowledge of all possible root canal anatomical configurations, so as to remove entire necrotic tissue and toxic products from root canal system. Keep in mind, no aspect of clinical endodontics is more important in locating aberrant anatomy than the Ability, Attitude and Desire of the clinician.

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Tables

Table 1: Summary of case reports of the maxillary central incisor with more than one root/ one canal.

* - Possible gemination

Figure

Authors	Year	Side	Sex	Bilateral or unilateral	Number of root/ canals	Location of canals	Treatment
Patterson (13)	1970	-	-	Unilateral	2/2	-	None
Heling (14)	1977	-	-	Unilateral	2/2	-	None
Mader&Konzelman (15)	1980	-	-	Unilateral	2/2	-	None
Sinai &Lustbader (16)	1984	-	-	Unilateral	2/2	-	Apexogenesis
Michanowicz et al (17)*	1990	-	-	Unilateral	2/2	1 Mesial 1 Distal	Surgery
Nazhan (18)	1991	Right	-	Not mentioned	1/ 2	1 Mesial 1 Distal	Conventional RCT
Lambruschini& Camps (19)	1993	-	-	Not mentioned	2/2	1 Mesial 1 Distal	Conventional RCT
Genovese &Marsico (4)	2003	Right	-	Not mentioned	2/2	1 Buccal 1 Palatal	Conventional RCT + Surgery
Plata & Plata (1)	2003	Right	-	Not mentioned	2/2	1 Mesial 1 Distal	Conventional RCT + Surgery
Khojastehpour&Khayat (20)	2005	Right	-	Unilateral	2/2	1 Mesial 1 Distal	Conventional RCT
Sponchiado et al (21)	2006	Right	-	Unilateral	2/2	1 Mesial 1 Distal	Conventional RCT
Lin et al (5)	2006	Left	-	Unknown	2/2	1 Buccal 1 Palatal	Conventional RCT
Nezami&Mokhber (6)	2007	Right	-	Bilateral	1/3	1 MB 1 DB 1 Palatal	Conventional RCT
Shokouhinejad et al (22)	2009	Right	-	Not mentioned	2/2	1 Buccal 1 Palatal	Conventional RCT
Rodrigues & Silva (7)	2009	Left	-	Unknown	1/ 2	1 Buccal 1 Palatal	Conventional RCT
Gondim et al (9)	2009	Right	-	Not mentioned	2/3	1 MB 1 DB 1 Palatal	Conventional RCT
Present case	2011	Left	-	Unilateral	1/ 2	1 Buccal 1 Palatal	Conventional RCT

Legends

Figure 1: Preoperative IOPA.

Figure 2: Working length determination IOPA.

Figure 3: Post obturation IOPA.

Figures

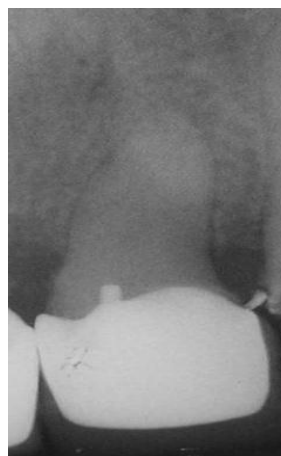


Figure 1: Preoperative IOPA.



Figure 2: Working length determination IOPA.

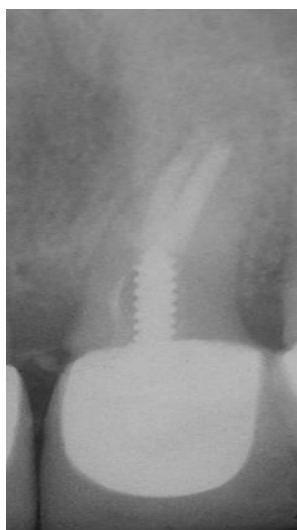


Figure 3: Post obturation IOPA.