

Case of the Month – October 2017

Nonsurgical endodontic treatment of a maxillary central incisor with bifurcated roots using CBCT: A rare case report.

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INTRODUCTION:

An accurate diagnosis of the morphology of the root canal system is a pre-requisite for successful root canal treatment. This is followed by negotiation, cleaning and shaping, and obturation of the entire canal system in 3 dimensions.¹ Many a time root canals are left untreated because the clinicians fail to identify additional canals, particularly in teeth that have anatomical variations. Failure to identify the complex root canal anatomy may lead to unsuccessful treatment outcome.

It is well known that maxillary central incisors are usually single-rooted teeth with a single canal.² The presence of an additional canal in the maxillary central incisor is a rare phenomenon. In the literature most of the examples are case reports.²⁻⁶

Cone beam computed tomography is a useful adjuvant to an endodontist for identifying root canals (Matherne et al. 2008, Filho et al. 2009).⁷ It gives prior knowledge of the number of root canals and their location which helps in identifying all the root canal entrances and has the advantage of minimizing the size of the access cavity.⁷

This case report describes the successful diagnosis and treatment of an unusual maxillary central incisor with bifurcated roots coded as ²21 ¹B¹P¹ according to the new classification system to categorize root and root canal configurations by Ahmed HMA et al. 2017.

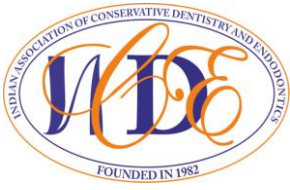
CASE REPORT:

A 17 year old female patient reported to the department of Conservative Dentistry and Endodontics, SDM College of Dental Sciences and Hospital, Sattur, Dharwad, Karnataka, India with the chief complaint of pain in relation to the upper front teeth region.

HISTORY:

Her medical history was noncontributory. No other significant dental history was found and no known drug allergies were noted.

CLINICAL EXAMINATION:



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- Disto-lingually rotated 21 with deep proximal caries.
- Mild tenderness on vertical percussion.
- Thermal testing (cold test) – delayed response.
- Electric pulp testing (Parkell Electronics Division, Farmingdale, NY, USA) of the involved tooth gave a delayed response whereas normal response was obtained on the adjacent tooth.
- Tooth mobility was absent and periodontal probing around the tooth was within physiological limits.

PRE-OPERATIVE RADIOGRAPH:

- Pre-operative RVG revealed deep proximal caries involving pulp and bifurcation of root in the apical one-third of 21 (Fig. 1).
- Pre-operative sagittal view of CBCT confirmed buccal and palatal halves of the bifurcation with 21 (Fig. 2).



**Fig. 1: Pre-operative
RVG**

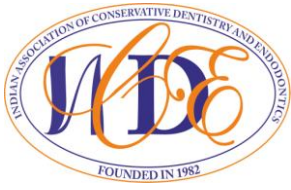


**Fig. 2: Pre-operative
sagittal view of CBCT**

DIAGNOSIS AND TREATMENT PLAN:

Based on clinical and radiographic findings, diagnosis of apical periodontitis was made with 21. A nonsurgical endodontic therapy of the symptomatic tooth was decided after discussion with the patient.

PROCEDURE:



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Local anaesthesia was obtained with 1:80000 solution of lignocaine with adrenaline and an access cavity was prepared after rubber dam isolation (Fig. 3). In the floor of the pulp chamber only a single orifice was detected using an endodontic explorer (DG-16). The buccal bifurcation was easy to negotiate but the palatal bifurcation posed problems due to initial curvature at the site of bifurcation. Therefore, the area coronal to the bifurcation at the apical one-third was enlarged using Gates Glidden drills #1, #2, and #3 (Mani Inc., Togichi, Japan) to enhance accessibility and instrumentation. K-file size 15 (Dentsply, Maillefer, Switzerland) in the buccal bifurcation and K-file size 8 (Dentsply, Maillefer, Switzerland) with precurvature at its tip was placed alongside the first file in the palatal bifurcation to determine the working length radiographically by following buccal object rule (Fig. 4).

The root canals were cleaned and shaped using hand and rotary instruments. The buccal bifurcation was first instrumented to a K-file size of 20 followed by enlargement using 08/25, 04/20, 04/25, 06/20, 04/30 and 04/40 Hyflex CM rotary NiTi instruments (Coltène/Whaledent, Allstätten, Switzerland) with a rotational speed of 500 rpm and the torque was adjusted to 2.5 Ncm according to the manufacturer's instructions. The palatal bifurcation was also initially enlarged upto size 20 K-file and then upto 04/25 using Hyflex CM files in the same sequential order as above. Sodium hypochlorite 3% (Sultan Chemists, Inc, Englewood, NJ) alternated with 17% EDTA gel (Glyde, Dentsply, Maillefer, Switzerland) was used for irrigation to facilitate shaping. The canals were then dried with sterile paper points (Dentsply, Maillefer, Ballaigues, Switzerland) and calcium hydroxide/distilled water paste was placed as an intracanal medicament. After 1 week, the tooth was asymptomatic. The root canals were again irrigated, dried and obturated with greater taper gutta-percha cones corresponding to the size of the master apical file and Sealapex sealer (Sybron-Endo, Glendora, CA, USA) and the lateral spaces were sealed using auxiliary cones.



Fig. 3: Access opening with 21

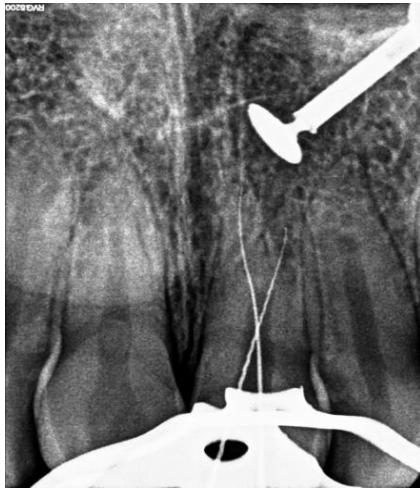


Fig. 4: Working length determination



Fig. 5: Master cone RVG



Fig. 6: Obturation with 21



Fig. 7: Post-operative RVG with 21



Fig. 8: Post-operative clinical photograph with 21

DISCUSSION:

The present report demonstrates a rare case of maxillary central incisor with bifurcated roots that was successfully treated by non-surgical endodontic treatment. Vertucci has reported that maxillary central incisor presents single root and single canal in 100% of the cases.⁸ However, there were few case reports describing an additional canal in the maxillary central incisor.² However, some of the cases were associated with developmental anomalies like fusion, germination or dens invaginatus.⁴

Cautious interpretation of radiograph is important in clinical endodontics.² The pre-operative RVG in this case revealed bifurcation of roots in the apical one-third which appeared to be mesial and distal. However, CBCT confirmed bifurcation of roots into buccal and palatal halves which facilitated easy negotiation and instrumentation of the canals.



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Hyflex CM instruments were reported to prepare curved canals without significant shaping errors and fracture of instrument.⁹ Also its good shaping ability could be attributed to the increased flexibility of these instruments (Testarelli *et al.* 2011, Peters *et al.* 2012).⁹ Therefore, Hyflex CM files were used in the present case.

CONCLUSION:

The experience from the present case shows the variability of root canal morphology of maxillary central incisor. The clinician should be cautious as even the most routine of cases might deviate from the usual.

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