MORPHOLOGIC VARIATIONS IN ROOT CANAL SYSTEM IN A SINGLE PATIENT

INTRODUCTION

The goal of each root canal treatment therapy is thorough cleaning, shaping and obturation of the entire root canal system. The main reasons for endodontic treatment failure are apical percolation and presence of microorganisms because of either incomplete instrumentation, inadequate cleaning or insufficient canal obturation, and the presence of missed or untreated canal. Therefore, a thorough knowledge of root and root canal morphology and an anticipation for their possible morphologic variations are essential and will help to reduce chances of endodontic failure because of incomplete root canal preparation and obturation.

In 1974, Vertucci and William, as well as Barker et al described the presence of an independent middle mesial canal in mandibular first molar. Since then, there have been multiple case reports published regarding aberrant canal morphology of this tooth. Additionally, Stroner et al. and Beatty and Iterian have reported on more obscure cases in which a third canal was located in the distal root. Martinez-Berna and Bandanelli showed two cases with six canals. Astonishingly, Reeh has even reported a case with seven canals, consisting of four canals in the mesial and three in the distal root.

The present article describes a case in which anatomical variations existed in the form of double palatal roots in maxillary second molar and the presence of five canals in mandibular first molar in the same patient. The author reviewed the literature, the clinical implications and the need to recognize late. But then also this anatomic variation should be considered important to ensure a sufficient cleaning and obturation of the root canal system.

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these variations as and when they are present to successfully carry out endodontic treatment.

**CASE REPORT I**

A 57-year old male patient came to the Department of Conservative Dentistry & Endodontics at Ahmedabad Dental College and Hospital with chief complaint of pain in relation to upper right posterior region. On examination, the involved tooth was identified to be tooth no.17 (*Federation Dentaire Internationale* nomenclature).

The pre-operative radiograph showed the tooth was root canal treated and only three canals were obturated although an extra palatal root was present in the same tooth.

After isolating the tooth with rubber dam, on visualization of the floor of the chamber, an extra canal orifice palatally was located in addition to the conventional three orifices found in the maxillary molar tooth. The instrumentation of the extra canal was performed with K-files accompanied by irrigation with sodium hypochlorite (2.5%). The canal was medicated with calcium hydroxide and 2% chlorhexidine digluconate. Lateral compaction was used to obturate the extra palatal canal and the access cavity was sealed with composite.

The tooth was later permanently restored with a crown and the patient kept on follow up.

**CASE REPORT II**

The same patient also complained of mild pain in the lower left posterior tooth region. The involved tooth was identified to be tooth no.46 (*Federation Dentaire Internationale* Nomenclature) and was confirmed by radiograph also. After placing the rubber dam, access cavity was prepared and pulp extirpation was done. On visualization of the floor of the pulp chamber, three canal orifices were located in the mesial root of tooth 46 with the presence of an extra middle mesial canal in addition to the two canal orifices in the distal root.
The instrumentation of all the canals was performed with K-files accompanied by irrigation with sodium hypochlorite (2.5%). All canals were medicated with calcium hydroxide and 2% chlorhexidine digluconate. Lateral compaction technique was used to obturate all the five canals and the access cavity sealed with composite. The tooth was later permanently restored with a crown and the patient was asked to come for follow up.

**DISCUSSION**

Based on the dental literature and the series of clinical cases, it is evident that knowledge of the morphology of any tooth is essential for the success of endodontic treatment. Although there are certain clinical guidelines for orifice locations of root canals that might aid in the determination of the pulp chamber position and the exact location and number of root canals in any individual tooth, it is very important that careful attention is paid to any evidence of additional root canals in any tooth for that matter. Christie et al described the existence of a double palatal root as the least frequent anomaly.\(^{11,12}\)

Furthermore, recent articles described the use of cone-beam (CBCT) or spiral computed tomography scans as a valuable method for initial identification of the internal or external morphology. CT has been suggested as the preferential imaging modality in difficult situations demanding localization and description of root canal systems because of its ability to render 3D information.\(^{13,14,15}\)

**REFERENCES**