

BILATERAL MANDIBULAR FIRST MOLAR DIAGNOSED WITH SINGLE ROOT AND ROOT CANAL BY CBCT: A RARE CASE

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ABSTRACT:

The success of root canal therapy depends on diagnosis and knowledge of common root canal morphology and its variation, locations of all the canals, thorough debridement and proper sealing is a basic requirement¹. We reported a case of bilateral mandibular first molar with single root & single canal .Both the tooth requires endodontic treatment. Reported incidence of single rooted mandibular first molars with single canal is 0.3% .

In our case report the CBCT assisted in the confirmation in diagnosis of bilateral single root & single canal and helped in accomplishing the treatment successfully.The morphological variant of single root and single canal is very rare & when detected should be examine carefully and manage properly for successful endodontic treatment.

Keywords: Permanent mandibular first molar, root canal treatment, single root & canal, Vertucci, CBCT

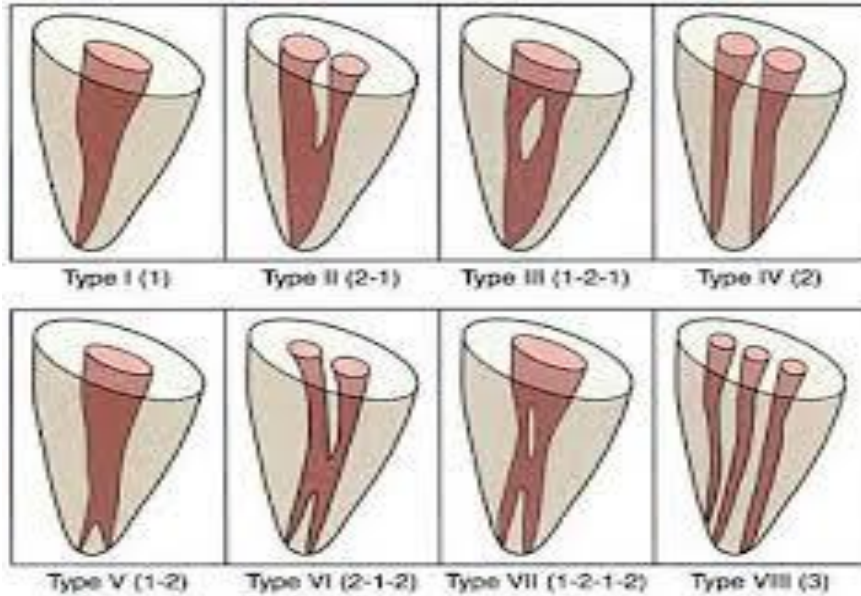


INTRODUCTION:

The success of root canal therapy depends on the locations of all the canals, thorough debridement and proper sealing. Together with diagnosis and knowledge of common root canal morphology and its variation is a basic requirement for endodontic success.^[1]

The mandibular first molar is one of the commonly encountered teeth for endodontic treatment.^[2] Typically, the mandibular first molar presents with a mesial root with two canals and a distal root with one or two canals.

Variations in the form, configuration, and number of root canals in mandibular molars^[3,4] include five, six, root canals^[5,6,7], middle mesial canal^[8], middle distal canal^[9], four canals in mesial root^[10], four canals in distal root^[11], radix entomolaris^[12], and “C-” shaped canal.^[13] But rarely it can have fused roots and fused canals. This case report has a bilateral mandibular first molar with single root and single canal. Only 0.3% asian population has one root. So single root canal (Vertucci Type I) is rarest.



VERTUCCI CLASSIFICATION

TABLE 1

Conventional intraoral periapical radiographs have been declared as the most common and important diagnostic tool for the assessment of the root & root canal morphology in clinical practice.

However, they are not completely reliable because of their inherent limitations such as the lack of 3-dimensional information and the possible masking of areas of interest by overlying anatomy. The application of cone-beam computed tomography (CBCT) for the preoperative assessment of unusual root canal morphology has been highlighted, aiding the correct endodontic management of complicated and challenging cases. The configuration of root canal diagnosed with cone

beam computed tomography is helpful for successful endodontic treatment.

CASE DETAIL:

A 27 yr/ female came to the department with chief complaint of continuous pain in lower left & right side of the jaw. History of intermittent and dull pain for the past 2 months was given. Subjective symptoms included prolonged sensitivity to thermal stimuli. Patient's medical history was non-contributory.

Clinical examination of the 36 & 46 mandibular molar revealed the presence of a large occlusal carious lesion which was tender on percussion. Periodontal probing around the tooth and mobility were within physiological limits. Vitality with electric pulp testing (Parkell Electronics Division, Farmingdale, NY)

showed delayed response in 46 & no response in 36.

Preoperative radiographs revealed a occlusal radiolucency approaching the pulp space with a widened periodontal ligament space adjacent to the root apex. Multiple angulated radiographs also confirmed the presence of a single root and a single canal. From the clinical and radiographic examination, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis was made for both side and hence routine nonsurgical endodontic treatment was planned.



FIGURE 1



FIGURE 2

Cone beam computed tomography (CBCT) images confirmed our diagnosis. This morphologic variation

has been reported once in the literature. The availability of three-dimensional images further provided the opportunity for the precise description of the anatomy of bilateral mandibular first molar with single roots and single canals



FIGURE 3



FIGURE 4

Access opening was refined under local anesthesia using 1.8mL 2% lidocaine with 1: 200,000 epinephrine and in rubber dam isolation. Working length was taken with no 20 k file.



FIGURE 5

Working length radiograph was taken & the presence of single canal was confirmed.



FIGURE 6

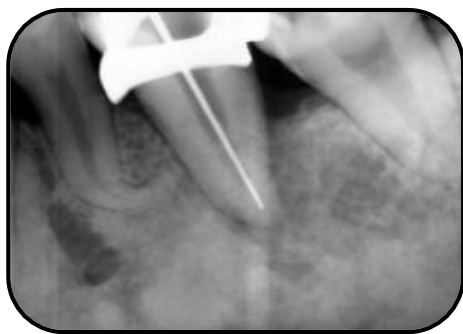


FIGURE 7

Cleaning and shaping was done using circumferential filing technique with ISO 2% taper files up to size 60 (MANI Inc.,Tochigi-Ken, Japan). Irrigation was performed using normal saline , 2.5% sodium hypochlorite solution, and 17% EDTA (Prime Dental Product

Pvt. Ltd., Mumbai India). The canal was dried with absorbent points (Dentsply Maillefer Instruments, Ballaigues, Switzerland) and obturated with Calamas Dual (Maillefer, Dentsply, Ballaigues, Switzerland) and AH plus (Maillefer, Dentsply, Ballaigues, Switzerland).

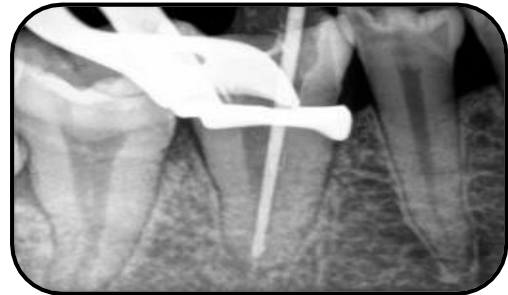


FIGURE 8

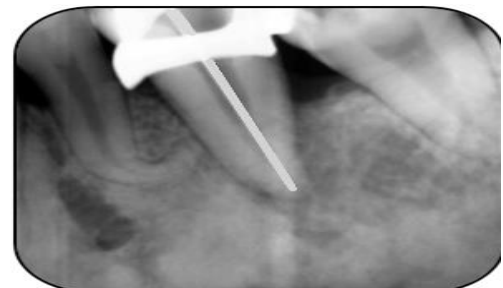


FIGURE 9



FIGURE 10

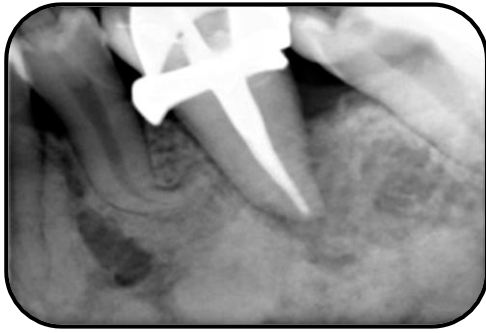


FIGURE 11

DISCUSSION:

A thorough knowledge of root canal morphology and the configuration of the teeth plays an important role in the success of endodontic therapy. Sabala et al [14]. stated that the rarer the aberration is, the greater the probability of it being bilateral will be. Despite the comprehensive literature review we found a very few case reports of this kind. Interestingly in the present case, all the mandibular posterior teeth, both premolars and molars, had single root canal and single canal.

Systematic review of literature on canal morphology of the mandibular first molar by Valencia De Pablo et al¹⁵. and Ballulaya et al. [16] has not documented this rare morphology. But this morphological variation has been documented only once earlier in an *in vitro* study done by Reuben et al¹⁷. Out of 125 samples of mandibular first molars from an Indian population, only one sample had a single root and single canal.

The completion of canal differentiation commences at about 3–6 years after root completion . Any disturbances in this differentiation could have resulted in this type of canal anatomy. [18] Radiographic examination is an essential component in endodontic treatment.

Preoperative radiographs or an additional radiographic view from a 20- degree mesial or distal projection increases the chances of detecting unusual root canal morphology.[19] The morphological variant of single root and single canal is easily detected in routine radiographs. The incidence of canal bifurcation in a root is usually identified in radiographs using the ‘fast break’ guideline. [20]

Fast break guideline states that the sudden disappearance or narrowing of the canal infers the presence of canal division. CBCT was developed in the late 1990s to produce geometrically accurate 3 dimensional scans of the maxillofacial skeleton. Kottoor et al [21,22] and La et al. [23] have suggested the use of CBCT for the purpose of determining the root canal morphology in cases with aberrations.

In our case report the CBCT assisted in the confirmation in diagnosis of bilateral single root with single canal and helped in accomplishing the treatment successfully.

CONCLUSION:

This report presents an extraordinary case of unusual tooth morphology involving mandibular first molar with a single root and root canal in a patient.

The necessity of the precise knowledge of root canal morphology and its variation is a must for successful endodontic treatment.

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