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Case Report

Morphological Variations in Bilateral Mandibular First Premolars- A Case Report

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Abstract

In younger age groups, mandibular first premolars are commonly extracted for orthodontic treatment. This case report describes the morphological variations in bilateral mandibular first premolars in a 14 year old healthy male patient who was undergoing fixed orthodontic treatment. Two roots and root canals were found in extracted bilateral mandibular first premolars.

Keywords: Mandibular First Premolars; Morphological Variations; Two Roots

Introduction

For a successful root canal treatment, an adequate knowledge about the morphology of the tooth especially roots and root canal systems are necessary. Mandibular premolars are known to have variations in their morphology [1]. Higher failure rates and flare-up are seen with mandibular premolars because of variations in root canal anatomy. Mandibular premolars are also referred as "endodontist enigma". Single root with one canal is commonly found in mandibular first premolars [2]. The incidence of two roots in mandibular first premolar is 1.8%. In the present case report, two roots and root canals were found in both the mandibular first premolars in 14 year old male patient.

Case Report

A 14 year old healthy male child was referred to Dental College for extraction of bilateral mandibular first premolars. The patient was undergoing fixed orthodontic mechanotherapy. On subsequent visits, extractions of both the mandibular first premolars were done under local anaesthesia. Each premolar was stored in 2% glutaraldehyde for disinfection and then placed in 2.5% sodium hypochlorite for one day, to remove organic substances. Photographs of buccal, lingual, distal and mesial surfaces of both the premolars were taken with digital camera (Figure 1). Dimensions of mandibular first premolars (right and left) were measured with digital vernier caliper (Figure 2 and 3), (Table 1). Radiographic image of

	Average Dimension In Millimeters*	Right Mandibular First Premolar	Left Mandibular First Premolar
Cervico-Occlusal Length Of Crown	8.5	8.64	8.28
Length Of Root	14.0	13.78	13.94
Mesiodistal Diameter Of Crown	7.0	7.08	7.36
Mesiodistal Diameter Of Crown At Cervix	5.0	4.88	5.38
Buccolingual Diameter Of Crown	7.5	8.20	8.69
Buccolingual Diameter Of Crown At Cervix	6.5	6.62	7.14

* Nelson S, Ash M. Wheeler's Dental Anatomy, Physiology and Occlusion. 9th Ed Philadelphia: Saunders.2010.

Table 1: Dimensions of Mandibular First Premolars.

both the premolars were also recorded (Figure 4). Morphological or anatomical variations of both the premolars were assessed.

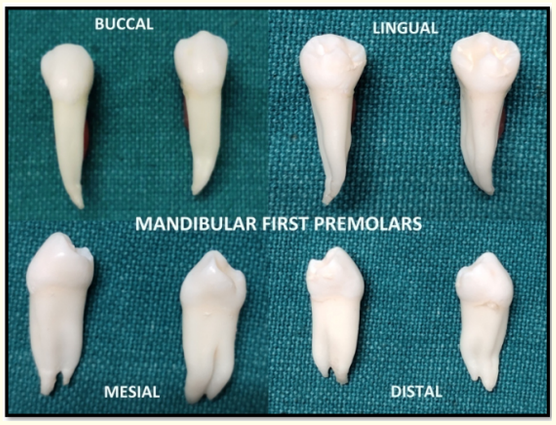

Figure 1: Extracted Mandibular First Premolars.

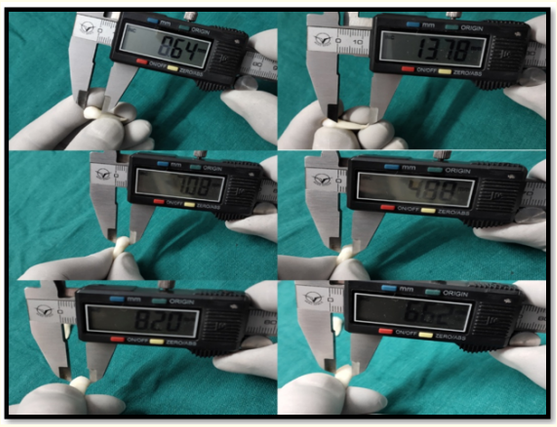

Figure 2: Measurement of Right Mandibular First Premolar.

Figure 3: Measurement of Left Mandibular First Premolar.

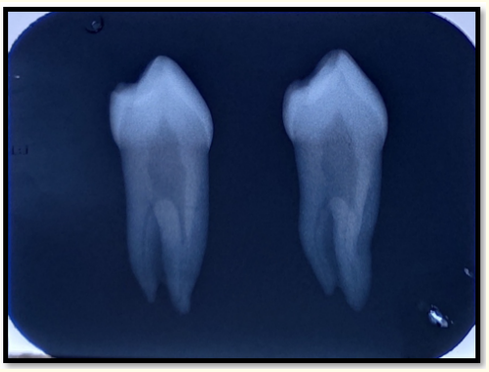

Figure 4: Radiographic Image (Two Roots and Root Canals).

Variations

Two roots, one buccal and one lingual were found in both the premolars and these roots were not completely separated in both tooth. In both the premolars, two roots were bifurcated at middle third. Buccolingual diameters of both the premolars were larger as compared to normal average values [3]. Lingual cusps in both the premolars were more prominent. Radiographically, the pulp chamber was wide till the bifurcation at middle third of root and then two narrow separated root canals were found in both the premolars (Figure 4).

Discussion

This case report illustrates deviation in morphology of the roots and root canal systems of bilateral mandibular first premolars in a 14 year old male patient. Coronal morphology and dimensions were within normal limits expect larger buccolingual diameter of crown and prominent lingual cusp of both the first premolars.

Jain and Bahuguna [4] reported that 97.10% of the mandibular first premolar teeth were found to have one root whereas 2.89% teeth were found to have two roots in Gujarati Population.

Velmurugan and Sandhya [5] also reported that single root canal occurred more frequently in the mandibular first premolar teeth in Indian population.

Root and root canal morphology also varies in different ethnic groups. A higher incidence of multiple roots is seen in the African American patients (16.2%) as compared to white patients (5.5%) for mandibular first premolar teeth. Incidence of C- shape canal system in mandibular first premolar teeth is 10 - 18% and this variation is frequently seen in Chinese population [6,7].

In the present case report, we found buccal and lingual roots and root canals in extracted bilateral mandibular first premolars in 14 year old male patient who was undergoing fixed undergoing

treatment. Conventional intra oral periapical radiograph failed to detect this variation and more chances for endodontic failure and flare-up due to missed root and root canal. So, it is recommended that the dentist should use various 3-D imaging techniques like CBCT in their clinical practice for proper diagnosis and treatment planning of such variations in morphology of mandibular first premolars.

Conclusion

The dentist should have an adequate knowledge about the morphology of each tooth especially root and root canal system as well as variations in the root and root canal anatomy. Preoperative radiographic interpretation, proper clinical inspection of the pulp chamber and angulation of endodontic file into the canals are some important points for detection of variations in the root canal system. Extra attention is required during endodontic management of mandibular first premolars because of chances of more variations in root canals morphology.

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