

Evaluation of Mandibular Second Premolars in a Kashmiri Population using Digital Radiography

Research Article

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Abstract

Mandibular premolars are known for having variations in root canal anatomy, Endodontic and periodontal success of such anatomical variations requires the clinician to be aware of their clinical and radiographic anatomy. This study was done to evaluate the mandibular second premolars in a Kashmiri population using routine digital radiography.

Keywords: Anatomical Variation; Endodontic Treatment; Mandibular Second Premolar.

Introduction

Any successful dental treatment depends on adequate knowledge of dental anatomy [1, 2] especially in anatomical variations [3]. The dental Clinician should always see for any aberration in root canal anatomy for a successful dental treatment. Mandibular premolars are known for variation in their internal and external morphology due to the possible presence of more than one root canal [7-11]. An incidence of 0.4% of mandibular second premolars with three root canals has been reported [11, 12]. There have been reports of mandibular second premolar with 3, 4 and even 5 root canals [9, 13, 14]. Anatomical variations of the pulp cavity have been diagnosed by computed tomography [15] and optical microscopy [16], but a thorough radiographic interpretation can diagnose such cases most of the time. There are no studies reported in the literature evaluating mandibular second premolars in a Kashmiri population. The study was done to evaluate mandibular second premolars in a Kashmiri population using routine digital radiography.

Materials and Methods

The study was conducted jointly in the departments of periodontics and conservative dentistry and endodontics, government Dental college Srinagar. A total of 400 patients were included in the study. The criteria of patients for inclusion in the study were:

- a) Age >18 years
- b) Presence of atleast one mandibular second premolar in the mouth
- c) Kashmiri origin patients

800 mandibular second premolars were evaluated using full mouth digital radiographs (Schick technologies, NY, USA) using mesial angulation of 20-30 degree. The digital radiographs were evaluated by atleast two observers. The study was approved by institutional review board. The majority of 792 mandibular second premolars had one root, seven mandibular second premolars had two roots and only one mandibular second premolar had 3 roots and root canals (confirmed after successful root canal treatment (Figures 1,2). There was no significant difference regarding the occurrence of 3 rooted mandibular second premolar between males and females.

Results and Statistical Analysis

The preoperative radiographic estimation in 800 mandibular second premolars was carried out during the period of the study. Pre-operative radiographic estimation revealed that 99 percent of the maxillary first premolars had one canal and 0.875 percent had two canals and only a rare 0.25 percent had 3 separate roots and canals, Table 1.

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Figure 1.



Figure 2.



Table 1.

Teeth	1 canal		2 canals		3 canals	
	No	(%)	No	(%)	No	(%)
Mandibular second premolar	792	99	7	0.875	1	0.125

Discussion

The morphological variations of the mandibular second premolar makes this tooth as one of the enigmas for endodontic and periodontal treatment. Certain authors have proposed that the Mandibular premolars pose the clinician with greatest difficulty of all teeth to treat [4]. A study reported the failure rate of non-surgical root canal treatment in all teeth showing the highest for the Mandibular first premolar at 11.45% [17]. The reasons for this treatment outcome being he numerous variations in the root canal morphology and difficult access to a second canal. Mandibular second premolar shows a variable root canal anatomy [16, 18]. A study that included first and second premolars has reported a 27.8% incidence of mandibular premolars with more than one canal [19]. A radiographic study showed that 15.7% of patients had atleast one mandibular first premolar with either a divided canal or a root [20]. 7% of mandibular second premolars had multiple canals in this study. The second canal in a mandibular second pre-mola, is usually fine and branched towards the lingual surface in the middle or the apical third of the main canal. An ethnic study showed differences between African American and Caucasian patients [21], with the African American group showing higher percentage (7.8%) than the Caucasian group (2.8%). A Turkish study showed an incidence of two or more canals in 43% of the male patients and 15% of the female patients [22]. Preoperative diagnostic radiographs are employed to identify anatomical alterations of the root canal system. Careful analysis of the pulp chamber can also help in identifying these internal variations and their exact location [16, 23]. Thorough radiographic examination

of the periodontal ligament space could help in identifying an extra root or canal. Indeed, in the present study, it can be noticed a sudden change of the radiopacity of the canal space (Figure 1). The radiolucent space uniformly disappears from the pulp chamber, suggesting a possible presence of an additional canal [11, 12, 15]. Furthermore the access cavities in these teeth are very small, hence impeding the visualization of the area. A modified endodontic access is needed to serach for such extra root canals [24]. In these cases, in order to better visualize the pulp chamber, the access cavity should have divergent walls to the occlusal face The success of any dental treatment depends on thorough knowledge of root canal anatomy. The other factoesz include recent instruments and the knowledge to use these instruments effectively. Teeth with extra roots and/or canals pose a particular challenge. This study evaluated the mandibular second premolar and its variations in a kashmiri population using digital radiography some guidelines that can help produce successful treatment outcomes.

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