

Endodontic management of mandibular premolar with two roots – case report

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Abstract

Mandibular premolars usually have single root with single root canal system. However anatomic variations of mandibular premolar have been reported. The clinician should be aware of the configuration of the pulp system for the successful endodontic treatment. The incidence of two roots in these teeth is quite rare. This report presents the clinical management of mandibular premolar having two roots bifurcated at the mid-root level.

Keywords: Mandibular premolar, root canal configuration, anatomic variation

Introduction

Knowledge of basic root and root canal morphology as well as possible variation in anatomy of the root canal system is important in achieving successful nonsurgical root canal treatment (NSRCT). This is followed by negotiation, cleaning and shaping, and obturation of the entire canal system in 3 dimensions.[1]

Mandibular premolars may show wide variations in root canal anatomy and morphology (Eideeb 1982). Studies reported by Green (1973), Hess (1925), Kerekes & Tronstad (1977), Mueller (1933), Pineda & Kuttler (1972), and Vertucci (1978), dealing with the number and form of roots and root canals of mandibular premolars have revealed that in most instances they have only one root canal, although teeth with two or more root canals do exist. Vertucci in his series of studies conducted on extracted teeth, reported 2.5% incidence of a second canal. Zilich and Dawson reported 11.7% occurrence of two canals and 0.4% of three canals [2,3]. Consequently, awareness of the possible existence of these anatomical variations would be important during endodontic treatment of mandibular premolars.[2]

A case of mandibular first premolars was referred to our postgraduate endodontic clinic, which on radiographic examination was found to have an unusual anatomy i.e. two roots. Successful endodontic management of the mandibular premolars with two roots was completed with proper precautions and planning. Routine radiographic examination of other patients in our department has often shown two-rooted mandibular premolars. This led us to believe that, perhaps the incidence of two-rooted mandibular premolars in our population was really high. The purpose of this investigation was to study the presence of extra roots in mandibular premolars, reported to have notoriety for unusual root anatomy. Thus, this paper attempts to alert the dental fraternity on the presence of extra roots as a common feature in mandibular second premolar, which if left untreated, can contribute to failure of treatment.

CASE REPORT

A 55-year-old male patient was referred to our department of conservative dentistry and endodontics for intentional root canal treatment of lower right and left canine and first premolar for prosthodontic rehabilitation. On intraoral clinical examination,

patient had missing mandibular right and left central and lateral incisors due to periodontal reasons. Also there was severe attrition of teeth. Pre-operative radiograph showed signs of interdental bone loss in between 33,34, 35 and 43, 44.

The patient was administered with 2% Lidocaine HCl in 1:80,000 Adrenaline, the tooth was isolated with rubber dam 6/6" size medium (HYGENIC) with 2A premolar clamp.

Access opening was done with 33,34 and 43,44. The second canal was explored carefully with DG 16 explorer lingually to the root canal already found and working length was determined. It was found to be Type II root canal configuration according to Vertucci, cleaning and shaping was carried out by step down technique by Protaper up to F1 (DENTSPLY).

The root canals were irrigated using 5.25% sodium hypochlorite solution during root canal treatment. The canals were dried with sterile paper points, calcium hydroxide dressing was given and access cavity was closed with caviti.

At the second appointment as the tooth was asymptomatic the canals were cleaned, dried and obturated with corresponding F1 Protaper guttapercha. Patient was recalled after one week and the symptoms were found to be subsided.

CASE 1



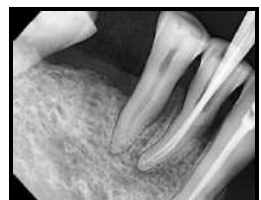
Pre – operative radiograph
Figure 1a



Working length with 34
Figure 1b



Master cone radiograph
Figure 1c



Obturation with 34
Figure 1d

CASE 2



Pre – operative radiograph
Figure 2a



Master cone radiograph
Figure 2b



Obturation with 34
Figure 2c

DISCUSSION

The presence of extra roots or canals in mandibular premolars is undoubtedly an endodontic challenge. A collection of previous studies have been tabulated for better understanding [Table 1].[5]

Table 1: Incidence of variations in mandibular second premolar root canal morphology.

Authors	1 Canal 1 foramina	1 Canal 2 foramen	2 Canals 1 foramina	2 Canals 2 foramina	3 Canals
Pineda and Kutler et al.	98.8	1.2	-	-	-
Green et al.	92	-	4.0	4.0	-
Zilich and Dawson et al.	87.9	-	0.9	10.8	0.4
Vertucci et al.	97.5	2.5	-	-	-
Goswami et al.	88	-	8	4	-

Figures in percentage

Recognition of the aberrant anatomy requires thorough knowledge of the root canal morphology, critical interpretation of the diagnostic aids, appropriate assessment of the pulp chamber floor and operative skills of the clinician. The case report presented here refers to the management of

endodontic challenge of mandibular first premolars having two roots which are bifurcated at the mid-root level.[3]

For the management of branched canal configuration wherein the clinician encounters difficulty in locating and preparing the canal, the use of magnification was necessary. One of the common reasons for having difficulty in identifying the second canal was inadequate access which leaves a shelf of dentine over the second canal.[4] The second canal generally leaves the main canal at a sharp angle nearly at a right angle. Slowey [6] recommends the visualization of such canal configuration as a lowercase letter 'h' where the main canal would be the straightline portion of the 'h' and the second canal exists about mid-root at a sharp angle from the straight canal. Also an important step needed in such canal was a modification in access which required an adequate flaring of the canal coronal to the bifurcation for unobstructed passage of instruments into the second canal. Careful manual exploration of the bifurcated canal should be done with a pre curved 10K file which will provide a tactile sensation as the instrument moves in an eccentric direction on deeper penetration into the canal and also prevents the instrument separation. The obturation of the branched canal configurations are challenging task. These can be obturated by two step technique either by using the thermoplasticized gutta-percha techniques or by the use of single cone obturation till the level of bifurcation. The single cone two step technique was used in the present case report.[7]

CONCLUSION

The clinician should be astute enough to identify the presence of unusual numbers of roots and their morphology. A thorough knowledge of root canal anatomy and its variations, careful interpretation of the radiograph, close clinical inspection of the floor of the chamber and proper modification of access opening are essential for a successful treatment outcome.

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