

A Case Report-Endodontic Management of Mandibular Premolar with Two roots

Pooja Sood^{1*} Ekta Singh Suneja² Gursandeep Kaur Sandhu³ Bhuvanesh Tandon⁴

¹Reader, Department of Conservative Dentistry and Endodontics, Baba Jaswant Singh Dental College and Hospital, Ludhiana, Punjab, India.

²Professor, Department of Conservative Dentistry and Endodontics, Baba Jaswant Singh Dental College and Hospital, Ludhiana, Punjab, India.

³Senior Lecturer, Department of Conservative Dentistry and Endodontics, Baba Jaswant Singh Dental College and Hospital, Ludhiana, Punjab, India.

⁴Reader, Department of Conservative Dentistry and Endodontics, Baba Jaswant Singh Dental College and Hospital, Ludhiana, Punjab, India.

ABSTRACT

Background: Mandibular premolars usually have single root with single root canal system. However, numerous studies related to 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 midroot level.

Keywords: Mandibular premolar, Anatomical Configuration, Two canals, Root canal treatment.

INTRODUCTION

Complete knowledge of the root canal anatomy is mandatory for successive endodontic therapy. Mandibular premolars have gained popularity for having the most atypical anatomy. Literature showed a fair percentage of teeth to have more than one canal.¹⁻² Mandibular premolars may show wide variations in root canal anatomy and morphology. The incidence of a mandibular second premolar having two, three or four canals is rare. Zilich and Dawson reported 11.7% occurrence of two canals and 0.4% of three canals.²

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.³

Slowey has suggested that mandibular first premolars often called "Endodontist's enigma" may present the greatest difficulty of all the teeth to perform successful endodontic treatment.⁴ Consequently, awareness of the possible existence of these anatomical variations would be important during endodontic treatment of mandibular second premolars.⁶ This case report describes the endodontic management of mandibular second premolar having two roots and two canals.

CASE REPORT

A 34 year Male patient came to the Department of Conservative Dentistry and Endodontics with the chief complaint of pain in lower left back region of jaw. Patient's medical history was non-contributory. Clinical examination revealed - tenderness on percussion in the left mandibular second premolar. Intra-oral periapical

Received: Mar. 11, 2017; Accepted: May. 9, 2017

*Correspondence Dr. Pooja Sood.

Department of Conservative Dentistry and Endodontics, Baba Jaswant Singh Dental College and Hospital, Ludhiana, Punjab, India.

Email: Not Disclosed



Fig 1: Pre-operative IOPAR i.r.t 35.



Fig 2: Clinical Photograph- Rubber Dam Isolation and an occlusal photograph of the access cavity showing pulp chamber floor with canal orifices.

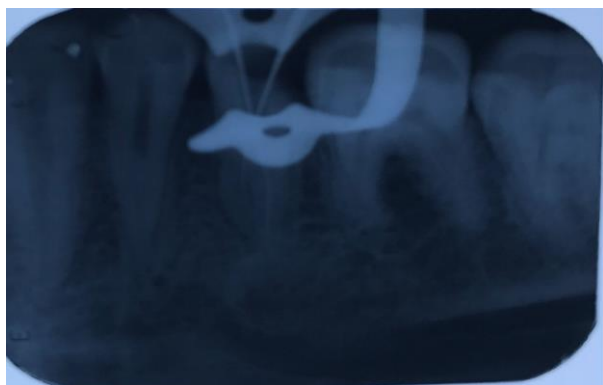


Fig 3: Working length IOPAR.



Fig 4: Master Cone IOPAR.



Fig 5: Obturation (Post-Operative IOPAR).

radiograph revealed previously restored mandibular second premolar with coronal radiolucency approaching pulp. No peri-apical pathology found. The periapical radiograph revealed restoration on the distal aspect of crown, root bifurcation in the middle third with distinct outline of the mesial and distal root without any periapical pathology (**Fig-1**). A diagnosis of Acute Apical Periodontitis for which non surgical endodontic therapy was attempted. 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. (**Fig-2**)

Access opening was done. Access was modified using a round diamond bur by coronal flaring till the level of bifurcation, two orifices were located one mesial and one distal. (**Fig-2**) Careful manual exploration with 10K file was done and Working length was measured with electronic apex locator and confirmed with radiograph. (**Fig-3**) Both the canals were prepared using hand k file till no 20. Cleaning and shaping was carried out by step down technique by Protaper up to F2 (DENTSPLY). The root canals were irrigated with 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 cavit.

At the second appointment as the tooth was asymptomatic the canals were irrigated with saline and obturated with corresponding F2 Protaper gutta- percha. (**Fig.4 &5**) Patient was recalled after one week and the symptoms were found to be subsided. Patient recalled after 6 month for evaluation and found to be a symptomatic.

DISCUSSION

Knowledge of pulp anatomy is essential for success of endodontic treatment and a lack of sound knowledge can lead to treatment failure. The morphologies of the roots and canals of the mandibular first and second premolars can be complex and variable. Due to this variation in morphology, the endodontic treatment of mandibular premolars is a challenging task.⁴⁻⁵

Vertucci found that the mandibular first premolar has one canal in 74.0% of teeth, two canals in 25.5% and three canals in 0.5% of teeth. The mandibular second premolar has one canal in 97.5% and two canals in 2.5% of teeth. Slowey indicated that the mandibular premolars are difficult to treat endodontically due to variations in canal anatomy.⁶ Failure to locate the extra canals is one of the main reason for the endodontic failure. A thorough knowledge of tooth morphology, interpretation of angled radiographs, proper access preparation and a detailed exploration of the interior of the tooth are essential for a successful outcome of treatment.⁷

Radiographs taken at different horizontal angulations facilitate searching for additional roots and canals. An additional canal should be suspected if a radiolucent line is present mesial or distal to the main canal. The methods commonly used to study root canal anatomy include radiography, clearing techniques, direct observation with a microscope, 3D reconstruction and macroscopic sectioning⁸.

In the present case, 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 reason for having difficulty in identifying the second canal was inadequate access which leaves a shelf of dentine over the second canal. The second canal generally leaves the main canal at a sharp angle nearly at a right angle^{9,10}

Slowey recommends the visualization of such canal configuration as a lower case letter 'h' where the main canal would be the straight line portion of the 'h' and the second canal exists about midroot at a sharp angle from the straight canal.^{11,12} Likewise in the present case, 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 separation¹³.

Successful endodontic outcome in such cases is dependent upon careful use of all the available diagnostic aids to locate and treat the entire root canal system. Careful interpretation of angled radiographs, proper access preparation and a detailed exploration of the tooth are essential prerequisites for a successful treatment outcome.¹³⁻¹⁴

CONCLUSION

The complex nature of root and root canal morphology of mandibular premolars has been underestimated, which resulted in unknown endodontic failures in many clinical cases. A thorough knowledge of root canal anatomy and its variations, careful interpretation of peri-apical radiographs, close clinical inspection of the floor of the pulp chamber and proper modification of access opening along with adequate magnification, all are essential for successful treatment outcome.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Zillich R, Dowson J. Root canal morphology of mandibular first and second premolars. *Oral Surg Oral Med Oral Pathol.* 1973; 36:738-44.
2. Benjamin KA, Dowson J. Incidence of two root canals in human mandibular incisor teeth. *Oral Surg, Oral Med, Oral Pathol.* 1974; 38(1):122-6
3. Vertucci FJ. Root canal morphology of mandibular premolars. *J Am Dent Assoc.* 1978; 97:47-50.
4. Slowey RR. Root canal anatomy. Road map to successful endodontics. *Dent clin North Am.* 1979; 23:555-73.

5. Slowey RR. Radiographic aids in the detection of extra root canals. *Oral Surg.* 1974; 37:762
6. Goswami M, Chandra S, Chandra S, Singh S. Mandibular premolar with two roots. *Endod J.* 1997; 23(3):187.
7. Rödiger T, Hülsmann M. Diagnosis and root canal treatment of a mandibular second premolar with three root canals. *Int Endod J.* 2003; 36(12):912-9.
8. Kratchman SI. Obturation of the root canal system. *Dent Clin N Am.* 2004; 48:203-215.
9. Sashi Nallapati. Three Canal Mandibular First and Second Premolars: A Treatment Approach. A Case Report *J Endod.* 2005; 31(6):474-76.
10. Nallapati S. Three canal mandibular first and second premolars: a treatment approach. *Endod J.* 2005;31(6):474-6.
11. Cleghorn BM, Christie WH, Dong CC. The root and root canal morphology of the human mandibular first premolar: a literature review. *Endod J.* Epub. 2007; 33(5):509-16.
12. Kararia N, Chaudhary A, Kararia V. Mandibular left first premolar with two roots: A morphological oddity. *Contemp Clin Dent.* 2012; 3(2):234-236.
13. Jha P, Nikhil V, Arora V, Jha M. The root and root canal morphology of the human mandibular premolars: A literature review. *Journal of Restorative Dentistry.* 2013; 1(1): 3-10.
14. Y Seema Endodontic management of Mandibular premolar with two roots. *International Journal of Applied Dental Sciences;* 2016; 2(4):72-74.