ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at: www.ijdsir.com
Volume – 5, Issue – 5, September - 2022, Page No. : 88 - 92

The Radiculous premolars - case reports of medley mandibular premolars

[1]Dr. Akshay Arun Khase, Post graduate student, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

[2]Dr. Ramchandra Kabir, Professor, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

[3]Dr. Sunanda Gaddalay, HOD and Professor, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

[4]Dr. Anita Kale, Professor, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

[5]Dr. Amol Badgire, Reader, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

[6]Dr. Pravin Dhore, Reader, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

Corresponding Author: Dr. Akshay Arun Khase, Post graduate student, Department of Conservative Dentistry, MIDSR Dental College, Vishwanath Puram, Ambajogai Road, Latur.

Citation of this Article: Dr. Akshay Arun Khase, Dr. Ramchandra Kabir, Dr. Sunanda Gaddalay, Dr. Anita Kale, Dr. AmolBadgire, Dr. Pravin Dhore, "The Radiculous premolars - case reports of medley mandibular premolars", IJDSIR- September - 2022, Vol. – 5, Issue - 5, P. No. 88 – 92.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Successful root canal therapy requires an accurate diagnosis and management of complex root canal morphology. Although the occurrence of either two or three root canals in mandibular premolars is very rare, the clinician must be able to identify it clinically and radiographically to make the necessary changes in his shaping and obturation techniques. We present the endodontic management of a mandibular premolar with three root canals (two roots) and two canals (two roots) which were diagnosed radiographically. The necessary modifications of the routine clinical steps and the successful management of the complex anatomy, with emphasis on access modifications and radiographic interpretations are also explained. Teeth with extra roots and/or canals pose a challenge in clinical management. Identifying them early is necessary to facilitate appropriate modifications in treatment protocol,

armamentarium to be used and plan optimal number of treatment sittings.

Keywords: Anatomic variation, Dental Loupes, mandibular premolar, root canal treatment

Introduction

Successful root canal therapy requires a thorough knowledge of root canal morphology. Indeed, the major causes of endodontic treatment failure are incorrect canal instrumentation, incomplete canal obturation, and untreated major canals. Additional canals may be detected by clinical investigation of the floor of the pulp chamber and radiographic examination of the roots. (1)

Prognosis of nonsurgical endodontic therapy is closely associated with locating all root canals, proper mechanical and chemical cleaning and shaping of all root canals, and finally perfect obturation using appropriate sealants and materials. (2)

Case report 1

A nineteen-year-old male patient of Indian descent was referred to the Post Graduate Department of Conservative Dentistry and Endodontics with the chief complaint of intermittent pain over three months in relation to lower right posterior teeth. Patient also complained of episodes of sensitivity to hot foods in the involved tooth. Medical and dental history were non-contributory.

On clinical examination, patient's oral hygiene was found to be moderate. Deep proximal carious lesion was observed in tooth # 44 and was tender on percussion. The crown of mandibular first premolar on the contralateral side showed no unusual anatomy in terms of number of cusps and dimension suggestive of any anomaly. Electric pulp test and heat test with a gutta-percha stick gave a lingering response. There was no evidence of swelling or sinus tract.

Preoperative periapical radiographic examination revealed radiolucency in association with tooth #44. Radiograph also showed the presence of two roots. (Fig.1a) Based on clinical and radiographic evidences a diagnosis of irreversible pulpitis was made. Access was gained to the pulp chamber after administration of local anaesthesia (2% Lidocainewith1: 80,000 adrenaline) under rubber dam isolation. To gain sufficient access to the canals, the conventional access opening was modified into one that was wider mesiodistally.

Radiographically, the mid-root diameter appeared to be almost equal to the crown diameter. Tactile examination of the walls of major canals was done with a small precurved 10 k file which was advanced slowly down each wall of the major canal, probing for a catch. A slight catch may signify the orifice of an additional canal especially in the case of the buccal and lingual walls because these are the unseen dimensions on the radiograph.

Orifice location was difficult as the coronal pulp chamber was unusually long and the separation of roots was from the middle third of the root.

Finally, the three canal orifices were located and patency was ascertained with a small size 10 k file. The working length radiograph was taken. (Fig.1b) Gates Glidden drills were applied with brushing motion in a crown down fashion to enlarge the orifice to achieve a straight-line access. The canals were cleaned and shaped sequentially with Protaper files, (Fig. 1c) irrigated using 3% sodium hypochlorite and a final rinse of saline. The canals were dried with paper points, cotton was placed in the pulp chamber and Cavite was used to close the access cavity.

At the second appointment the canals were obturated with F1 Pro Taper gutta-percha cones using resin-based sealer. (Fig.1d) The access cavity was filled with

composite resin and informed consent of the patient was obtained.

Fig.1a

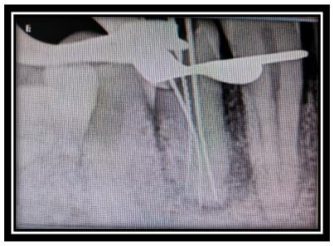

Fig.1b

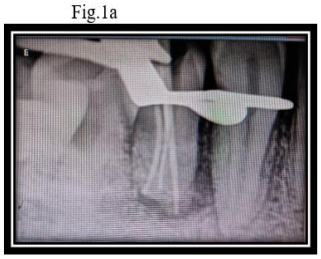

Fig.1c

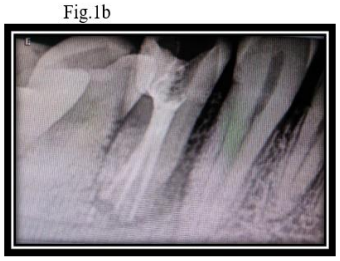

Fig.1d

Case report 2

A forty-five-year-old Female patient of Indian descent was referred to the Post Graduate Department of Conservative Dentistry and Endodontics with the chief complaint of intermittent pain over one month in relation to lower right posterior teeth. Patient also complained of episodes of sensitivity to hot and cold foods in the involved tooth. Medical and dental history were non-contributory.

On clinical examination, patient's oral hygiene was found to be moderate. Deep proximal carious lesion was observed in tooth # 43,44 and was tender on percussion. Electric pulp test and heat test with a gutta-percha stick gave a lingering response. There was no evidence of swelling or sinus tract.

Preoperative periapical radiographic examination revealed radiolucency in association with tooth #44. Radiograph also showed the presence of two roots. (Fig.2a) Based on clinical and radiographic evidences a diagnosis of irreversible pulpitis was made. Access was gained to the pulp chamber after administration of local anaesthesia (2% Lidocainewith1:80,000 adrenaline) under rubber dam isolation. To gain sufficient access to the canals, the conventional access opening was modified into one that was wider mesiodistally.

Radiographically, two different root canals (buccal and lingual) can be easily seen from the orifice till the apical foramina. (Fig.2a)

Two canal orifices were located and patency was ascertained with a small size 10 k file. The working length radiograph was taken. (Fig.2b) Gates Glidden drills were applied with brushing motion in a crown down fashion to enlarge the orifice to achieve a straight-line access. The canals were cleaned and shaped sequentially with Protaperfiles, (Fig.2c) irrigated using 3% sodium hypochlorite and a final rinse of saline. The canals were dried with paper points, cotton was placed in the pulp chamber and Cavite was used to close the access cavity.

At the second appointment the canals were obturated with F1 Pro Taper gutta-percha cones using resin-based sealer. (Fig.2d) The access cavity was filled with composite resin and informed consent of the patient was obtained.

Fig.2a

Fig.2b

Fig.2c

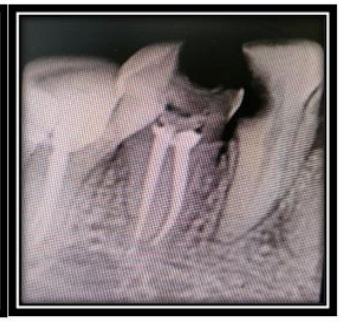

Fig.2d

Discussion

Increased prevalence of anatomical variations makes it imperative to analyse the root canal anatomy of mandibular first premolars, which demands the need for proper diagnosis, treatment planning and careful execution of clinical endodontic procedure. Table 1 shows the anatomical variations in the mandibular first premolar as reported by various authors. (3)

Racial differences in the canal morphology of mandibular premolars have also been reported in the literature. Trope et al. found that Afro-Americans have a higher number of mandibular premolars with extra canals than Caucasians. The former had more than one canal in 32.8% of first premolars and 7.8% of second premolars. (3)

Table 1: Anatomical variations of mandibular first premolars according to different authors

Authors	Year	One canal (%)	Two canals (%)	Three canals (%)
Vertucci (4)	1984	74.0	25.5	0.5
Pineda and Kuttler (5)	1972	74.2	24.9	0.9
Zillich and Dowson (6)	1981	80.7	18.9	0.4
Yoshioka et al. (7)	1985	80.6	15.1	4.3

A study of 1000 mandibular first premolars in Chennai (South Indian) population has shown that the occurrence of three canals is 0.4% and that of two roots is 3.9%. (8)

Clinicians should visualize and have knowledge of internal anatomy before undertaking endodontic therapy. Prior to initiating root canal treatment, the endodontist cannot precisely determine the actual number of root canals present. Examination of the pulp chamber floor may offer clues to the location of orifices and to the type of canal systems present. Krasner and Rankow (9) in a study of 500 pulp chambers demonstrated that definite patterns of the pulp chamber floor and wall anatomy exists. These authors proposed six laws for assisting clinicians identify canal morphology which was found to occur in 95% of the teeth examined.

Careful evaluation of two or more periapical radiographs is mandatory. Martinez-Lozano et al. (10) examined the effect of X-ray tube inclination on accurately determining the root canal system present in premolars. They found that by varying the horizontal angle 20° and 40°, the number of root canals observed in the maxillary and mandibular premolars coincided with the actual number of canals present.

A DG 16 endodontic probe used as pathfinder determines the angle at which the canals depart from the main chamber. (11) Using the ‘fast break’ guideline as stated by Nattress and Martin (12), the canal bifurcation in the present case was diagnosed by the abrupt disappearance of the canal.

Conclusion

It is extremely important to use 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 interior of the tooth, ideally under magnification, are essential prerequisites for a successful treatment outcome.

References

1. Praveen R, Thakur S, Kirthiga M, Shankar S, Nair VS, Manghani P. The Radiculous’ premolars: case reports of a maxillary and mandibular premolar with three canals. Journal of natural science, biology, and medicine. 2015 Jul;6(2):442.

2. Hossein pour S, Kharazifard MJ, Khayat A, Naseri M. Root canal morphology of permanent mandibular premolars in Iranian population: A systematic review. Iranian endodontic journal. 2016;11(3):150.

3. Poorni S, Karuma ran CS, Indira R. Mandibular first premolar with two roots and three canals. Australian Endodontic Journal. 2010 Apr;36(1):32-4.

4. Vertucci FJ. Root canal anatomy of human permanent teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1984; 58: 589–99.

5. Pineda OA, Kuttler Y. Mesiobuccal and buccolingual roentgenographic investigation of 7275 root canals. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1972; 33: 101–10.

6. Zillich R, Dowson J. Root canal morphology of the mandibular first and second premolars. Oral Surg Oral Med Oral Pathol 1973; 36: 738–44.

7. Yoshioka T, Villegas JC, Kobatashi C, Suca H. Radiographic evaluation of root canal multiplicity in mandibular first premolars. J En.

8. Iyer VH, Indira R, Ramachandran S, Srinivasan MR. Anatomical variations in mandibular premolars in Chennai population. Indian J Dent Res 2006; 17: 7–10.

9. Krasner P, Rankow HJ. Anatomy of the pulp chamber floor. J Endod 2004; 30: 5–16.

10. Martinez-Lozano MA, Forner-Navarro L, Sanchez-Cortes JL. Analysis of radiologic factors in determining premolar root canal systems. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999; 88: 719–22.

11. Burns RC, Her Branson EJ. Tooth morphology and access cavity preparation. In: Cohen S, Burns RC, eds. Pathways of the pulp. 8th ed. St. Louis, MO: Elsevier Mosby; 2002. p. 181.

12. Nattress BR, Martin DM. Predictability of radiographic diagnosis of variations in root canal anatomy in mandibular incisor and premolar teeth. Int Endod J 1991; 24: 58–62.