ENDODONTIC MANAGEMENT OF A TAURODONT MANDIBULAR SECOND PREMOLAR WITH THREE CANALS USING CBCT – A CASE REPORT

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ABSTRACT

The presence of three root canals in mandibular premolar may sometimes be recognized when there is persistent post operative discomfort following root canal therapy. This paper presents two cases one of mandibular premolar with three canals and the other mandibular molar with pin point pulp exposure. The possibility that there is more than one root canal in lower premolar teeth must be considered in the radiographic and clinical examination during root canal treatment.¹ the incidence of three canals in mandibular second premolar has been reported to be 0.45-0.5%.² IN this case, three orifices were located in mesiobuccal, distobuccal and lingual.

Keywords: Dental Pulp Cavity, Abnormality, Bicuspids.

I. INTRODUCTION

Successful endodontic treatment requires an understanding of root canal anatomy and morphology. There is wide morphological divergence in root canal system. According to Green the highest incidence 47% of accessory foramina was observed in mandibular second premolar.³ Vertucci et al reported that mandibular second premolar had one root canal at the apex in 97.5% and three root canals in only 2.5% of the teeth.⁴ there seems to be a racial difference for the presence of two or more canals in mandibular premolars. Incidence of mandibular premolars with more than one root canal has been significantly higher in Negroids 32.8% than in Caucasians 13.7%⁵.

The purpose of present case series was to discuss the treatment recommendations for an unusual occurrence of three canals in second mandibular premolar.

II. CASE REPORT

A 36 year old male patient with no systemic history reported to Hazaribag College Of Dental Sciences and Hospital in the Department Of Conservative Dentistry & Endodontics with the chief complaint of hot and cold sensitivity in lower left back region of tooth since 1 month and was diagnosed with Apical Periodontitis with Chronic Irreversible Pulpitis # 35.It aggravates on chewing food # 35 and 36. Clinical examination revealed deep proximal carious lesion # 35 & 36. Vitality test on both teeth was done in which #35 was non vital; whereas #36 was vital .Radiographic examination of the complaint area revealed widening of periodontal ligament with periapical radiolucency #35. Three canals were suspected # 35 so a Cbct examination was carried out to confirm number of roots and canals. On spiral CT scan three canals were found, including mesiobuccal, distobuccal and lingual.

Non surgical endodontic treatment was planned in both 35 and 36. Composite build up # 36 after bio dentin placement was done. Local anaesthesia was administered; under rubber dam isolation # 35 was accessed. The modified GG - drill was used circumferentially to create a tapering preparation from canal orifice and proper accessibility. Then working length was established using Canal Pro (Coltene, Switzerland.) Electronic apex locator and confirmed radiographically. Biomechanical preparation of the three canals WAS DONE with protaper
next system (DENTSPLY maillefer, ballaigues, Switzerland) to size x2 for all canals. Copious irrigation with 3% sodium hypochlorite (NAOCL) followed by 17% ethylene Diamine tetracetic acid (EDTA) was carried out during the instrumentation phase. The canals were then dried with paper points and calcium hydroxide intracanal medicament was placed for 7 days. On next visit, the calcium hydroxide dressing was removed; canals were dried with paper points, master cone was taken and obturated with gutta-percha cones and Endosequence BC sealer (Brasseler, Savannah, GA). The access cavity was sealed with a permanent restorative material.

FIGURE 1: Photograph showing three canal orifice

FIGURE 2: Pre-operative

Working length  Master cone  Obturation

Spiral CT scanned images
III. DISCUSSION

Slowly felt that mandibular premolars were the most difficult teeth to treat endodontically because of their aberrant anatomy. A complete awareness of their statistical data is important for the clinician to achieve a higher degree of success in endodontic treatment.

Studies have reported that the incidence of two or more canals in mandibular second premolar may vary between 1.2% and 34%. Sert and Bayirli have reported an incidence of 0.4% of mandibular second premolars with three root canals. Vertucci assessed the root canal morphology in 100 Turkish male and 100 Turkish female patients. Men (43%) exhibited two or more canals much more frequently than the female patients (15%) in the study. Vertucci reported an incidence of 2.5% of two separate and distinct root canals in mandibular second premolars; however, he has not reported any case of mandibular second premolar with three root canals.

Mandibular second premolars mostly have a single root. The incidence of 2 or more roots is low, approximately 0.4%, whereas in mandibular first premolar it is 2.1%. Majority of the mandibular premolars have a single canal, but approximately 9% have 2 or more canals. A single apical foramen might be found in mandibular teeth in more than 9 out of ten cases, but 2 or more foramina may occur approximately 8.2% of the time. The incidence of more than 1 root, more than 1 canal, and more than 1 foramen is less frequent in the mandibular second premolar than in the mandibular first premolar.

Thirty-six anatomic studies were analyzed by Kottoor et al., which included 12,752 first premolars and nineteen studies assessing 6646 second premolars. A significant variation in the number of roots, root canals, and

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apical foramina was observed between Caucasian, Indian, Mongoloid, and Middle Eastern ethnicities. The most common anatomic variation was C-shaped canals in mandibular first premolars with highest incidence in Mongoloid populations (up to 24%).

Intraoral radiographies with X-ray angle change of 20 and 40° in the mandibular first premolar is more accurate than direct radiography in diagnosing the real number of canals. In addition to radiography, which may be a key to initial diagnosis for extra canals, the microscope and optical loupes and clinician’s sense of touch during the initial placement of a file are also very helpful in finding additional canals. The consistency of periodontal ligament space in radiograph may also work as a supplement in finding extra-canals. A canal suddenly narrowed in radiographic cliché could represent an extra-canal or extra-root.

It is very important where canals are isolated from the main canal because the more apical is the location of canals’ isolation, the more difficult will be cleaning and obturation. Modern dental tools including loupe and microscope used currently in endodontic treatment help to locate canals in pulp chamber and coronal areas. The cases reported in this study involved successful nonsurgical treatment of three cases of premolar teeth with three separate canals isolated in the apical half of the root trunk. In such cases, the clinician’s sense of touch and radiographic images during the treatment will take on further importance.

IV. CONCLUSION

The anatomy of the mandibular premolar has complex variations. Adequate knowledge of root canal anatomy and its variations, careful interpretation of periapical radiographs, proper modification of access opening, and close clinical inspection of the floor of the pulp chamber result in successful treatment outcomes.

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