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CASE STUDY

TREATMENT OF RADIX ENTOMOLARIS: CASE SERIES

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ABSTRACT

The basic prerequisites for successful endodontic treatment are firstly a comprehensive knowledge on the root canal anatomy and proper identification of all the canals, meticulous chemo-mechanical preparation followed by three dimensional obturation with hermetic seal. Failure of any of these steps may occur due to unusual tooth morphology. Usually mandibular first molars have two roots with three canals (mesiobuccal, mesiolingual & distal) but in few cases, the number of roots and canals vary. The variation of mandibular permanent 1st molar with additional distolingual root is called Radix Entomolaris (RE). This article presents seven such case reports. Also mentioned are the modifications in the access opening, canal preparation, problems encountered during the treatment, common iatrogenic errors which occur during the treatment and factors which affect the prognosis.

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INTRODUCTION

Treatment of entire root canal system is required for getting successful results and to prevent reinfection HYPERLINK "https://paperpile.com/c/BQSEuO/GCdW+BfyL", The reasons for failure of establishment of hermetic seal is not only reaching complete working length but also lack of knowledge of anatomic structures and its variations . According to Barrett, of all the phases of anatomic study in human system, one of the most complex is that of pulp cavity morphology. The hard tissue reservoir of the human dental pulp takes on multifarious configurations and shapes. Therefore a complete knowledge of tooth morphology, careful interpretations of fine radiographs at different levels, good access preparation, detailed cleaning and shaping of the canals and tri-dimensional obturation with hermetic seal are essential prerequisites of successful treatment outcome [3] because the non-treatment of one canal may lead to endodontic treatment failure [4] . Therefore successful treatment is very important since first molars play an important role in mastication, maintains vertical dimension of face, maintains continuity of dental arched and also maintains teeth and tongue position [5]. Human permanent molars exhibit a varied anatomy. The anatomical variations has been described in the mandibular first molar: FabraCampos[6] reported the presence of three mesial canals and Stroner[7] observed the occurrence of three distal canals. The aim of this case series study is to describe a clinical case of a mandibular first molar with four canals and three roots: one mesiobuccal, one mesiolingual, one distobuccal, and one distolingual (RE).

Prevalence: A RE can be found on the first, second and third mandibular molar, occurring least frequently on the second molar. Each ethnic groups varies in prevalence of RE. With less than 5% in Indians/Eurasians and 3-4% in Europeans [8]. In Caucasians the prevalence of RE is 4.2%. In American Indian population and in Asian population it occurs very frequently with prevalence ranging from 5% - 40 % [9–11] In Africans frequency of RE was reported less than 3%. 8 HYPERLINK "https://paperpile.com/c/BQSEuO/Ktxy+ksPG"[,12]. Incidence of RE was about 1.35% in German population as reported by Schafer et al [13]. In Taiwanese population Tu et al investigated the occurrence of three rooted mandibular 1st molar and found that 21.09% of the patients examined had distolingual root that could affect the endodontic treatment if diagnosed incorrectly. [14] De Moor et al [15] classified the RE into three types according to buccolingual variations: type I, straight root/root canal; type II, initially curved entrance that continues as a straight root/root canal; type III, initial curve in the coronal third and a second curve beginning in the middle and continuing to the apical third. Carlsen and Alexanderson [16] have classified the RE into four types according to its cervical part: type A and type B, distally located cervical part of RE with two normal mesial and one normal distal component, respectively; type C, mesially located cervical part; and type AC, central location, between distal and mesial root components. Ribeiro and Consolaro [17] proposed a classification for radix entomolaris as follows: Type I refers to a straight root/root canal; Type II to an initially curved entrance and the continuation as a straight root/root canals; Type III to an initial curve in the coronal third of the root canal and a second buccally orientated curve starting from the middle to apical third.

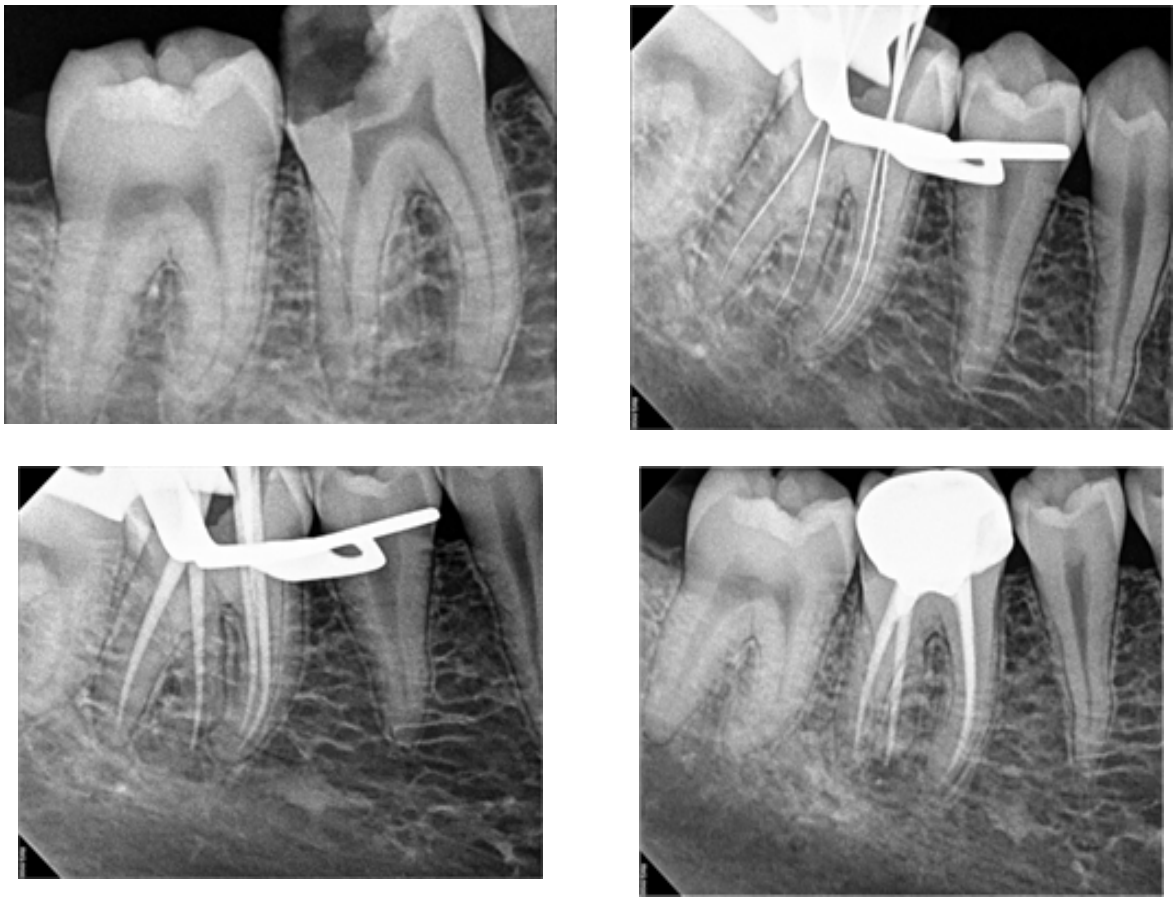

Fig. 1. (a) Diagnostic Radiograph of 46 (b) Working length Radiograph of 46. (c) Master Cone Radiograph. (d) Post Obturation Radiograph

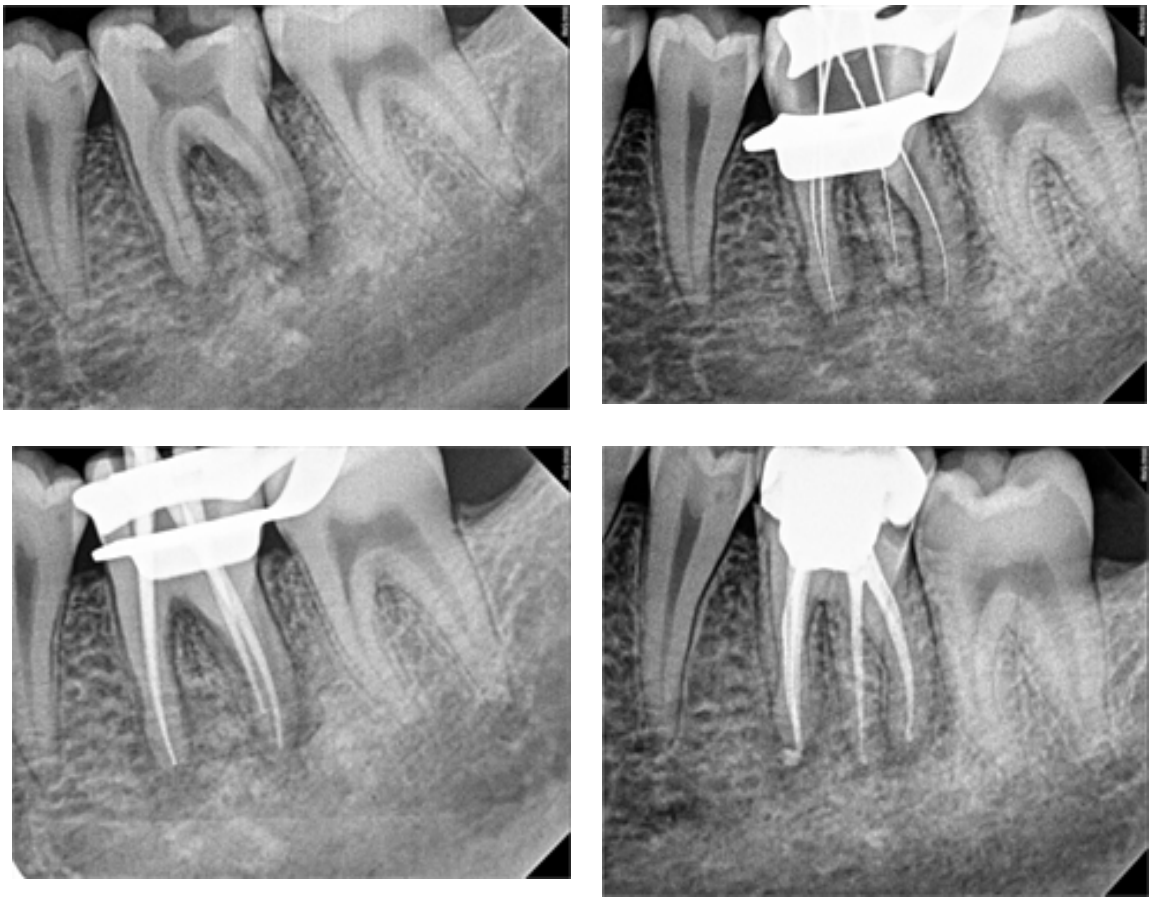

Fig 2: (a) Diagnostic Radiograph of 36 (b) Working length Radiograph of 36. (c) Master Cone Radiograph. (d) Post Obturation Radiograph.

CASE REPORT

A 24 year old patient was reported to The Department of Conservative Dentistry and Endodontics at Sinhgad Dental College And Hospital, Pune, India in the year 2015 complaining of discomfort in the lower left back region of jaw and pain in the lower right back region of jaw. The patient gave history of discomfort since 30 days in the lower left back region of jaw and pain since 15 days in lower right back region of jaw. Medical history was not contributory. On intraoral examination the left mandibular first molar tooth 36 and 46 was carious and tender on percussion . The diagnostic radiograph showed periodontal space widening in the apical one third region, with discontinuous lamina dura in the apical one third region. An additional root between mesial and distal roots was observed (Fig.1a & 2a). Two radiographs with different horizontal angulations i.e. mesial and distal angulations were made which confirmed that the additional root was located distolingual to the mesial root. A diagnosis of radix entomolaris with apical periodontitis was made. The patient was informed in detail about the treatment planning for non surgical endodontic treatment for the tooth 36 and 46. The Patient refused other alternative treatment like extraction of tooth 36 and 46. The treatment followed the same way as in case report 1 where the biomechanical preparation was done of the tooth 46 with Pro Taper System(Dentsply, Konstag, Germany) upto size F2 and then was obturated with corresponding gutta-percha master cone points using AH+ Sealer (Dentsply) (Fig. 1). After one week, tooth was restored with a composite restoration and a full cast crown was advised for long term success. The patient remained asymptomatic when he last reported 1 months after the treatment and is under continuous active follow up. After a month the treatment of the tooth 36 followed the same way as in case report 1 where the biomechanical preparation was done of the tooth 36 with Pro Taper System(Dentsply, Konstag, Germany) upto F2 and was obturated with corresponding gutta-percha master cone points using AH+ Sealer (Dentsply).(Fig. 2)

DISCUSSION

Thorough mechanical and chemical debridement of the entire root canal system and its obturation with an inert material with Hermetic seal is the main objective of endodontic treatment. [18] Ingle listed apical percolation and subsequent diffusion into the root canals as the most frequent cause of endodontic failure. One of the main reasons for failure is a canal that is left untreated because a clinician fails to recognize it [19]. Therefore, for understanding the principles and problems of cleaning and shaping, for the determination of apical limits and dimensions of canal preparation, and for successful treatment outcomes a thorough understanding of the complexity of the root canal system is essential.[3] Intraorally, an additional cusp (tuberculum paramolare) or a cervical convexity that is noticed by probing may indicate RE. Sometimes location of the additional canal orifice may be difficult. If the orifice is missed the treatment leads to failure due to infected tissue or necrotic remnants. A modification of the classical triangular shaped access opening into a trapezoidal shape and a straight line access is necessary in order to locate the disto-lingual orifice. If the orifice is not located even after the modified trapezoidal access opening a thorough inspection of the walls and the floor is necessary especially in the disto-lingual region. Most RE are curved and in some cases an additional curvature appears in the middle or apical third of the root according to Ribeiro and Consularo[20] . Therefore, a straight access to these root canals is crucial for adequate shaping and cleaning [21] (also mention about the rotary). In one of these case, although electronic determinations of the working length in this root canal had been reproduced, the root canal filling seems to be a little short of the apex therefore, a curved RE is assumed. This could be due to the fact that the apex of the RE could have a severe curvature, which is not visible on the radiograph. Canal curvature, particularly in the apical third of the root can cause shaping aberrations, such as straightening of the root canal, ledge formation, root canal transportation resulting in loss of working length. Therefore, after the canal location, orifice enlargement, working length determination and glide path preparation till 15# K-files should be administered followed by completion of shaping and cleaning by flexible nickel-titanium rotary files. All of these steps help the file to attain a more centered preparation with restricted enlargement of the coronal third of the root canal. An additional root may also be a contributing factor to localized periodontal destruction. Attachment loss and greater probing depths and at the disto-lingual aspect have been observed as a common finding for RE [22]. In one of the above cases, an increased probing depth of 5 mm was recorded at the lingual aspect in the furcation area where the RE was located. After root canal treatment this probing depth reduced to 3mm. Thus, one of the adjunctive method to identify an additional root is probing at the distolingual aspect of mandibular molar. Careful clinical examination for any unusual morphology, in combination with Visual aids such as loupes, endoscopes and dental operating microscopes can help in the early diagnosis of these complicated macrostructures [18]. Since 5% of the Indian population have RE, every effort must be taken in order to diagnose and treat RE successfully.

Conclusion

Different morphology of mandibular 1st molars makes it difficult for endodontic treatment if the knowledge of the operator is not precise. Basic diagnosis of tooth morphology plays a vital role in treatment outcome of the root canal therapy. Hence RE must be diagnosed correctly by taking eccentric radiographs in order to imply the modifications in access opening, biomechanical preparation and obturation for successful treatment. Not just diagnosis but the knowledge of prevalence, canal configuration and root morphology is also important. The access opening in RE must modified into a trapezoidal shape for easy access of canals.

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