CASE REPORT

3-D ASSISTED ENDODONTIC MANAGEMENT OF BILATERAL REDIX ENTOMOLARIS

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Abstract:

The variation in root canal morphology, especially in multirooted teeth, are a constant challenge for diagnosis and successful endodontic therapy. This case report describes the successful nonsurgical endodontic management of cariously exposed bilateral three rooted mandibular first molar with four root canals detected on the preoperative radiograph taken with mesial angulation and confirmed with a 64 slice spiral computed tomography scan assisted 3-Dreconstructed images.

Key words: Bilateral, Redix entomolaris, C T scan, Anatomical variation, Mandibular first molar.

Introduction:

The main purpose of root canal therapy are thorough shaping and cleaning of all pulp canal spaces **.** Understanding and awareness of the presence of atypical root canal morphology can thus lead to the successful outcome of root canal treatment [(1)] . Most of the mandibular first molars are two rooted with one mesial root and one distal root [(2)] . An additional third root, first mentioned in the literature by Carabelli, is called the Radix Entomolaris (RE).This extra root is located distolingually in mandibular molars, mainly first molars. An additional root at the mesiobuccal side is called the radix paramolaris [(1,3)] . The prevalence of RE in the mandibular first molar is 40% in those with Mongolian traits, 3.4 to 4.2% in Europeans, 3% in Africans and less than 5% in Indians and Eurasians [(4)] .The bilateral occurrence of RE is reported to vary from 37.14% to 67%[(1,5)]. However, a recent study reported 3.72% prevalence of bilateral three-rooted mandibular first molar in indian population. Therefore Possible anatomical variations of tooth, in terms of root inclination and root canal curvature should always consider to avoid or overcome procedural errors during endodontic therapy.

Case report:-

A 17 year old female reported to us with chief complaint of pain in the right & left lower back teeth. Intensity of pain increased on having food and was relieved on taking medication. On examination, the right & left mandibular first molar displayed deep dental carious lesion with tenderness on percussion. Thermal and electrical pulp testing of both teeth elicited a negative response. The pre-treatment radiographs showed widening of the periodontal ligament and periapical radiolucency surrounding root apex of both teeth and an additional root between the mesial and distal roots [Fig.1a,1b]. From the

clinical and radiographic findings, a diagnosis of irreversible pulpitis with acute apical periodontiitis with respect to teeth #36 and #46 was made and endodontic treatment of teeth#36 & #46 was planned one by one . Three dimensional reconstructed [Fig.2a,2b] and axial images [Fig.3] were obtained using a 64slice spiral CT scan to get detailed information of the anatomical variation in teeth #36 and #46 and to confirm the presence of extra root.

Distal surfaces of both teeth were restored with composite resin to ensure better isolation. First the tooth #36 was anesthestised using 1.8ml of 2% lidocaine (LIGNOX 2% A) and rubber dam was placed. A modified access opening was established under operating microscope. The pulp chamber floor was shown to have four canals located at the terminus of the roots' developmental fusion lines. (Fig4a). Working length was determined using apex locater and confirmed with periapical radiogaraph (Fig.4b). Cleaning and shaping was performed by using V Taper rotary Ni-Ti instruments (SS White) with a standardized technique. Irrigation was achieved using normal saline, 5.25% sodium hypochlorite solution and 17% EDTA in between instrumentation. Root canals were dried with absorbent points (Dentsply Maillefer). Calcium hydroxide dressing was given and access cavity was sealed with Cavitemp (Ammdent). The patient was asymptomatic on the next visit; therefore, obturation of tooth #36 was done using gutta percha and AH 26 root canal sealer and sealed with Cavitemp (Figure 4c). In next visit, tooth was permanently restored using composite resin (Ivoclar vivadent). Same procedure followed for tooth #46. Access cavity was established under rubberdam and modified to locate the extra canal (Fig.5a) with respect to the distolingual root in the right mandibular first molar. Working length was determined using apex locater and confirmed with periapical radiograph (Fig.5b). Copious irrigation was performed with 5.25% sodium hypochlorite and 17% EDTA in between instrumentation while final irrigation done with normal saline. Biomechanical preparation was done using V Taper rotory Ni-Ti instruments. Calcium hydroxide dressing was done for 1 week. The tooth was obturated using gutta percha and AH 26 root canal sealer and sealed with cavit (Fig.5c) and it was permanently restored with composite in next visit. On followup visits, both teeth #36 & #46 was asymptoatic so advised to get permanently restored with crown.

Figure with legends:

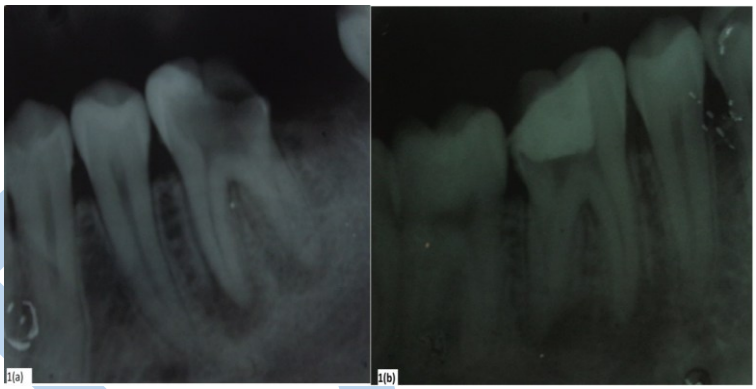


Fig.1(a) & 1(b) showing Pre-op radiograph of Left mandibular first molar & Right mandibular first molar respectively.

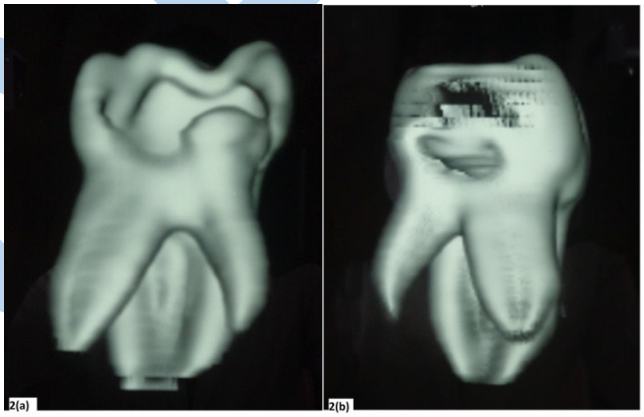


Fig.2(a) & 2(b) showing 3D reconstructed images of left mandibular first molar and right mandibular first molar respectively.

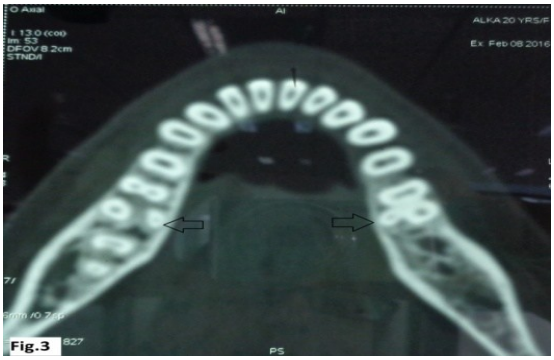


Fig.3 showing axial section at apical level (Black arrow shows the extra supernumery root on disto-lingual aspect of right mandibular first molar & left mandibular first molar)

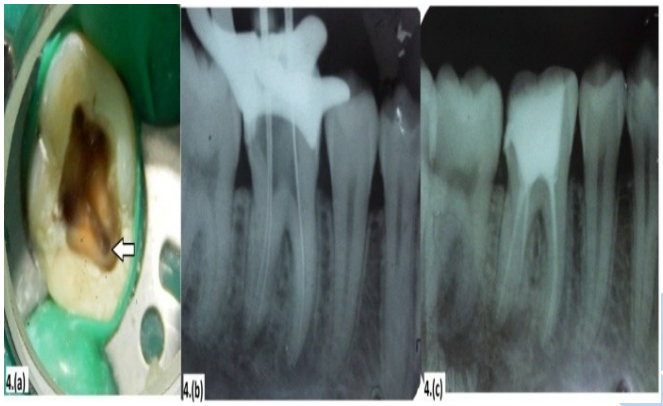
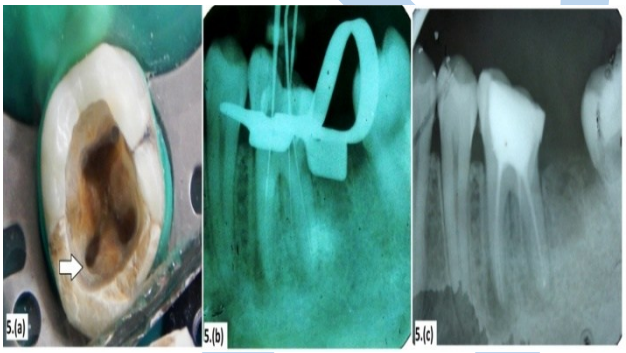


Figure 4.(a) Clinical picture of pulp chamber floor showing orifice of distolingual canal of tooth#46, 4.(b) Working length radiograph of tooth#46, 4.(c) Radigraph after obturation



5.(a) Clinical picture of pulp chamber floor showing orifice of distolingual canal of tooth#36, 5.(b) Working length radiograph of tooth#36, 5.(c) Radigraph after obturation

Discussion:

Successful outcome of endodontic treatment depends upon accurate diagnosis, thorough knowledge about possibble anatomic variation of tooth & canal configuration and clinical approach employed. Accurate diagnosis of radix entomolaris can be made with help of clinical examination , thorough inspection of radiograph and advanced imaging techniques. It is mentioned in literature that the radiographs were successful in over 90% of the cases but superimposition of the distal roots can be limiting factor for identification of additional root. An angled radiograph (25-30°) can be more useful in this regard and it is said that a mesial angled radiograph is better than a distal angled radiograph for RE detection[6,7]. The main drawback of periapical radiographic technique is to provide 2-dimensional image of 3-dimensional image.

De Moor classified the distolingual root of first mandibular molars into three types, according to the canal curvature of RE in buccolingual orientation: Type I (straight root), Type II (an initially curved entrance and then continuing as a straight root), and Type III (a curvature in the coronal third and buccal curvature from the middle third or apical third of the root).[8] In this case, both redix entomolaris comes under the type III as per De Moor classification. 3D reconstructed images obtained with help of 64 slice spiral CT scan confirmed Type III curvature of RE of both teeth #36 & #46 (Figure 2a & 2b). This Type III RE is more frequently found than any other anatomical type of RE in the mandibular first molar.[9]

Recently wang et al classified RE into three types based on radiographic appearance. Type i presents the identifiable radiographic image. For a Type ii image, a large beam angulation is necessary mesially or distally for their identification. For a Type iii image, identification becomes extremely difficult because of the overlap of the adjacent distobuccal root.[9] In this case both RE are readily identifiable in pre-op radiograph so comes under Type I (acco. To wang et al) . In radiograph, Both RE seems to have straight distolingual root without any curvature. Sometimes such false interpretation may lead to procedural errors. Therefore three-dimensional imaging techniques based on cone beam computed tomography (CBCT) and computed tomography are useful for visualizing the true morphology of an RE in a noninvasive manner using less radiation. However, cost and access to them are said to be the limiting factors[10].

Conclusion:

The observation of presence and location of RE has become easier with the advent of more advanced 3D imaging modalities however, these can only be used occasionally when required because of high cost and doses of radiation.

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