MAVEN

CASE REPORT

MANAGMENT OF EXTRA ROOT IN MANDIBULAR MOLARS: A CASE SERIES

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Abstract

Success of endodontic treatment depends on the proper identification of all the canals thor- ough chemo-mechanical preparation followed by three dimensional obturation with her- metic seal. Failure of any of these steps may occur due to unusual tooth morphology. Usu- ally mandibular molars have two roots with three canals (mesiobucccal, mesiolingual & distal) but in few teeth, the number of roots and canals vary. The variation in the number of roots is called radix entomolaris. This article presents three case reports of mandibular first molars with extra roots. Also mentioned are the modifications in the canal preparation, problems encountered during the treatment, common iatrogenic errors which occur during the treatment and factors which affect the prognosis. (2018, Vol. 02; Issue 01: Page 7 - 12)

Keywords: Radix entomolaris, Variations, Extra roots.

Introduction

It is necessary for the clinician to have a thorough knowledge of the variation in in- ternal and external root anatomy and characteristic features in various racial groups for successful endodontic treat- ment. The main objective of root canal treatment is thorough mechanical and chemical cleaning of all the canals before obturation with an inert filling material. Generally flare-ups occur due to improper cleaning and shaping of anals, lack of un- derstanding of root canal morphology, fail- ure of establishment of hermetic seal, un- derfillings, overfillings and also due to im- proper identification of canals (1).

The root canal anatomy of permanent mandibular first molar has been tradition- ally described as a two-rooted tooth, one mesial and one distal, with two canals in the mesial root and one or two canals in the distal root. Nonetheless, other possi- bilities exist (2, 3).

A major anatomical variant in mandibular molars is the presence of an additional third root. If this supernumerary root is located distolingually, it is called as radix entomolaris.

The Latin term radix entomolaris was

coined by Mihaly Lenhossek though most authors wrongly attribute this term to George Carabelli.

Likewise when an additional root is lo- cated at the mesiobuccal side, it is called as radix paramolaris (4-6).

This paper highlights on Radix Entomola- ris, a developmental variation occurring in mandibular molars which is associated with an extra root and so the extra canal. The other variant of Radix is Radix Para- molaris which indicates the presence of extra root on the buccal side.

Case report 1

A 23 year old male patient reported to De- partment of Conservative Dentistry and Endodontics with a chief complaint of se- vere pain in the right lower back tooth re- gion since four days.

Pain was of intermittent type, aggravated on taking cold foods and persists even af- ter the removal of stimulus. A diagnostic radiograph was taken which showed prox- imal caries approaching pulp with periap- ical radiolucency (Fig 1A). On keen obser- vation, there appears to be an additional root. Another radiograph has been taken which with SLOB. Local anesthesia was administered and the tooth was isolated under rubber dam.

Access preparation was done with an endo access bur no.1 (Dentsply Switzerland). The first distal canal has been found slightly away from the centre (buccally) and indicating that the other canal will be on the lingual side. As such the access cavity preparation was modified from a tri- angular shape to a trapezoidal form and the fourth canal was located.

The root canals were located with DG- 16 endodontic explorer and patency of canals was made with 15 number K -file (Mani

Japan). Working length was determined radiographically (Fig 1B).

Cleaning and shaping was done with ro- tary ProTaper Gold instruments in a step- down manner. Glyde was used as a lubri- cant and the irrigants used were sodium hypochlorite, hydrogen peroxide and nor- mal saline. Intra canal medicament Met- apex (Meta,Switzerland) was placed with respect to same tooth (Fig 1C). Follow up radiograph was taken after 1 month (Fig 1D). Then obturation was performed with cold lateral condensation. Access cavity was restored with composite and a post- obturation radiograph was taken (Fig E & F). Follow-up was done upto six months and the radiographs showed no evidence of pathology.

Case report 2

A 31year old male patient came with chief complaint of severe pain in the right lower back tooth region. Pain was of continuous type and with disturbed sleep. Pain aggra- vated on taking hot substances and even on mastication. Diagnostic radiograph shows no periapical changes but shows radiolucency involving pulp (Fig 2A). 2% Local anesthesia was administered and the tooth was isolated under rubber dam. Access opening was done with Endo ac- cess bur. Three canals were located but the dentinal map seems to be slightly ex- tending in a distolingual direction. Access preparation was modified in that direction with an extra shank round bur. The fourth canal was explored with DG 16 explorer (Dentsply, Switzerland). Canal orifices were enlarged with ProTaper SX, working length was determined radiographically (Fig 2B), cleaning and shaping was per- formed with rotary Hyflex EDM Files in- struments in a step-down fashion. The same irrigation regimen was followed as mentioned in the case report 1. Intra canal

medicament (Metapex-Meta, Switzerland) was placed with respect to same tooth (Fig 2C) and follow up was done up to 2 months (Fig 2D). Obturation was per- formed by cold lateral condensation and access cavity was restored with Composite (Fig 2E & F). Post obturation radiograph shows well obturated four canals. Patient was recalled after one week and a radio- graph was taken which had showed no ev- idence of pathology. Follow-up was done upto six months and no signs and symp- toms were noticed (Fig 3).

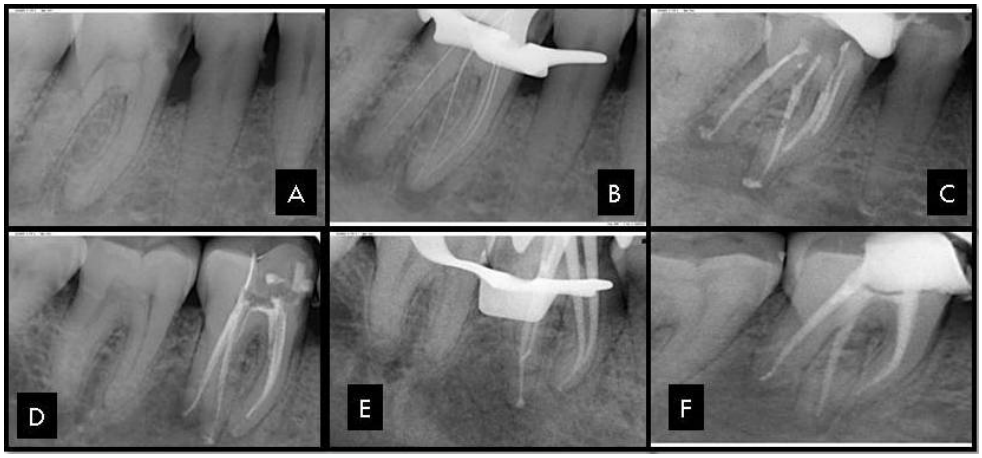

Fig 1: A- Pre-operative radiograph; B- Working length radiograph; C- Intracanal Medica- ment placed; D- After 1month follow up; E- Mater Cone Selection; F- Obturation followed by post endodontic treatment.

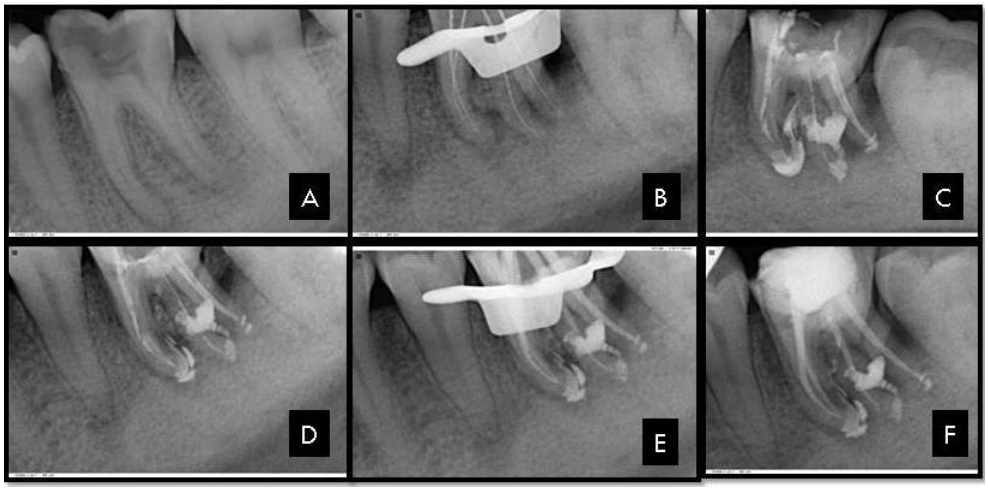

Fig 2: A- Pre-Operative Radiograph; B- Working Length; C- Placement of intracanal Medic- ament; D- After 1 month follow up; E- Master cone selection; F- Obturation followed by post endodontic treatment.

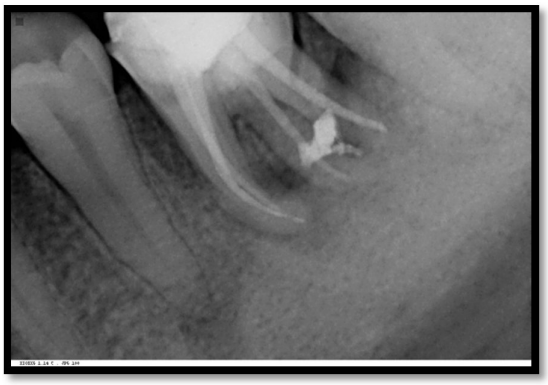

Fig 3. After 2 month follow up

Case report 3

A 27 year old male patient was referred to department of endodontics with chief complaint of severe pain. Pain was of con- tinuous type which also radiates to the ear. On examination, it was found that oc- clusal caries approaching to the pulp chamber (Fig 4A).

Before starting the treatment, local anaes- thesia was administered and the tooth was isolated under rubber dam. Upon re- moving the caries, three orifices were lo- cated. In the process of removing the re- maining roof in the distolingual corner, a bleeding spot was observed which when explored found to be an additional canal. The access cavity preparation was modi- fied from a triangular to a trapezoidal form for proper accessibility of all the canals. After that the orifice enlargement was done, working length was determined ra- diographically (Fig 4B). The same irriga- tion regimen was followed as mentioned in the case report 1. Cleaning and shaping was performed with rotary Neolix Ni-Ti in- struments in a step down fashion and ob- turation was performed with cold lateral condensation. Access cavity was restored with composite and a post- operative radi- ograph was taken (Fig 4C & D). Follow-up was done upto six months and the radio- graph showed no evidence of pathology.

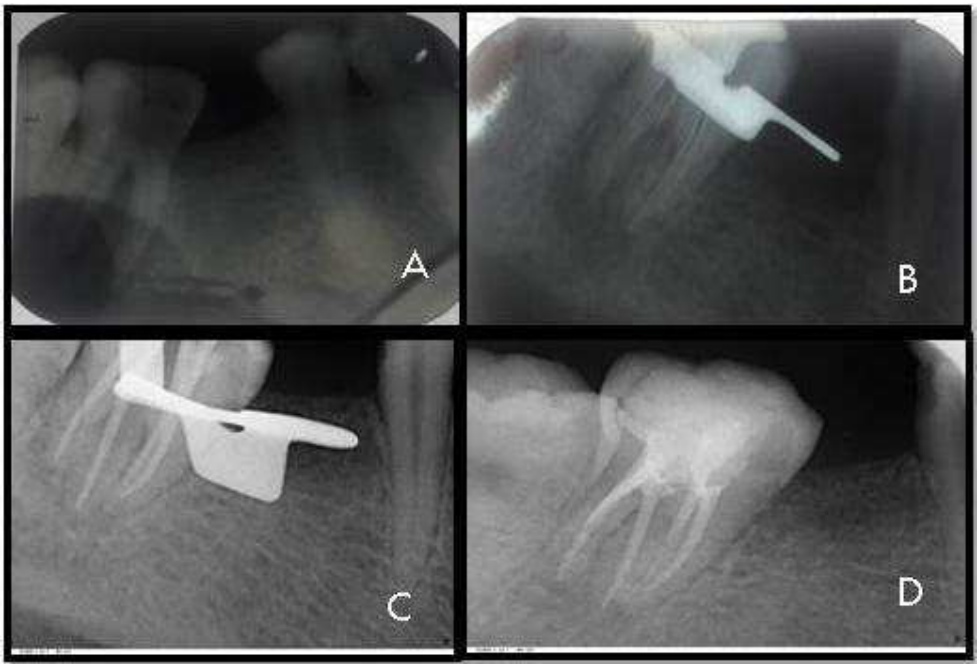

Fig 4: A- Pre-Operative Radiograph; B- Working length determination; C- Master Cone Se- lection; D- Obturation followed by post endodontic treatment.

Discussion

The exact cause of radix entomolaris and radix paramolaris is still not known. Some authors say that it may be due to disturb- ance during odontogenesis or may be due to an atavistic gene. Incidence varies from 5 to 30% and also among different popu- lations. To achieve a correct diagnosis minimum of two diagnostic radiographs are necessary using buccal object rule. Even the presence of an extra cusp may sometimes indicate the presence of radix entomolaris. Access cavity preparation should be modified usually from a trian- gular to a trapezoidal shape. The modifi- cation should be done following the den- tinal map. Advanced diagnostic aids help in the better assessment of the teeth.

The mandibular molar generally has two separate roots with round or elliptical ca- nal in the distal root and two canals in the mesial root. In 35% of cases, four canals are present. Sometimes, the "extra" canal is found in the mesial root which is termed as middle mesial canal (MMC) and was first reported by Vertucci and Williams in 1974. The incidence rate of MMC varies from 1% to 15% (7).

The presence of additional third root which can be found distolingually is termed as "Radix Entomolaris." This was first mentioned by Carabelli in 1844. In In- dian population, the frequency of radix en- tomolaris is <5% (8, 9).

According to Pomeranz et al., the MMC can be classified as confluent because the prepared canal originated as a separate orifice but apically joined to mesiolingual canal (10). Here, middle distal canal was found confluent at the junction of middle and apical one-third with distolingual ca- nal. This indicates the presence of sepa- rate orifice of the middle distal canal. Sim- ilarly, according to Carlsen and Alexander, Radix Entomolaris in this case is classified as type A because of distally located cervi- cal part of the Radix Entomolaris with two normal distal root components.

It has been postulated that secondary dentine apposition during tooth matura- tion will form a dentinal vertical partition in the canal cavity, thus creating extra root canals. Other possible reasons for the presence of extra roots and canals include role of external factors during odontogen- esis, penetrate of an atavistic gene and ra- cial genetic factors (9).

A classification was given by Carlsen & Andersen for identification and visualiza- tion of all canals based on the location of the cervical part. They are types A, B, C, AC. Type A & B refers to a distally located cervical part, Type C refers to a mesially located cervical part and type AC refers to the location of the cervical part in the cen- tral location in between the mesial and distal components. De Moor et al had given another classification based on the curvature Radix Entomolaris variants in the buccolingual direction. Type I refers to straight root / canals, Type II refers to a curvature at the entrance of the orifice and Type III refers to Radix entomolaris with two curvatures, one at the coronal level and the other at the middle third.

Some of the common problems encoun- tered during the treatment of Radix Ento- molaris are:

1) Difficulty in Radiographic interpreta- tion.
2) Inability to locate the fourth canal.
3) Modification in access cavity prepara- tion.
4) Confusion in working length determina- tion.

Apart from these difficulties clinicians are prone to commit some iatrogenic errors like straightening of a root canal resulting in loss of working length, ledge formation, zipping, transportation or even perforation (10).

Conclusion

Teeth are never alike. A number of varia- tions occur which pose a challenge to a cli- nician. This particular variation Radix En- tomolaris may be a challenge if anybody does not have proper diagnostic aids and lack in proper knowledge of root canal anatomy. Correct diagnosis should be made with two preoperative radiographs taken at two different angles before start- ing the treatment. So thorough knowledge of root canal anatomy and awareness of the variations make the treatment more successful and if one exhibits proper skill, these cases can be done with ease.

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