CASE REPORT

ENDODONTIC MANAGEMENT OF MANDIBULAR FIRST MOLARS WITH RADIX ENTOMOLARIS: TWO CASE REPORTS

RUNNING TITLE-

Endodontic management of Radix Entomolaris in mandibular molars.

ABSTRACT

Aim: To increase understanding of Radix Entomolaris for better diagnosis which can reduce complication and procedural errors in mandibular molars.

Presentation of case: This article presents two cases of radix entomolaris (RE) in the mandibular first molar. Its management started right from detection of root canal in extra root using intraoral radiographs through SLOB technique followed by correct protocol of chemo-mechanical debridement and 3D obturation of canals in mandibular first molars.

Discussion: Mandibular molars have numerous variations in their internal anatomy one of which is RE which is commonly seen in the Asian population. Correct identification of all canals which can be done by various diagnostic techniques and thorough instrumentation of canals are required for a proper root canal treatment. A missed root canal is a common reason for the failure of RCTs.

Conclusion: A proper radiographic investigation for better diagnosis and the use of flexible Ni-Ti rotary files that can avoid various procedural errors will lead to effective management of radix entomolaris.

KEYWORDS: Radix Entomolaris, mandibular molar, anatomic variation, disto-lingual root.

INTRODUCTION:

Mandibular first molar displays several anatomical variations, therefore; the physician must have proper knowledge of these anatomic variations for proper treatment.[1]. The mandibular molar usually has two roots placed mesially and distally, which in general has two mesial and one distal

canal. Several anatomical variations have been observed in mandibular molars [2]. The variation of an extra distolingual root called radix entomolaris [3], Paramolaris, C – shaped canals, three mesial canals [4], three distal canals [5]. Carabelli first described radix entomolaris as one of the anatomical variations found in permanent mandibular molars. It is a supernumerary root that is located distolingually [3]. Among mandibular molars, RE occurs least frequently in the second mandibular molar with a prevalence of 0.6%. [7].

According to buccolingual variations, De Moor et al. classified the RE into three types [7]. In Type I root is vertical; Type II has a curved entry point after which it continues in straight form. In Type III coronal third is curved, the middle third has a second curvature which continues till the apical third. RE is classified into 5 types by Song et al. depending on its morphological features [8]. Other types are Type IV, which is not more than half of the distobuccal root and Type V has a cone-shaped extension with no canal.

Debriding the canal is an essential step in the treatment; which can be achieved by proper removal of organic substrate, infected pulp tissue, and microorganisms; followed by complete three-dimensional obturation. The progression of periapical inflammation can occur due to missed canal, that is not properly instrumented and sealed [9].

The below-mentioned cases were diagnosed with the help of the intraoral periapical radiograph according to the SLOB rule (Same side lingual opposite side buccal). These cases described the methods that can be used to avoid various procedural errors that can occur during the treatment.

CASE REPORT 1:

A 17-year-old female patient with non-contributory medical history was referred to the Department of Conservative Dentistry with the chief complaint of intermittent pain in the mandibular first molar on the left side for 2 months. Clinical examination revealed deep disto-occlusal caries and tenderness on vertical and horizontal percussion in the left first molar, indistinct periapical radiolucency was seen around the roots. Interestingly, the periapical radiograph (Fig 1) revealed the presence of an additional root distally. Following the same lingual opposite buccal rule (SLOB technique), the location of the

extra root was confirmed in the lingual aspect. Based on clinical and radiographic interpretation, a final diagnosis of symptomatic apical periodontitis with irreversible pulpitis of the mandibular first molar was made, and root canal treatment was planned.

The tooth was anesthetized (2% lidocaine and 1:1,00,000 epinephrine) and isolated with the help of a rubber dam. Large round bur and safe end bur were used to obtain access. Four canal orifices (Fig 5) were carefully negotiated in the pulp chamber with the help of an explorer. The #10 size K-files were used for exploring and negotiating the canals. An apex locator (Canalpro, Coltene, Altstätten, Switzerland) was used to determine the working length of canals electronically; which was confirmed radiographically (Fig 2). Canals were instrumented using Protaper rotary files (Dentsply Maillefer, Switzerland) and irrigated with 3% sodium hypochlorite (NaOCl) and 17% ethylenediaminetetraacetic acid (EDTA) solution. An intracanal medicament of Calcium hydroxide was placed in the canal for 2 weeks. The canals were irrigated and then dried with paper points in the next visit. Obturation was done with gutta-percha (Fig 3) and Sealapex sealer (Sybron Endo, USA) and then a permanent restoration was done to seal the access cavity (Fig 4).

CASE REPORT 2:

A 26-year-old female patient was referred to the Department of Conservative Dentistry with a chief complaint of pain in the lower right back tooth for 1 month. The right mandibular first molar was tender to vertical percussion. The patient had a non-contributory medical history. The patient had a dental history of root canal treatment and crown in the lower right second molar. On radiographic examination (Fig 6), an irregular carious lesion is extending from the distal surface to the pulp was observed and an extra root outline was also noticed on the distal aspect in the right mandibular first molar.

Based on the clinical and radiographic interpretation, a final diagnosis of the symptomatic periapical abscess was made for the right mandibular first molar, and root canal treatment was planned and initiated. The tooth was anesthetized, rubber dam isolation was done, and access was made. The pulp chamber was inspected carefully for the root canal orifices (Fig 10). Four root canal orifices were

detected out of which two were mesial and two were distal canals. In the same visit, after determining working length canals (Fig 7) were instrumented using Protaper Next rotary files and irrigated with 3% sodium hypochlorite and 17% ethylenediaminetetraacetic acid (EDTA) solution. Calcium hydroxide intracanal medicament was placed. In the next visit, after 14 days, irrigation was done. The canals were dried with paper points, Obturation was carried out with gutta-percha (Fig 8) and Sealapex sealer and then a permanent restoration (Fig 9, Fig 11) was used to seal the access cavity.

DISCUSSION:

The incidence of RE in the South Asian and Indian populations is very high as compared to populations of other ethnic groups [1]. The prevalence of RE ranges from 0.2 to 32% differing significantly between races [10,11,12,13]. According to Chandra SS *et.al* prevalence of RE in the South Indian population was 13.3% [10]. Among mandibular molars, RE occurs least frequently in the second mandibular molar with a prevalence of 0.6%. [6]. The occurrence of RE can lead to iatrogenic errors or procedural errors like missed canal which can be avoided by proper diagnosis.

Successful endodontic treatment of a radix entomolaris (RE) depends on its diagnosis which is based on a detailed anatomic, clinical, radiographic assessment of tooth, canal configuration, and its management through proper treatment plan [1]. Detection of RE is mainly based on thorough clinical examination and various radiographic and imaging techniques like SLOB. [14]. An angled radiograph (25-30°) can be more useful for the correct interpretation of RE. A mesial angled radiograph is better than a distal angled radiograph for its detection [15].

Various diagnostic methods that help in the localization of additional canals are knowledge of the law of symmetry, the law of orifice location, visualizing the dentinal map, and canal bleeding points. Endodontic explorer, Pathfinder, DG 16 probe, Micro-openers are the tactile methods to localize canal. Champagne bubble test which is done with NaOCl also helps in the localization of canals. Visual aids such as loupes, intraoral camera, and dental microscope are also useful. Three-dimensional imaging systems via computer tomography (CT) and cone-beam CT are also useful tools in diagnosing RE.

For successful root canal treatment, a proper access cavity preparation, thorough chemo-mechanical debridement, and 3-D obturation are required. The most important is the principle of the above-mentioned technique is 'straight-line' access which will help in avoiding perforations. To prevent instrument separation in the canal manual preflaring is recommended. Most of the times RE has a severe root inclination or curvature in the apical region which could lead to procedural errors such as ledges, transportation, and instrument separation. A glide path along with the proper determination of the canal curvature and working length would reduce procedural errors such as ledging and transportation. On comparing with stainless steel instruments Ni-Ti rotary files provide a more centered, rounder, and conservative canal preparation [14].

Thus, in-depth knowledge about the location of additional roots, proper radiographic examination, and clinical approach, provides a long-term success of root canal treatment without any post-operative complications.

CONCLUSION:

In the Asian population, mandibular molars should be thoroughly observed and investigated for the chance of the presence of RE, which can be successfully managed by in-depth knowledge of anatomy, thorough diagnosis, instrumentation, and obturation. These are considered important parameters to reduce various procedural errors that can occur during the treatment. This also helps in the reduction of post-operative complications.

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Fig 5: Access Opening

Fig 10: Access Opening

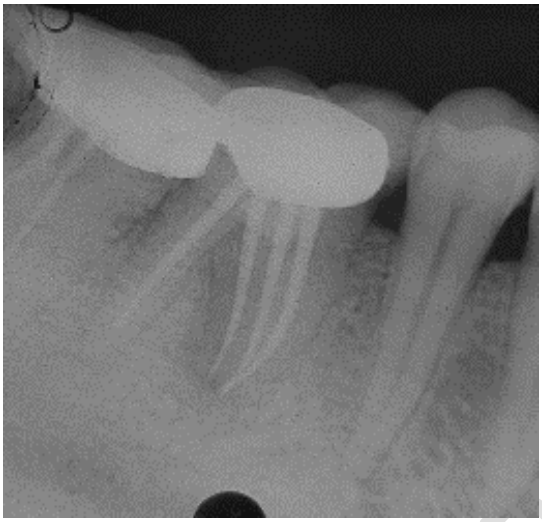

Fig 11: Post Op IOPA