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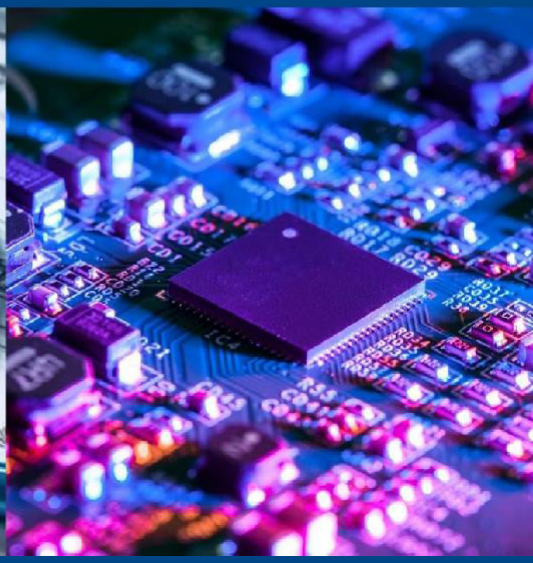

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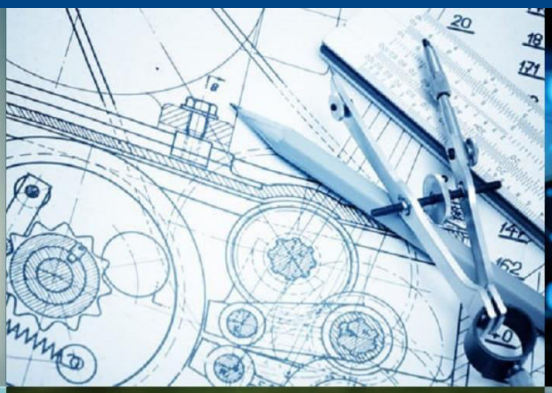

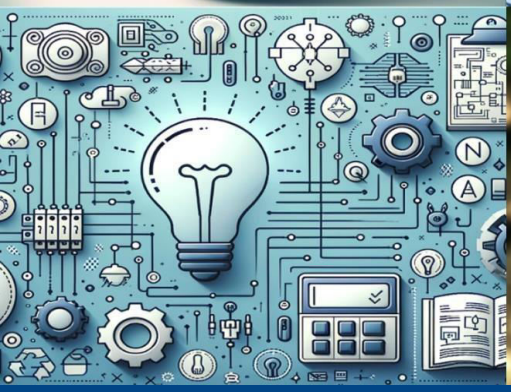

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Endodontic Management of Radix Entomolaris with a Novel Bioceramic Sealer – A Report of Two Cases

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ABSTRACT: Mandibular first molars usually have one mesial and distal root but in some cases there are anatomical variations wherein the number of roots and root canals vary. Presence of an additional lingual root distally in mandibular molars is called radix entomolaris (RE). Appropriate diagnosis is must before starting with endodontic procedure in these teeth to ensure successful treatment outcome. This case report describes the endodontic management of mandibular first molar with radix entomolaris using a novel bioceramic sealer.

KEYWORDS: Anatomical variation, Bioceramic sealer, Endodontic treatment, Mandibular molar, Radix entomolaris

I. INTRODUCTION

Mandibular first molars exhibit significant anatomical variations, not only in the number of canals but also in the number and shape of roots. One complex variation is the presence of an additional root—either on the lingual or buccal side—alongside the usual two roots[1]. The third root in addition to the two roots of mandibular first molar was reported by Carabelli as Radix Entomolaris.[1,2] Proper diagnosis, identification, and treatment of these variations require thorough knowledge of root and root canal anatomy and configurations to improve treatment outcomes[3,4]. This case reports presents the endodontic treatment of two mandibular first molars with a radix entomolaris , a rare anatomical formation. It also discusses the prevalence, external morphological differences, and internal anatomy of the radix entomolaris.

CASE REPORTS

A 46 year- old male patient reported to the Department of Conservative Dentistry and Endodontics, Desh Bhagat Dental College and Hospital Mandi Gobindgarh with a chief complaint of pain in lower-left back tooth region for 2 months. The patient revealed a history of mild intermittent pain for the past 2 months, which had increased in intensity during the past 2 weeks. The patient reported prolonged sensitivity to hot and cold substances. The pain was spontaneous and aggravated particularly at night. Clinical examination revealed deep occlusal carious lesions on mandibular first molar. The tooth 36 was tender to vertical percussion. Intra-oral Periapical Radiograph (IOPA) was done Fig 1(a). Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with

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symptomatic apical periodontitis with respect to 36 was made. Informed consent was obtained, and endodontic treatment was initiated.

Access cavity preparation was done [Fig 1(a)] under local anesthesia with an endo access round diamond bur (Coltene, Switzerland). The first distal canal was located towards the buccal side indicating the presence of one additional canal on the lingual side. The shape of the access cavity was modified from triangular to a trapezoidal form to locate the fourth canal. DG-16 (Maillefer) endodontic explorer was used to locate the root canal orifices and 15 # K-file (Mani, Japan) was used to establish patency of the canals. Working length was determined using apex locator (Canal Pro CL2i, Coltene, Switzerland, Fig 2a) and reconfirmed radiographically Fig 1(b). Biomechanical preparation was done with rotary Hyflex CM file system (Coltene, Switzerland Fig 2b). During instrumentation, CanalPro 5.25% sodium hypochlorite (Coltene, Switzerland, Fig 2c) was used as an irrigant and 17% Canal Pro EDTA solution (Coltene, Switzerland, Fig 2d) was used for smear layer removal and was activated for 1 min using Canal Pro Endo Activator (Coltene, Switzerland Fig 2e). Normal saline was used to wash out remaining EDTA from the canals. Master Cone fit radiograph was taken (Fig 1c) and obturation was performed (Fig 1d) with gutta-percha points using Canal Pro Bioceramic sealer (Coltene, Switzerland Fig 2f). Final radiographs were taken to establish the quality of the obturation.

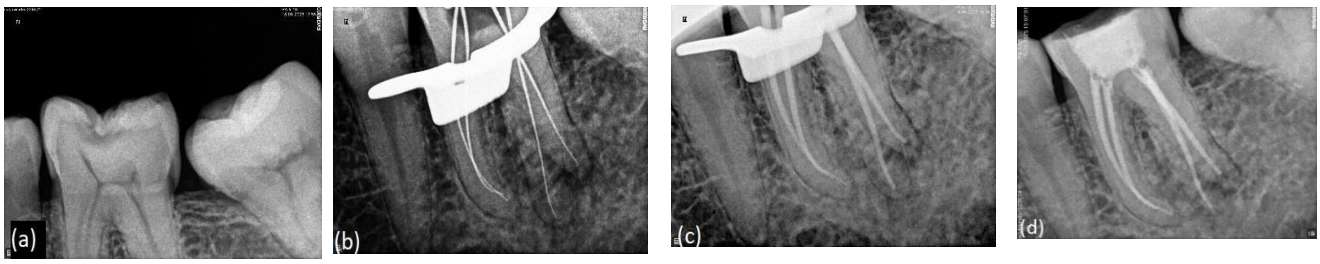

Figure 1: (a) Pre Operative Radiograph of 36. (b) Working Length Radiograph of 36. (c) Master Cone Radiograph of 36. (d) Postoperative Radiograph of 36

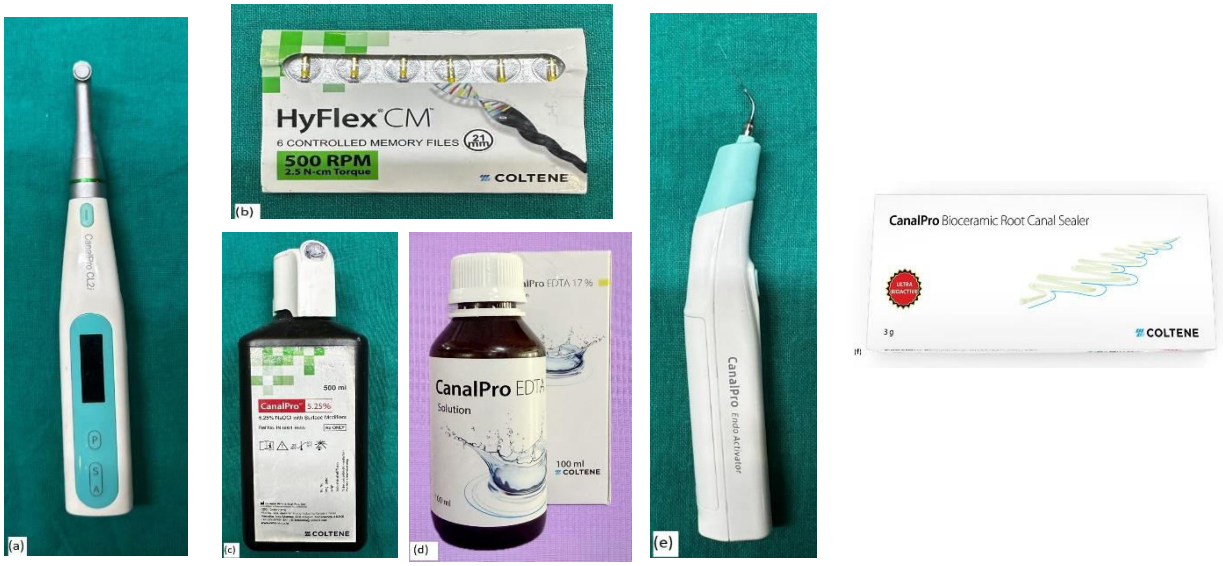

Figure 2:(a) Canal Pro CL2i (b) Hyflex CM files (c) Canal Pro 5.25% sodium hypochlorite (d) Canal Pro EDTA Solution (e) Canal Pro Endo Activator (f) Canal Pro Bioceramic Root Canal Sealer

CASE REPORT

A 36-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Desh Bhagat Dental College and Hospital Mandi Gobindgarh with a chief complaint of pain in lower-right back tooth region for 1 month. The patient revealed a history of mild intermittent pain for the past 1 month, which had increased in intensity during the

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past 1 week. The patient reported prolonged sensitivity to hot and cold substances. The pain was spontaneous and aggravated particularly at night. Clinical examination revealed deep occlusal carious lesions on mandibular first molar. The tooth 46 was tender to vertical percussion. IOPA radiograpgh was done Fig 3(a). Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 46 was made, informed consent was obtained, and endodontic treatment was initiated. Same treatment protocol was followed as in case one. Final postoperative radiograph was taken after obturation with Canal Pro Bioceramic sealer (Coltene, Switzerland) Fig 3(b).

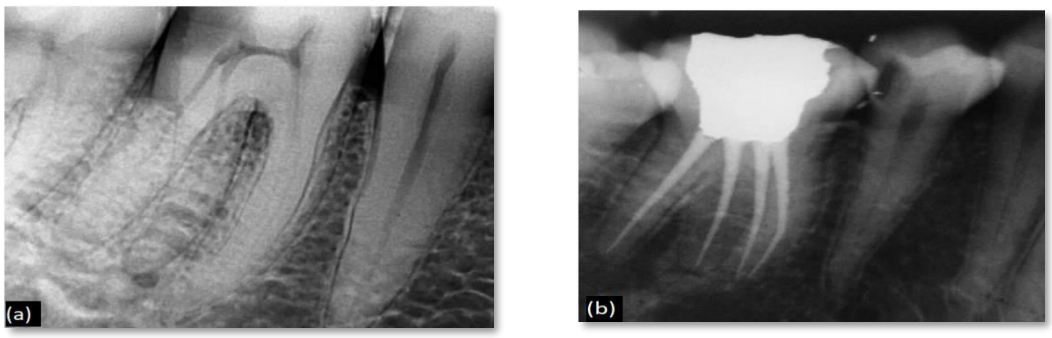

Fig 3 (a) Pre-operative radiograph of 46 (b) Post-operative radiograph of 46

II. DISCUSSION

A thorough knowledge of internal and external anatomy coupled with a correct diagnosis, adequate cleaning, and shaping of the root canal system will normally lead to a successful outcome.[5] The presence of radix entomolaris or a radix paramolaris has clinical implications in endodontics, and an accurate diagnosis of these supernumerary roots can avoid complications or a "missed canal" during root canal treatment. Because RE is mostly situated in the same buccolingual plane as the distobuccal root, a superimposition of both roots can appear on the preoperative radiograph, resulting in an inaccurate diagnosis. A thorough inspection of the preoperative radiograph and interpretation of particular marks or characteristics, such as an unclear view or outline of the distal root contour or the root canal, can indicate the presence of a "hidden" RE. Initial exposure should be from the standard buccal-to-lingual projection. The second projection is recommended at 20° angulation from the mesial, and the third one should be 20° from the distal so as to obtain every minute detail regarding the anatomical variations of the involved tooth.[7] Modern diagnostic aids such as Cone beam computed tomography (CBCT) is ideal in the management of RE as it provides a three dimensional view of the extra root, its morphology, and exact location. [8] The location of the orifice of the root canal of an RE also has implications for the opening cavity. The orifice of the RE is located distolingually to mesiolingually from the main canal or canals in the distal root. An extension of the triangular opening cavity to the distolingual canal orifice results in a more rectangular or trapezoidal outline form. This way an accurate diagnosis can be made in the majority of cases.[2,6] Ethylenediaminetetraacetic acid (EDTA) liquid is a chelating agent primarily used to remove the smear layer formed during mechanical root canal preparation.Proper timing, concentration, and volume are essential for the optimal use of EDTA in endodontic therapy.[9] EDTA is normally used in a concentration of 17% and can remove the smear layers when in direct contact with the root canal wall.[10] Here ,we have activated 2ml of 17% Canal Pro EDTA solution (Coltene, Switzerland) using Canal Pro Endo Activator (Coltene, Switzerland) for 1 min, with 4 cycles of 15 sec each. Bioceramic sealers have gained a significant attention in endodontics due to their advantageous properties, such as biocompatibility, dimensional stability, and their ability to promote hydroxyapatite formation, which are vital for the long-term success of endodontic procedures.[11] We have used Canal Pro Bioceramic sealer (Coltene, Switzerland) as it has excellent biocompatibility and good flow allowing it to penerate lateral canals and giving good clinical proven results.

III. CONCLUSION

A thorough understanding of root canal anatomy, coupled with meticulous examination of the pulp chamber floor using conventional radiographs taken at varying angulations, is essential for the successful clinical management of

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anatomical variations in endodontic treatment. Additionally, the use of bioceramic sealers may further enhance treatment outcomes due to their superior biocompatibility and their ability to promote hydroxyapatite formation, thereby contributing to improved sealing and long-term success of endodontic therapy.

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