Conservative Management of a Grossly Decayed Mandibular Molar with Radix Entomolaris: Endodontic Therapy and Post-Endodontic Rehabilitation.

Abstract:

The management of grossly decayed teeth with compromised periodontal support and anatomical variations presents a significant clinical challenge in endodontics. Radix entomolaris, characterized by an additional distolingual root, further complicates diagnosis and treatment due to its complex morphology.

This case report describes the conservative management of a 27-year-old female patient presenting with a grossly decayed mandibular molar in the lower right posterior region. Clinical examination revealed extensive coronal destruction without tenderness or mobility, while radiographic findings showed periodontal bone loss, furcation involvement, and an additional distolingual root suggestive of radix entomolaris. A diagnosis of pulpal necrosis with asymptomatic apical periodontitis was established.

Nonsurgical root canal treatment was performed with careful identification and management of the additional canal, followed by chemomechanical preparation and intracanal medicament placement. Obturation was completed using gutta-percha and a bioceramic sealer to achieve a three-dimensional seal. Post-endodontic rehabilitation included placement of a prefabricated metal post, core build-up, and full-coverage crown. The patient was also referred for periodontal management.

This case highlights the importance of accurate diagnosis, awareness of anatomical variations, and a multidisciplinary approach in managing complex endodontic cases. It demonstrates that teeth with a questionable prognosis can be successfully preserved with meticulous treatment planning and execution.

Key-words:Grossly decayed tooth; Radix entomolaris; Root canal treatment; Pulpal necrosis; Asymptomatic apical periodontitis; Metal post; Post-endodontic restoration

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INTRODUCTION

Preservation of natural dentition remains a fundamental objective in contemporary dental practice. Root canal treatment is considered the most appropriate treatment modality for teeth that are pulpally involved or structurally compromised, provided adequate debridement, disinfection, and three-dimensional obturation of the root canal system can be achieved. However, the success of endodontic therapy is often challenged by the presence of anatomical variations in root and canal morphology.(1)

Mandibular molars typically present with two roots and three canals; however, variations such as the presence of an additional root are well documented. The presence of an extra root lingual to the distal root has been documented by Carabelli et al. as radix entomolaris; the one buccal to the mesial root has been reported by Bolk et al. as radix paramolaris.Among these, radix entomolaris is more commonly encountered and has significant clinical implications.(2) Its presence may lead to missed canals, inadequate cleaning and shaping,instrument separation due to severe curvature and ultimately endodontic failure if not properly identified and managed.(3)

The diagnosis of radix entomolaris can be challenging due to superimposition in conventional radiographs. Careful interpretation of radiographs from multiple angulations, along with thorough clinical examination, is essential for its detection.(4) In addition, grossly decayed teeth with extensive structural loss often require post-endodontic rehabilitation to restore function and strength. Intracanal posts play a vital role in such cases by providing retention for the core and final restoration.(5)

The present case report describes the successful endodontic management of a grossly decayed mandibular molar with radix entomolaris, followed by post and crown rehabilitation, emphasizing the importance of meticulous diagnosis and comprehensive treatment planning.

CASE REPORT

A 27-year-old female patient reported to KD Dental College and Hospital, Mathura with the chief complaint of a grossly decayed tooth in the lower right posterior region. The patient did not report any pain or discomfort associated with the tooth. Clinical examination revealed extensive coronal destruction with mild gingival recession. The tooth was non-tender on percussion and palpation, and no mobility was observed, suggesting a chronic condition.

Radiographic examination revealed significant bone loss and furcation involvement. An additional root was identified distolingually, suggestive of radix entomolaris.(Figure-1)Based on the clinical and radiographic findings, the tooth was diagnosed as Pulpal necrosis with asymptomatic apical periodontitis in a grossly decayed mandibular molar with radix entomolaris and associated periodontal bone loss.

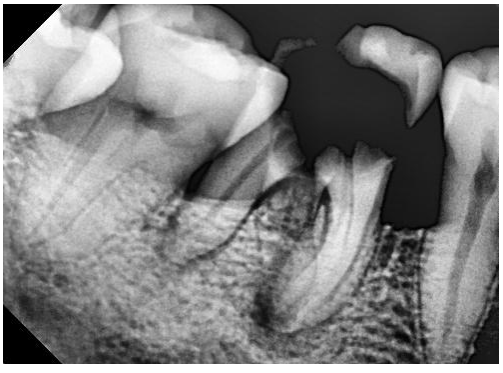

FIGURE 1 – PREOPERATIVE RADIOGRAPH

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Considering these findings, the prognosis of the tooth was considered questionable. Extraction followed by prosthetic rehabilitation was initially advised; however, the patient expressed a strong desire to retain the natural tooth. Considering the patient's preference, a conservative treatment plan involving root canal therapy followed by post-endodontic restoration was formulated.

Endodontic treatment was initiated under rubber dam isolation. Access cavity preparation was performed, and careful exploration of the pulp chamber was carried out to locate all canal orifices, including the additional canal associated with radix entomolaris. Working length was determined using an apex locator and confirmed radiographically (Figure 2). Biomechanical preparation was carried out using rotary instrumentation up to size 24/04. Copious irrigation was performed using sodium hypochlorite, saline, and EDTA, with activation to enhance disinfection. Calcium hydroxide was placed as an intracanal medicament, and the patient was recalled after one week.

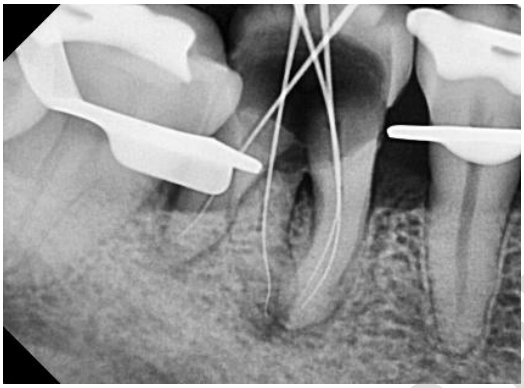

FIGURE 2– WORKING LENGTH RADIOGRAPH

At the subsequent visit, the canals were asymptomatic and dry. The master apical gutta-percha cone was selected and its fit was verified radiographically (Figure 3).

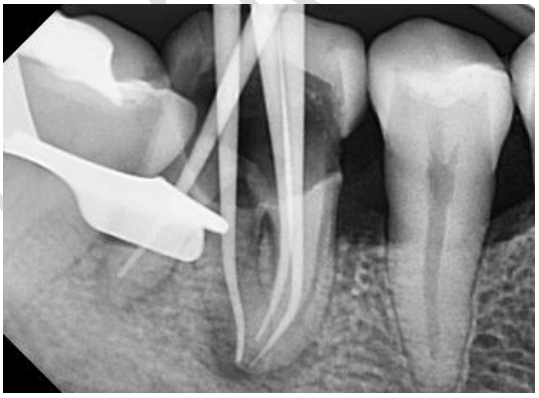

FIGURE 3– MASTERAPICAL RADIOGRAPH

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Obturation was completed using gutta-percha in conjunction with a bioceramic sealer to achieve a three-dimensional seal (Figure 4).

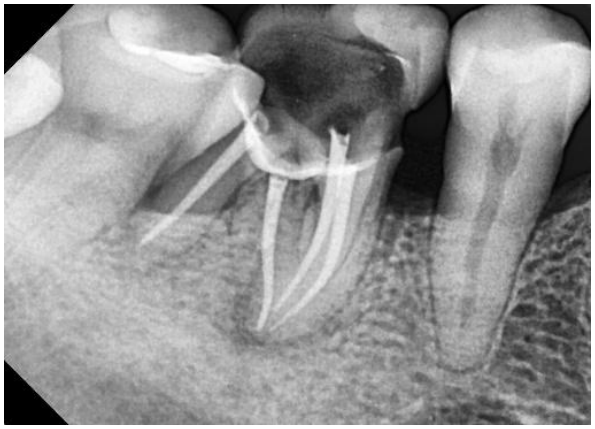

FIGURE 4 -IMMEDIATE POSTOPERATIVE RADIOGRAPH DEMONSTRATING THREE-DIMENSIONAL OBTURATION OF ALL CANALS USING GUTTA-PERCHA AND

After a short interval, post space preparation was performed in the selected canal, and a prefabricated metal post was placed.The post position was verified radiographically and cemented using glass ionomer cement(Figure 5).

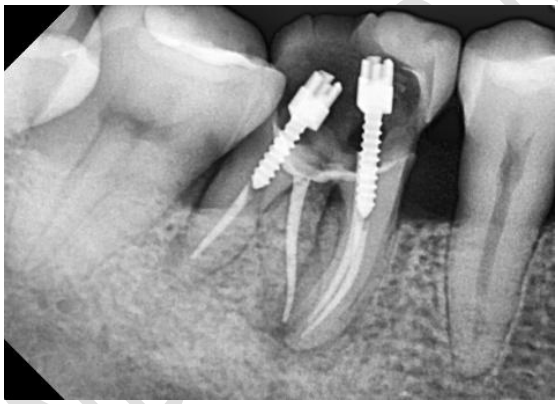

FIGURE 5- RADIOGRAPHIC VERIFICATION OF PREFABRICATED METAL POST PLACEMENT FOLLOWING POST SPACE PREPARATION IN THE SELECTED CANAL.

Core build-up was completed to restore the lost tooth structure.(Figure 6)

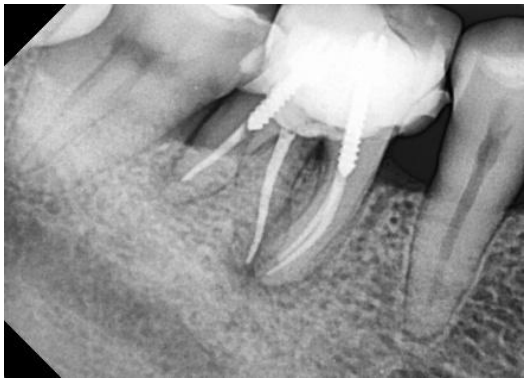

FIGURE 6 -POSTOPERATIVE RADIOGRAPH SHOWING THE CORE BUILD-UP PERFORMED

Following adequate core formation, tooth preparation for full-coverage restoration was carried out. A crown was fabricated and subsequently cemented, thereby restoring the function and esthetics of the tooth.(Figure 7)

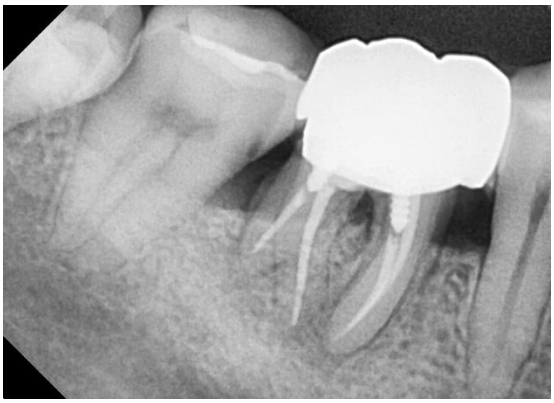

FIGURE 7 -FINAL POSTOPERATIVE RADIOGRAPH DEMONSTRATING THE DEFINITIVE FULL-COVERAGE CROWN

Considering the associated periodontal bone loss and furcation involvement, the patient was further referred to the Department of Periodontology for comprehensive evaluation and management of periodontal condition."

DISCUSSION

The retention of severely damaged teeth is often considered controversial, particularly when the prognosis of endodontic treatment is questionable. Although dental implants have been advocated as a reliable alternative, they are relatively more invasive and less conservative. Evidence from systematic reviews suggests that compromised but adequately treated and well-maintained teeth can demonstrate long-term survival rates comparable to implant-supported restorations. Furthermore, endodontic treatment followed by appropriate restoration is less invasive, more cost-effective, and psychologically more acceptable to patients, thereby providing an opportunity to preserve natural dentition even in cases with extensive structural loss.

Endodontically treated teeth are known to be more brittle and susceptible to fracture due to loss of tooth structure. Therefore, post placement becomes essential in cases with significant coronal destruction, as it enhances fracture resistance and provides retention for the core and definitive restoration. In the present case, considering the extensive loss of tooth structure, a prefabricated metal post was used to achieve adequate retention and support for the subsequent core build-up and full-coverage crown restoration.Metal posts, although less esthetic compared to fiber posts, offer high strength and are particularly useful in posterior teeth where functional demands are greater. (5)

Radix entomolaris represents a significant anatomical variation that poses challenges during endodontic treatment. The additional root is often located distolingually and may exhibit severe curvature, increasing the risk of procedural errors such as ledge formation, transportation, or instrument separation. Instrument separation is often an unpleasant experience with the RE. This is because of the presence of acute curvature in the coronal third. This can be prevented by doing proper coronal

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preflaring and creation of glide path for rotary instruments. If rotary instruments are used, a flexible instrument with less taper is preferentially used to prevent the flexural failure of the instrument.(1)

Endodontic success in the presence of RE depends on its diagnosis, anatomy or morphology, canal configuration and clinical approach employed. An accurate diagnosis of RE can avoid complications like missed canal which is a common reason for endodontic failure. Detection of RE can be based on clinical examination, radiographic and imaging techniques and other accessories. (4)

Radiographically, double periodontal ligament images or an unclear view or outline of the distal root contour or the root canal can hint to the presence of an RE. However, this requires a thorough inspection of the preoperative radiograph. It is mentioned that the radiographs were successful in over 90% of the cases while identifying additional roots but superimposition of the distal roots can be limiting factor. 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.(4)

Three-dimensional imaging techniques based on computed tomography (CT) and cone beam computed tomography (CBCT) are useful for visualizing or studying 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.(4)

In addition to careful radiographic investigation, clinical examinations are important for RE diagnosis. The use of periodontal probes, endodontic explorer, micro-opener, and path finder are among the instruments that can help in diagnosis. Also, examining the more prominent distal or distolingual occlusal lobe or the presence of an extra cusp can suggest the presence of RE. In addition, it is worth investigating the champagne effect in the pulp chambe. (3)

One of the most important basic principles for RCT is the principle of straight-line access (SLA). The RE presence may affect the way SLA is established and cause the access cavity to change from the classic triangular shape to larger dimensions such as a trapezoid or rectangle, of course, all these factors are also affected by the caries location. (3)

In these cases, successful management of RE was achieved through thorough irrigation and shaping of the canal system using appropriate disinfectants. Chemical irrigation plays a crucial role as an integral part of RCT. The efficacy of this procedure depends on various factors, including irrigant volume, contact time, and irrigant activation [12]. The present study aimed to establish an effective chemical irrigation protocol by considering all these factors. It is recommended that these considerations be taken into account in similar cases where the complexity of the procedure is increased. (3)

The use of calcium hydroxide as an intracanal medicament enhances microbial control, while bioceramic sealers provide superior sealing ability and biocompatibility, contributing to improved treatment outcomes. In cases of extensive coronal destruction, post-endodontic restoration becomes critical.

This case highlights the importance of a multidisciplinary approach involving endodontic and restorative procedures. Even in the presence of unfavorable factors such as severe decay, bone loss, and anatomical complexity, successful rehabilitation can be achieved with proper planning and execution.

CONCLUSION

The present case demonstrates that even grossly decayed mandibular molars with compromised periodontal support and complex anatomical variations such as radix entomolaris can be successfully managed through a conservative and multidisciplinary approach. Careful diagnosis, thorough knowledge of root canal morphology, meticulous chemomechanical preparation, and proper identification of the additional canal were essential for achieving successful endodontic treatment. Post-endodontic rehabilitation with a prefabricated metal post, core build-up, and full-coverage crown further contributed to the functional and structural restoration of the tooth. This case emphasizes that preservation of natural dentition should always be considered whenever feasible, as appropriate treatment planning and execution can provide satisfactory long-term outcomes even in teeth with a questionable prognosis.

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