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IP International Journal of Maxillofacial Imaging

Journal homepage: <https://www.ijmi.in/>

Case Report

Management of endodontic periodontic lesions with hemisection: Case reports

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ARTICLE INFO

Article history:

Received 25-07-2024

Accepted 22-08-2024

Available online 03-10-2024

Keywords:

Endoperio lesion

Furcation involvement

Hemisection

ABSTRACT

The connection between periodontal and endodontic diseases has been a topic of interest for many years. The simultaneous presence of pulpal pathosis and inflammatory periodontal disease complicates diagnosis and treatment planning, necessitating a comprehensive treatment approach that combines endodontic, periodontic, and prosthodontic interventions.

This case report presents a multi-disciplinary approach for managing a combined endodontic-periodontic lesion. The objective is to illustrate the effectiveness of a multi-disciplinary treatment strategy for compromised teeth with endo-perio lesions. Hemisection and root resections are highlighted as preferred treatments to preserve the remaining portion of the molar with a sound periodontium.

Hemisection is defined as the surgical division of a multi-rooted tooth at the furcation, permitting the removal of both the crown and root of the sectioned part as a single unit.

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1. Introduction

Advances in dentistry now offer the possibility of maintaining a functional dentition throughout a person's lifetime.¹ The loss of posterior teeth is both significant and undesirable, often resulting in tooth drifting, reduced masticatory function, and a decrease in arch length, which underscores the need for preventive and maintenance measures.² Managing periodontally compromised molars with extensive decay is challenging, often leaving dental extraction and implant replacement as the primary options.³ Nevertheless, the treatment strategy for retaining such teeth involves a comprehensive assessment of periodontal, prosthodontic, and endodontic factors to ensure the appropriate selection and enhance the chances of long-term survival.¹ Hemisection is a conservative approach to preserving a tooth. The terms "hemisection" and "root

amputation" are synonymous with "root sectioning" or "bisection," referring to a treatment modality that preserves tooth structure and alveolar bone while offering cost savings compared to other treatment options.⁴

2. Case Report 1

A 40-year-old man presented to the Department of Conservative Dentistry and Endodontics with a complaint of dull pain and sensitivity in the lower right posterior region of the jaw for the past year. Although the pain was dull and intermittent, it intensified during mastication. Additionally, he experienced sensitivity that worsened with the consumption of hot or cold substances. The patient reported no history of systemic disease.

Intraoral examination revealed that tooth 46 was tender on percussion and exhibited grade I mobility. Probing depth around the distal root of the tooth was 8 mm. An intraoral periapical radiograph showed severe vertical

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bone loss around the distal root, along with furcation involvement,(Figure 1) while the bone support of the mesial root remained completely intact. An electrical pulp test indicated that the tooth was non-vital. Consequently, a perio-endo lesion was diagnosed in relation to tooth 46. Therefore, it was recommended that the distal root of tooth 46 be hemisected following the completion of phase I and endodontic therapy.

After completing the endodontic therapy, periodontal flap surgery combined with hemisection was scheduled for 3 months later. During the procedure, a full-thickness mucoperiosteal flap was elevated in the area of tooth 46 under mandibular block anesthesia. A crevicular incision was made from the first premolar to the second molar to access the site. Inflammatory granulation tissue was removed using Gracey curettes to expose the vertical bone defect.(Figure 1)

A vertical cut was then made faciolingually through the buccal and lingual developmental grooves, the pulp chamber, and the furcation to resect the distal root along with its crown. A high-speed, long-tapered fissure carbide bur was used to make the vertical cut toward the bifurcation area, and the distal root was extracted atraumatically. The distal socket was thoroughly debrided and irrigated with sterile saline to remove any bony chips.

The flap was then repositioned and sutured with 3-0 black silk sutures. The occlusal table was reduced to redirect occlusal forces along the long axis of the mesial root. An intraoral periapical radiograph revealed the mesial root in good condition and a well-healed extraction socket of the distal root. The patient was recalled after one week for suture removal, and the healing process was uneventful. A follow-up radiograph taken three months later showed successful healing, with reduced probing pocket depth and no signs of mobility. (Figure 1)

3. Case Report 2

A 55-year-old man presented to the Department of Conservative Dentistry and Endodontics with a complaint of dull pain and sensitivity in the lower right posterior region of the jaw for the past year. Although the pain was dull and intermittent, it worsened during mastication. Additionally, the patient experienced increased sensitivity to hot and cold substances.

On intraoral examination, tooth 46 was tender to percussion and exhibited grade I mobility. The probing depth around the distal root was 8 mm. An intraoral periapical radiograph revealed radiolucency involving the pulp of tooth 46. The bone support for the mesial root remained intact. Electrical pulp testing indicated that the tooth was non-vital.

Given the diagnosis and the challenges associated with post-endodontic restoration and prognosis for the distal root region, it was determined that a hemisection of the



Figure 1: Showing radiograph of 46, root canal and hemisection procedures, follow up picture after 3 months

distal root would be necessary to preserve the tooth. This procedure would be performed following the completion of phase I and endodontic therapy.

After completing the endodontic therapy, periodontal flap surgery combined with hemisection was scheduled for 3 months later. At that time, a full-thickness mucoperiosteal flap was elevated in the region of tooth 46 under mandibular block anesthesia. A crevicular incision was made from the first premolar to the second molar to access the area. Inflammatory granulation tissue was removed using Gracey curettes to expose the vertical bone defect.(Figure 2)

A vertical cut was then made faciolingually through the buccal and lingual developmental grooves, the pulp chamber, and the furcation to resect the distal root along with its crown. A high-speed, long-tapered fissure carbide bur was used to create the vertical cut toward the bifurcation

area, and the distal root was extracted atraumatically. The distal socket was thoroughly debrided and irrigated with sterile saline to remove any bony chips.(Figure 2)

The flap was repositioned and sutured with 3-0 black silk sutures. The occlusal table was adjusted to redirect occlusal forces along the long axis of the mesial root. An intraoral periapical radiograph showed the mesial root and the extraction socket of the distal root in good condition. The patient was recalled after 1 week for suture removal, and healing was uneventful. A follow-up radiograph taken three months later showed successful healing, along with reduced probing pocket depth and no signs of tooth mobility. (Figure 2)



Figure 2: Showing radiograph of 46, root canal and hemisection procedures, follow up picture after 3 months

4. Discussion

The success of treating complex lesions relies on a thorough understanding of clinical knowledge, accurate diagnosis and prognosis, and a well-coordinated multidisciplinary treatment plan. Despite this, managing complex periodontal-endodontic lesions remains challenging in modern clinical practice. Addressing cases where

primary periodontal issues are compounded by secondary endodontic lesions necessitates an integrated approach that includes both periodontal and endodontic therapies.

A lesion can initially originate from either the periodontium or the pulp, but by the time it is presented, it may show features of both. If only endodontic treatment is performed, the periapical lesion may heal only up to the boundary of the periodontal lesion. Conversely, if only periodontal therapy is applied, healing will be restricted to the crestal bone. Consequently, the lesion will not fully heal because the untreated part continues to cause irritation and inflammation.⁴ When a definitive diagnosis cannot be made, it is advisable to start with endodontic therapy before initiating periodontal treatment to achieve optimal healing. Ideally, treatment results should be assessed after 2–3 months, allowing time for initial tissue healing and reducing the risk of introducing bacteria and their by-products during the early healing phase. This approach also facilitates a more accurate evaluation of the periodontal condition.

Hemisection is a valuable alternative to extraction for preserving multi-rooted teeth through an endodontic approach. The procedure involves performing root canal treatment on the remaining roots, restoring them with suitable materials, and splinting them with adjacent teeth to reduce the risk of displacement. A fixed prosthetic restoration is then used to maintain occlusal balance. However, there is less literature on distal root resection compared to mesial root resection in mandibular molars, primarily due to the anatomical challenges associated with the distal root.^{5,6} Nevertheless hemisection is a viable option to be considered before the extraction of molars⁷ Hemisection is particularly beneficial in situations such as severe vertical bone loss affecting one root of a multi-rooted tooth, furcation destruction, close proximity of adjacent tooth roots, challenges in maintaining hygiene in proximal areas, and severe root exposure due to dehiscence. It is also indicated for conditions like prosthetic failure of piers or abutments within a splint, endodontic failures, vertical root fractures, and non-restorable portions of a multi-rooted tooth.⁸

Buhler (1988) observed a 32% failure rate in hemisection cases, attributing failures to endodontic pathology and root fractures. In contrast, other studies have reported a success rate ranging from 0% to 9%, indicating better long-term outcomes for hemisection.^{3,7,8} In the present case, a good prognosis was observed with proper occlusion, absence of mobility, and healthy periodontal condition up to 6 months of follow-up. Consistent with previous reports, hemisection proves to be an effective treatment option for molars in young children that might otherwise require extraction due to extensive caries. This approach helps preserve the affected tooth structure and function, offering a better long-term outcome compared to extraction.⁶ Thus,

conservative management of extensively carious molar teeth in young patients not only helps preserve the tooth but also alleviates financial burden, reduces psychological trauma, and prevents occlusal dysfunction.

5. Conclusion

Hemisection offers an effective and conservative alternative to conventional procedures or extraction for teeth affected by both periodontal and endodontic issues.

6. Source of Funding

None.


7. Conflict of Interest

None.

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Cite this article: Keerthi K, Shailendra M, Naik R, Rani M, Sravan P, Suresh A, Jose J. Management of endodontic periodontic lesions with hemisection: Case reports. *IP Int J Maxillofac Imaging* 2024;10(3):121-124.