NAVIGATING THE COMPLEXITY: A COMPREHENSIVE CASE REPORT ON PRIMARY PERIODONTAL SECONDARY ENDODONTIC LESION RESOLUTION AND MULTIDISCIPLINARY APPROACH

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ABSTRACT

The management of endodontic periodontal combined lesions poses a challenge for clinicians, given the complexity involved in accurately diagnosing and assessing prognosis. In addressing such cases, a comprehensive approach is essential, combining endodontic therapy with periodontal regenerative procedures. This case report illustrates the successful treatment of a combined lesion attributed to traumatic occlusion.

The initial step involved the application of conventional root canal therapy to address the endodontic aspect of the lesion. Subsequently, a multidisciplinary approach was employed, integrating periodontal therapy into the treatment plan. Three months post-operatively, a favourable outcome was observed, marked by a reduction in pocket depth. Radiographic examination further indicated evidence of bone regeneration, highlighting the success of the combined endodontic and periodontal intervention.

This case underscores the importance of a thorough and integrated approach in managing endodontic periodontal combined lesions. By addressing both endodontic and periodontal components, clinicians can optimize treatment outcomes and promote the regeneration of affected tissues.

Keywords: Endodontic periodontal lesion, Periodontal regenerative procedures, Root canal treatment.

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INTRODUCTION

The term 'endodontic-periodontal' (endo-perio) lesions is employed to characterize conditions that affect both the pulp and periodontal tissues, either independently or in a combined manner. For clinicians, diagnosing, managing, and predicting the prognosis of teeth with endo-perio lesions pose significant challenges. The intricacy of these lesions stems from the intimate developmental relationship between the pulp and periodontal tissues. Over the last decade, there has been a notable shift in the perspective and understanding of endo-perio lesions, marking a transformative period in how these conditions are approached in clinical practice. This case report describes diagnosis and treatment protocol for an endo-perio lesion of primary periodontal with secondary endodontic involvement.

CASE REPORT:

A 27-year-old male presented to the Department of Periodontology with a chief complaint of tooth mobility in the upper left posterior region over the last three months. The patient's medical history was unremarkable. Intraoral examination revealed Grade II mobility for tooth 24 and Grade I mobility for tooth 26. Pocket depths of 15mm with a clinical attachment loss (CAL) of 13 mm were noted for tooth 24, and 11mm pockets with a CAL of 9mm were observed for tooth 26. Additionally, Grade I furcation involvement was identified for tooth 26, and there was no evidence of caries.

Further diagnostic measures, including electric pulp testing and thermal testing, confirmed that tooth 24 was non-vital, while tooth 26 remained vital. Radiographic examination revealed significant bone loss extending almost to the apex of tooth 24 and noticeable bone loss around tooth 26. The combined clinical and radiographic findings pointed towards a Primary Periodontal Secondary Endodontic lesion affecting teeth 24, 25, and 26.

Although extraction of tooth 24 was advised, the patient expressed reluctance. Consequently, a treatment plan was devised involving root canal therapy (RCT) followed by periodontal surgery. Scaling and root planing (SRP) were performed, and the patient was recalled after one week for re-evaluation. Subsequently, RCT was carried out in two appointments. The endodontic procedure involved canal patency establishment, root canal cleaning and shaping using Protaper rotary files, and the application of intracanal medicament with calcium hydroxide. A temporary filling was placed, and occlusal reduction was performed to alleviate trauma from occlusion. After 10 days, the teeth were asymptomatic and were obturated, with permanent restoration using posterior composite resin.

Three months post-endodontic treatment, periodontal therapy was initiated. A pre-procedural mouth rinse was administered, and local anaesthesia was provided in the 23-27 region. A full-thickness flap was raised, and open flap debridement was conducted using Gracey curettes. Pre-suturing was performed, and Osteon-II bone graft was applied to tooth 24, while platelet-rich fibrin (PRF) was placed around tooth 26. Sutures were applied, and post-operative care included analgesics and antibiotics. Suture removal took place after one week, and the patient was scheduled for regular recalls at 1 and 3 months.

At the three-month follow-up, tooth 24 exhibited reduced mobility (grade I), 5mm probing depths, and no signs of inflammation. Radiographically, evidence of bone regeneration was observed. The patient returned for a one and half year follow-up, reporting satisfactory results with no mobility and a 5mm pocket depth for tooth 24. The collaborative endodontic and periodontal approach yielded successful outcomes in preserving the natural dentition and restoring periodontal health.

DISCUSSION:

Dental mortality is predominantly attributed to pulpal and periodontal issues, collectively responsible for over half of tooth losses. The intimate connection between dental pulp and periodontal tissues, both originating from ectomesenchymal cells (dental papilla for pulp

and dental follicle for periodontal ligament), is underscored by their separation via Hertwig's epithelial root sheath. Simring and Goldberg's 1964 work highlighted the interplay between periodontal and pulpal diseases, coining the term "endo-perio lesion" to denote conditions where inflammatory products affect both tissues.[1]

Three main pathways have been implicated in the development of periodontal-endodontic lesions, namely[2]:

1. Dentinal tubules

2. Lateral and accessory canals

3. Apical foramen

Bacterial infections are the primary culprits in the majority of pulpal and periodontal diseases. Anatomical pathways such as the apical foramen, lateral canals, accessory canals, dentinal tubules, and palato-gingival grooves, along with non-physiological routes like iatrogenic root canal perforations and vertical root fractures, facilitate cross-infection between the root canal and periodontal ligament. Periodontal disease progresses coronally to apically, while endodontic lesions propagate from apex to crown.

The infected pulp triggers an inflammatory response in the periodontal ligament, yet the impact of periodontal inflammation on pulpal tissue remains debated. Clinically, the pulp remains unaffected by periodontal disease unless accessory canals are exposed or the microvasculature of the apical foramen is compromised.

Simon et al.'s classification system include[3]

1- Primary Endodontic Diseases,

2- Primary Periodontal Diseases

3- Primary Endodontic Disease with Secondary Periodontal Involvement,

4- Primary Periodontal Disease with Secondary Endodontic Involvement, and

5- True Combined Disease.

This classification provides valuable guidance for informed clinical decision-making.

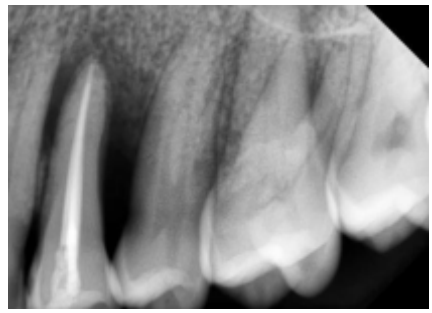
Critical factors influencing treatment decisions include pulp vitality and the type and extent of the periodontal defect. Although distinguishing between endodontic and periodontal diseases poses challenges, accurate diagnosis is crucial for tailored treatment approaches. The differential diagnosis, despite its complexity, plays a pivotal role in ensuring appropriate and effective interventions for optimal patient outcomes.

The consensus in dental literature emphasizes that addressing either endodontic or periodontic issues alone may not yield a satisfactory prognosis when both disease entities coexist.[4] Hiatt and Amen[5] argued that persistent periodontal disease may only resolve after definitive periodontal therapy is followed by successful endodontic treatment. Many authors agree that a combination of both therapies is crucial for the successful healing of combined lesions. The challenge lies in determining which lesion occurred first and which is causing or perpetuating the clinical problem. While there is a general agreement that pulpal disease could initiate or perpetuate periodontal disease, the opposite theory remains controversial. Johnson and Orban[6] demonstrated that periodontal disease persisting after unsuccessful endodontic therapy cleared up after successful endodontic treatment. Some studies have also shown the remission of severe periodontal bone loss after endodontic therapy alone. Simring and Goldberg suggested that endodontic therapy is indicated in the treatment of terminal periodontal disease unresponsive to periodontal therapy[1].

The impact of periodontal inflammation on the pulp remains a topic of controversy, with conflicting studies. Some propose that periodontal disease has no effect on the pulp until it involves the apex, while others suggest a degenerative influence, including increased calcifications, fibrosis, collagen resorption, and direct inflammatory effects. It appears that the pulp is not directly affected by periodontal disease until recession exposes an accessory canal to the oral environment[7]. Therefore, treatment of combined lesions should aim to eliminate both issues.

While the treatment and prognosis of primarily endodontic and primarily periodontal diseases are straight forward, predicting the prognosis

PRE-OP XRAY



PD- 15MM

INTRAOPERATIVE DEFECT

GRAFT AND PRF PLACED

SUTURES PLACED

PERIODONTAL PACK PLACED

POST OP PD- 5MM
1.5 YEARS

PRE-OP XRAY-
1.5 YEARS

of combined lesions is more challenging. Endodontic therapy is considered more predictable, and completing this therapy before periodontal procedures positively influences periodontal healing. True combined lesions are associated with the most guarded prognosis. In general, assuming adequate endodontic therapy, issues of endodontic origin tend to heal. However, in cases of combined diseases, the prognosis depends on the severity and extent of the periodontal lesion and the effectiveness of periodontal therapy[2]. In conclusion, understanding that in perio-endo lesions, endodontic treatment is more predictable, but its success depends on completing periodontal therapy. A comprehensive approach addressing both aspects of perio-endo lesions is essential for achieving successful long-term results.

Wang and Boyapati suggested PASS principle that is critical for bone regeneration: primary wound closure, angiogenesis as a blood supply and source of undifferentiated mesenchymal cells, space maintenance, and stability of the wound [8].

CONCLUSION

While conventional wisdom often suggests that endodontic treatment should precede periodontal management in cases of primary periodontal lesions with secondary endodontic involvement, it is commonly observed that endodontic therapy alone primarily addresses the endodontic component, with limited impact on the periodontal lesion. However, this case report emphasizes the significance of accurate diagnosis, elimination of etiological factors, and the adoption of a comprehensive, multidisciplinary treatment approach in restoring the functional status of teeth affected by endo-perio lesions.

In contrast to the conventional sequential approach, this case underscores the importance of a combined endodontic and periodontal strategy from the outset. By integrating both aspects of treatment concurrently, clinicians can address the complexities of primary periodontal and secondary endodontic involvement more effectively. This multidisciplinary approach ensures a holistic management plan, aiming not only to resolve the endodontic issues but also to comprehensively manage the periodontal component.

The successful outcome presented in this case report illustrates the potential benefits of a well-coordinated treatment strategy. By considering both endodontic and periodontal aspects simultaneously, clinicians can enhance the chances of restoring functional and structural integrity to teeth affected by endo-perio lesions. This reframing of the treatment paradigm emphasizes the need for a nuanced and integrated approach in managing these challenging dental cases.

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