REVIEW ARTICLE

Endo-Perio Lesions: Diagnostic Challenges and Treatment Strategies

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Abstract: Endodontic-periodontal lesions (EPLs) are clinical entities in which pulpal and periodontal tissues are pathologically interconnected. They present diagnostic and therapeutic challenges because of overlapping signs, shared microbial ecology, anatomical communication pathways, and variable prognosis. This review summarizes current understanding of etiology, classification, diagnostic work-up (including the role of CBCT), contemporary treatment strategies (endodontic, periodontal and combined), prognostic factors and suggested clinical pathways for decision-making. Key recent consensus and systematic reviews are synthesized to guide evidence-based management.

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Introduction

Endo-perio lesions (EPLs) occur when infection or inflammation involves both the pulp and the periodontal tissues. They vary from primary endodontic disease with secondary periodontal involvement to primary periodontal disease with secondary endodontic involvement, and true combined lesions with independent endodontic and periodontal origins. Accurate diagnosis is essential because treatment sequencing and prognosis differ markedly between types. Recent expert consensus emphasizes a multidisciplinary approach combining endodontic and periodontal therapies tailored to lesion type and severity.

Etiology and Pathogenesis

Major mechanisms that connect pulp and periodontium include:

- **Apical foramen and accessory canals** — permit spread of endodontic infection to the periodontal ligament.
- **Lateral/accessory canals, furcation canals** — especially relevant in multi-rooted teeth.
- **Iatrogenic pathways** — e.g., root perforations, fractured roots, overextended root fillings, coronal leakage.
- **Periodontal pocket progression into the apical region** — advanced periodontitis may cause pulpal involvement through lateral canals or an open apex.

Microbial biofilms play central roles in both compartments; while endodontic infections are typically obligate anaerobic species, periodontal pockets may harbor a more diverse community.

Cross-contamination and host response (immune/inflammatory) determine tissue breakdown and healing potential.

Classification

Several classification schemes exist; a clinically useful one distinguishes:

1. **Primary endodontic lesions** (with or without secondary periodontal involvement)
2. **Primary periodontal lesions** (with or without secondary endodontic involvement)
3. **True combined lesions** (concurrent but independent endodontic and periodontal pathology)
4. **Iatrogenic lesions** (e.g., root perforation, root fracture).

Al-Fouzan's modified classification and later adaptations emphasize lesion origin, presence of root damage, and prognostic implications — useful when planning staged therapy. PMC

Diagnostic Work-up

A systematic diagnostic approach reduces misclassification:

History & clinical exam

- Pain characteristics, swelling, sinus tracts, mobility, pocket probing depths (vertical/angular defects), and prior endodontic treatment.

Pulp testing

- Thermal/electric pulp tests to assess vitality (remember false negatives in calcified or traumatized teeth).

Periodontal charting

- Full-mouth probing depths, attachment levels, furcation involvement, bleeding on probing.

Radiography

- Periapical radiographs (multiple angulations) provide baseline bone loss, periapical radiolucencies, and root anatomy.

Cone-beam CT (CBCT)

- CBCT improves detection of periapical lesions, vertical root fractures, furcation communications and the extent/pattern of alveolar bone loss; it is particularly helpful when conventional radiographs are inconclusive. Use CBCT judiciously following ALARA principles.

Microbiologic tests and biomarkers

- Not routinely required; selected cases may benefit from microbial sampling for persistent infections or research settings.

Treatment Principles and Sequencing

General principle: **treat the pulpal infection first** when endodontic involvement is suspected, then re-evaluate periodontal status — because many periodontal signs (sinus tracts, localized bone loss) may resolve after successful endodontic therapy.

1. Primary endodontic lesions (± secondary periodontal involvement)

- Perform root canal therapy (RCT) with disinfection and obturation.
- Reassess after 3–6 months; periodontal treatment only if persistent periodontal pockets or bone defects remain.

2. Primary periodontal lesions (± secondary endodontic involvement)

- Initial periodontal therapy (scaling/root planing, hygiene, possible regenerative procedures).
- Pulp testing and endodontic treatment only if pulp becomes non-vital or shows symptoms.

3. True combined lesions

- Often require both therapies. Many clinicians perform RCT first (to eliminate an endodontic source) followed by periodontal therapy (non-surgical/subgingival debridement, then surgical/regenerative approaches as indicated). Simultaneous endodontic and periodontal therapy may be considered in selected cases (e.g., when extensive periodontal surgery is planned), but evidence on timing is mixed — individualize to case and operator expertise.

Adjuncts and advanced options

- **Regenerative periodontal surgery** (bone grafts, membranes, growth factors) for intrabony defects after infection control.
- **Endodontic microsurgery (apicoectomy)** for persistent periapical disease or when orthograde RCT is not possible.
- **Management of root fractures/perforations**: prognosis guarded; extraction may be necessary for vertical root fractures.
- **Use of lasers/photobiomodulation**: adjunctive in some practices but evidence is variable.

A recent scoping/systematic review found many clinical trials combine endodontic and periodontal treatments, and outcomes differ based on lesion type, defect morphology, and treatment sequencing — supporting individualized, multidisciplinary care.

Prognosis and Prognostic Factors

Prognosis depends on:

- **Origin of the lesion** (primary endodontic lesions generally have better outcomes after RCT).
- **Severity and morphology of periodontal bone loss** (deep, vertical defects amenable to regeneration have better periodontal outcomes than horizontal generalized bone loss).
- **Presence of root damage** (vertical root fracture or resorption worsens prognosis).
- **Tooth restorability and coronal seal** (failure to achieve a good coronal restoration predisposes to reinfection).
- **Patient factors** (smoking, systemic disease, oral hygiene).

Overall, teeth with endodontic origin and limited periodontal involvement have favorable outcomes after prompt RCT; combined lesions with severe periodontitis have more guarded prognosis and higher failure/extraction rates. Recent expert consensus stresses realistic prognosis communication and shared decision making.

Proposed Clinical Decision Pathway (Practical)

1. **Initial assessment:** pulp tests + full periodontal chart + periapical radiographs.
2. **If pulpal necrosis or acute periapical pathology is present:** perform RCT first. Reassess periodontal pockets at 3 months.
3. **If primary periodontal signs predominate and pulp is vital:** begin periodontal therapy and monitor pulp status.
4. **If true combined lesion suspected or no improvement after initial therapy:** consider CBCT, coordinate endodontic and periodontal treatments; plan for regenerative/surgical periodontal therapy when necessary.
5. **If root fracture or perforation detected:** discuss guarded prognosis; plan appropriate intervention or extraction.

Gaps in Evidence & Future Directions

- High-quality randomized controlled trials comparing timing strategies (sequential vs simultaneous therapies) are limited.
- Better characterization of microbiome overlap between pulp and periodontal pockets may inform targeted antimicrobial strategies.
- Long-term comparative studies on regenerative techniques in combined lesions are needed.
- Standardized classification and outcome reporting would improve cross-study comparisons. Recent expert consensus documents are helping to harmonize terminology and recommendations.

Conclusion

Endo-perio lesions require careful diagnosis, methodical treatment sequencing, and interprofessional collaboration. In most cases, addressing the endodontic infection first simplifies diagnosis and can resolve secondary periodontal signs; persistent periodontal defects then require targeted periodontal therapy, sometimes including regenerative surgery. Prognosis is lesion-dependent; clinicians should use CBCT selectively, apply evidence-based disinfection and restorative techniques, and inform patients honestly about expected outcomes. Recent consensus and systematic reviews support a tailored, multidisciplinary approach.

Key References (selected)

1. Al-Fouzan KS. *A new classification of endodontic-periodontal lesions.* 2014.
2. Ardila CM, et al. *Clinical efficacy of treatment of endodontic-periodontal lesions: scoping review.* 2022
3. American Association of Endodontists — Overview: Endodontic-Periodontal Lesions.