

ENDOPERIO LESION

Dr. Niladri Maiti¹, Dr. Duran Kala², Dr. Alisirbabakuliyev³

¹Associate Professor, Department of Endodontics,

Faculty of Dentistry, Tishk International University, Erbil, Kurdistan Region

²Lecturer & Dean, Faculty of Dentistry,

Tishk International University, Erbil, Kurdistan Region

³Asst Lecturer, Department of Endodontics,

Faculty of Dentistry, Tishk International University, Erbil, Kurdistan Region

Corresponding Author email: niladri.maiti@tiu.edu.iq

ABSTRACT

Endo-Perio lesions often remain free of symptoms for long periods, until it starts acute symptoms of inflammation and/or increased pain. The differential diagnosis of endodontic and periodontal diseases can be challenged but a correct diagnosis has a vital importance so that appropriate treatment can be provided. Endodontic treatment is highly predictable and has high successful rate when appropriately performed. If majority of bony support has been lost from periodontitis, regardless of predictability of endodontic therapy, tooth may have hopeless prognosis. Regeneration, root resection and hemisection are indicated as a part of strategic treatment of multirrooted teeth. Differentiating between a periodontal and an endodontic problem can be difficult. A symptomatic tooth may have pain of periodontal and/or pulpal origin. The nature of that pain is often the first clue in determining the etiology of such a problem. Radiographic and clinical evaluation can help clarify the nature of the problem. In some cases, the influence of pulpal pathology may cause the periodontal involvement and vice versa. The simultaneous existence of pulpal problems and inflammatory periodontal disease can complicate diagnosis and treatment planning. An endo-perio lesion can have a varied pathogenesis which ranges from simple to relatively complex one.

Keywords: Endo Perio Lesion,

I. INTRODUCTION

Simring and Goldberg in 1964 first described the relationship between periodontal and pulpal disease.[1] The periodontal complex comprises alveolar bone, periodontal ligament and root cementum. When the pulp becomes necrotic, there is a direct inflammatory response by the periodontal ligament at the apical foramen or accessory canals. Many of these are similar pathogens encountered in periodontal infections. On the other hand, the effect of periodontal disease on the pulp is degenerative in nature including an increase in calcifications, fibrosis and collagen resorption. Inadequacy of the coronal seal leading to microleakage can be one of the reasons for the failure of the root canal treatment. Teeth that has undergone periodontal surgery had a more favorable healing response with the gain of connective tissue attachment when occlusal trauma was relieved. The primary endodontic disease with secondary periodontal involvement should first be treated with an endodontic therapy. Prognosis depend on the severity of periodontal involvement, periodontal treatment and patient response. The differential diagnosis is difficult when a sinus tract, originating from the endodontic lesion may drain along periodontal ligament. Therefore, a primary endodontic lesion draining from attachment apparatus should be initially treated by an endodontic therapy. If there is evidence of pulpal disease and the possibility of associated periodontal bone loss, the endodontic treatment should be completed first and then the patient should be reevaluated. In many cases, apparent periodontal pathology, including bone loss, suppuration, and pocket depth resolves if there has been a pulpal lesion that has been successfully treated endodontically. Residual periodontal problems can be treated after completion of successful endodontic treatment, and in many cases, successful regeneration of periodontal defects is possible in endodontically treated teeth.

The following are the means of intercommunication between the pulp and the periodontal tissues:

1. Apical foramen
2. Dentinal tubules
3. Lateral canals
4. Periodontal ligament
5. Alveolar bone
6. Palatogingival groove
7. Neural pathways
8. Vasculolymphatic drainage pathways
9. Pathological communications due to fractures and perforations.

II. ETIOLOGY OF ENDO-PERIO LESIONS

Tissues of dental pulp and periodontium are interlinked from the embryonic stage. The dental papilla (precursor of dental pulp) and dental sac (precursor of PDL) are of a common mesodermal origin. At the late bell stage, epithelial root sheath separates the dental papilla and dental follicle except at the base the future apical foramen. Therefore, it is natural to expect that any part of periodontium can get affected by pulpal inflammation and vice versa.[2] There are several reviews in literature where authors have given wide information about the etiology, pathogenesis, classification, diagnosis, and treatment planning. This review aims to brief the etiology, various classifications, diagnosis, and management of endodontic-periodontic lesions.

III. CLASSIFICATION OF ENDODONTIC-PERIODONTAL LESIONS

Simon et al. (1972) [3]

- Primary endodontic lesions
- Primary endodontic lesions with secondary periodontal involvement
- Primary periodontal lesions
- Primary periodontal lesions with secondary endodontic involvement
- True combined lesions

Grossman I (1991) [4]

Based on therapy into three groups,

1. Teeth that require endodontic therapy alone
2. Teeth that require periodontal therapy alone
3. Teeth that require endodontic as well as periodontal treatment.

Torabinejad and Trope (1996) [5]

Based on the origin of the periodontal pocket,

1. Endodontic origin
2. Periodontal origin
3. Combined endo-perio lesion
4. Separate endodontic and periodontal lesions
5. Lesions with communication
6. Lesions with no communication.

World workshop for classification of periodontal diseases (1999)[6] Periodontitis

associated with endodontic disease:

1. Endodontic-periodontal lesion
2. Periodontal-endodontic lesion
3. Combined lesion.

von Arx and Cochran proposed a classification of endo-perio lesion based on the clinical treatment with the employment of a membrane (2001) [7]

- Class I: Lesion with bone defect in the apex which may invade the buccal/labial and lingual cortex.
- Class II: Apical lesion with the concomitant marginal involvement also referred as a combined periodontal endodontic lesion, with great periodontal pocket deepness around the affected tooth.
- Class III: Furcation lesion coming from the accessory canals or from iatrogenic perforation and the marginal lesion may or may not occur.

Kim and Kratchman (2006)[8]

- a. Absence of periradicular lesion, no mobility, normal pocket depth, but unresolved symptoms after non-surgical therapies have been exhausted.
- b. Presence of a small periradicular lesion in the apical quarter, clinical symptoms such as discomfort/sensitivity to percussion as sinus tract, normal periodontal probing depths, and no mobility.
- c. Large periradicular lesions progressing coronally but without periodontal pockets and/or mobility.
- d. Clinically similar to those in Class C but with periodontal pockets >4 mm and no communication of the pocket and the endodontic lesion.
- e. Deep periradicular lesions with endodontic-periodontal communication to the apex, but no obvious fracture.
- f. Apical lesion and complete denudement of the buccal plate but no mobility.

New classification based on the primary disease with its secondary effect: Rotstein and Simon (2006)[9]

1. Retrograde periodontal disease: It could be of two types
 - a. Primary endodontic lesion with drainage through the PDL
 - b. Primary endodontic lesion with secondary periodontal involvement.
2. Primary periodontal lesion.
3. Primary periodontal lesion with secondary endodontic involvement
4. Combined endodontic-periodontal lesion
5. Iatrogenic periodontal lesions.
 - a. Root perforations
 - b. Coronal leakage
 - c. Dental injuries or trauma
 - d. Chemicals used in dentistry

- e. Vertical root fractures.

Etiological factors leading to pulpo-periodontal problems[10]

1. Live pathogens

- Bacteria.
- Fungi (yeasts).
- Viruses.

2. Non-living etiologic agents

- Extrinsic agents.
- Intrinsic agents.

Contributing factors leading to pulpo-periodontal problems[11]

1. Poor endodontic treatment
2. Poor restorations
3. Trauma: Crown fracture without pulp involvement, crown fracture with pulp involvement, crown-root fractures, root fractures, concussion, subluxation, extrusive luxations, intrusive luxations, and avulsion.
4. Resorptions: External, replacement, and internal
5. Perforations
6. Developmental malformations.

IV. DIAGNOSIS

It is incumbent to collect all relevant information through history and examination. Later, it has to be correlated with appropriate diagnostic aids. It also helps to differentiate between various conditions and to arrive at the correct diagnosis.

Table 1. Diagnostic examinations used to classify EPL adapted from Parolia et al 2013

Test	Primary endodontic lesion	Primary periodontal lesion	Primary endodontic secondary periodontal	Primary periodontal secondary endodontic	True combined lesions
Visual	Presence of decay/ incorrect restorations/ erosion/ abrasion	Inflammation/ recession of gingiva Presence of plaque/ calculus Intact teeth	Plaque/ calculus at the gingival margin Root perforation/ fracture	Plaque/ calculus And swelling around multiple teeth Puss + exudate	Periodontitis around single or multiple teeth Puss + exudate
Pain	Sharp	Usually dull ache	Usually sharp	Usually dull ache	Usually dull ache, sharp only in acute condition
Palpation	Not conclusive	Pain on palpation	Pain on palpation	Pain on palpation	Pain on palpation
Percussion	Normally tender	Tender on percussion	Tender on percussion	Tender on percussion	Tender on percussion
Mobility	Present only in fractured or traumatized teeth	Localized/ generalized mobility	Localized mobility	Generalized mobility	Generalized Higher grade mobility on involved tooth
Pulp vitality	Lingering or no response	Positive	Negative	Positive	Usually negative
Pocket probing	Solitary narrow pocket	Multiple wide and deep pockets	Solitary wide pocket	Multiple wide and deep pockets	Typical conic periodontal type of probing
Sinus tracing	Radiograph with gutta-percha points to	At lateral aspect of the root	Mainly at the apex/ furcation area	At lateral aspect of the root	Difficult to trace
X-rays	Periapical radiolucency	Vertical bone loss Wider bone loss coronally	Wide based apical radiolucency	Angular bone loss in multiple teeth	Similar to a vertically fractured tooth
Cracked tooth testing	Painful when chewing	No symptoms	Painful when chewing	No symptoms	Painful when chewing

[12,13]

V. TREATMENT OF ENDODONTIC-PERIODONTAL LESIONS

Primary endodontic disease

After a root canal treatment, generally, the disease heals. After removal of affected pulp, the sinus tract disappears in early stages and later is well cleaned and obturated. Sometimes, due to lesion being chronic manifests as periodontal abscess, therefore, careful evaluation is necessary for the appropriate treatment.

Primary periodontal diseases

Any periodontal disease precedes with hygienic phase which involves proper scaling and root planing and removal of poorly contoured restorations and developmental grooves making it accessible for better maintenance and to treat successfully. Periodontal treatment is then advocated, but the outcome is not so predictable and poorer than the endodontic lesions and extends of lesion and efficacy of periodontal treatment also determines the success of treatment.

True combined diseases

They may be the result of mishaps in endodontic treatment or due to misplaced posts or coronal restoration. They are first treated as primary endodontic lesions with secondary periodontal involvement, but their prognosis of them is poorer or hopeless in some extensive periodontal lesions. Sometimes, regeneration procedures are to be advocated to improve the outcomes; hence, the prognosis of the combined lies in efficacy of periodontal therapy.

Treating iatrogenic lesions

The first priority is to close the iatrogenic communication. Root perforations are treated according to their etiology. Palatal perforations are difficult to manage, even surgically and may frequently lead to extraction. The successful treatment of root perforations depends on early detection and sealing. The prognosis seems poor. Teeth with lesions caused by vertical root fractures have hopeless prognosis and should be extracted.

If after a period of time a suppurating primary endodontic disease remains untreated, it may then become secondarily involved with marginal periodontal breakdown. Plaque forms at the gingival margin of the sinus tract and leads to marginal periodontitis. When plaque or calculus is present, the treatment and prognosis of the tooth are different from those of teeth involved with only primary endodontic disease. The tooth now requires both endodontic and periodontal treatments. If the endodontic treatment is adequate, the prognosis depends on the severity of the marginal periodontal damage and the efficacy of periodontal treatment. With endodontic treatment alone, only part of the lesion will heal to the level of the secondary periodontal lesion. In general, healing of the tissues damaged by suppuration from the pulp can be anticipated. Primary endodontic lesions with secondary periodontal involvement may also occur as a result of root perforation during root canal treatment, or where pins or posts have been misplaced during coronal restorations.

True combined diseases

True combined endodontic–periodontal disease occurs with less frequency. It is formed when an endodontic disease progressing coronally joins with an infected periodontal pocket progressing apically [14,15]. The degree of attachment loss in this type of lesion is invariably large and the prognosis is guarded. This is particularly true in single-rooted teeth. In molar teeth, root resection can be considered as a treatment alternative if not all roots are severely involved. Sometimes, supplementary surgical procedures are necessary. In most cases, periapical healing may be anticipated following successful endodontic treatment. The periodontal tissues, however, may not respond well to treatment and will depend on the severity of the combined disease.

VI. CONCLUSION

EPL can be a challenge to doctors as interdisciplinary collaboration is needed in order to obtain a favourable outcome. Due to the lack of current literature documenting these multi-factorial

illnesses, the first step of diagnosis can be challenging. Thus, this review's purpose is to highlight the current diagnostic and treatment planning strategies. As this paper shows, the diagnostic should be conducted by conscientiously following all clinical examination tests in order to correctly classify the lesion. Only by careful diagnosis can the most effective therapy method be selected and the success rate increased. The guidelines to a precise treatment method are straightforward once the lesion is categorized properly. The prognosis and treatment of each endodontic–periodontal disease type varies. Primary endodontic disease should only be treated by endodontic therapy. Good prognosis is to be expected if treatment is carried out properly with a focus on infection control. Primary periodontal disease should only be treated by periodontal therapy. In this case, the prognosis depends on the severity of the periodontal disease and the patient response. Primary endodontic disease with secondary periodontal involvement should first be treated with endodontic therapy. Treatment results should be evaluated and only then periodontal treatment should be considered. This sequence of treatment allows sufficient time for initial tissue healing and better assessment of the periodontal condition.

REFERENCE

1. Simring M, Goldberg M. The pulpal pocket approach: retrograde periodontitis. *Journal of Periodontology* 1964;35:22-48.]
2. Shah N. Endodontic-Periododontic Continuum. *Dent Clin N A* 1974;10:53-67.]
3. Simon JH, Glick DH, Frank AL. The relationship of endodonticperiodontic lesions. *J Periodontol* 1972;43:202-8.]
4. Grossman I. *Grossmans Endodontic Practice*. 11th ed. Philadelphia, PA: Louis; 1987. p. 449-61.
5. Torabinejad M, Trope M. Endodontic and periodontal interrelationships. In: Walton RE, Torabinejad M, editors. *Principles and Practice of Endodontics*. Vol. 4. 1996. p. 94-106.
6. Armitage GC. Development of a classification system for periodontal diseases and conditions. *Ann Periodontol* 1999;4:1-6.
7. von Arx T, Cochran DL. Rationale for the application of the GTR principle using a barrier membrane in endodontic surgery: A proposal of classification and literature review. *Int J Periodontics Restorative Dent* 2001;21:127-39.
8. Kim S, Kratchman S. Modern endodontic surgery concepts and practice: A review. *J Endod* 2006;32:601-23
9. Rotstein I, Simon JH. The endo-perio lesion: A critical appraisal of the disease condition. *Endod Topics* 2006;13:34-56.
10. Carranza FM, Newman MG. *Clinical Periodontology*. 8th ed. Philadelphia, PA: WB Saunder Company; 1996. p. 640-650.
11. Rotstein I, Salehrabi R, Forrest JL. Endodontic treatment outcome: Survey of oral health care professionals. *J Endod* 2006;32:399-403.
12. Newman GN, Takei HH, Klokkevold PR, Carranza FA. *Clinical Periododontology*. 10th Edition. Saunders. 2006. 88-90.
13. Parolia A, Toh CG, Porto I, Mala K. Endo-perio lesions: A dilemma from 19th until 21st century. *J Interdiscip Dent*. 2013;3(1):2-11
14. Simon JHS, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions. *J Periodontol* 1972: 43: 202-208.
15. Seltzer S, Bender IB, Ziontz M. The interrelationship of pulp and periodontal disease. *Oral Surg Oral Med Oral Pathol* 1963: 16: 1474-1490