

Endo-Perio Interdisciplinary Approach –A Review

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Abstract

Endodontic-periodontal lesions are complicated disease entity, frequently encountered in day-to-day dental practice, difficult to diagnose and treat. The success of management of a combined periodontal and endodontic lesion depends on the elimination of both of the disease processes. In the case of a combined endo-perio lesion, the endodontic therapy results in healing of the endodontic component, while the prognosis of tooth would finally depend on the healing of the periodontal lesion. This literature review aims to assess the causes and consequences of periodontal-endodontic lesions, as well as its clinical, radiographic and microbiological aspects, and presents a comprehensive outline of diagnosis of perio-endo lesions and a sequential treatment protocol to the same.

Keywords: Retrograde pulpitis, Retrograde periodontitis, Pulp, Periodontium.

INTRODUCTION

The tooth, the pulp within it and its supporting periodontal tissues should be viewed as one biological unit. The interrelationship among these structures influences themselves during health and disease.^[1] The periodontal-endodontic lesions are characterized by the co-existence of the pulpal and periodontal disease in a same tooth, which makes complex its diagnosis, as well as management, because a single lesion often present signs of endodontic and periodontal involvement. This suggests that one disease might be the cause or consequence of the other, or had originated from two different and independent processes which were mingled by their advancement.^[2,3] The periodontal-endodontic lesions have been characterized by the involvement of the pulp and periodontal disease in the same tooth. This makes it difficult to diagnose because a single lesion may present signs of both endodontic and periodontal involvement. There is a general agreement today that the vast majority of pulpal and periodontal lesions are the result of bacterial infection. This suggests that one disease may be the result or cause of the other or even originated from two different and independent processes which are associated with their advancement.^[4-6]

The relationship between the pulp and the periodontium was a matter of concern since long back. Effects of periodontal disease on pulp were first depicted by Turner and Drew (1919).^[7] The reverse was first narrated by Simring and Goldberg (1964)^[2] Cahn (1927) and Sicher (1936) first pointed the communicating channels between pulp and periodontal tissues.

CLASSIFICATION OF ENDODONTIC-PERIODONTAL LESION

Simon *et al.* (1972)^[8] classified endodontic-periodontal lesion, based on origin of the disease and its spread, as following:

1. Primary endodontic lesion (when the lesion is entirely endodontic in origin)
2. Primary endodontic lesion with secondary periodontal involvement (when periodontal defect develops in endodontic ally affected teeth)
3. Primary periodontal lesion (when the lesion is entirely periodontal in origin)
4. Primary periodontal lesion with secondary endodontic involvement (when endodontic problem arises in periodontally diseased teeth)
5. True combined lesion (when both endodontic and periodontal disease develop independently and unites).

Stock (1988)^[9] modified Simon *et al.* classification and omitted Class V lesions as he argued that both Class II and Class IV lesions become combined lesion in advanced stage.

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Similarly, one can argue on including “primary periodontal lesion” in the classification

Al-Fouzan Khalid (2014) modified the primary endodontic lesions, since it has no periodontal relationship; and proposed a new endo-periodontal interrelationship classification as follows:^[10]

1. Retrograde periodontal disease
 - a. Primary endodontic lesion with drainage through periodontal ligament
 - 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 lesion.

Here, the primary endodontic lesion with/without periodontal involvement secondarily is referred as retrograde periodontitis, (as such periodontal disease begins from apex and then extends coronally - just reverse to common periodontal disease).

WEINE (1982)^[11] PRESENTED A DIFFERENT CLASSIFICATION DEPENDING ON CLINICAL PRESENTATION AS FOLLOWS

1. Symptoms clinically and radiographically simulate periodontal disease, but are in fact due to pulpal lesions
2. That has both pulpal and peri-apical disease and periodontal disease concomitantly
3. That has no pulpal disease but requires endodontic therapy plus root amputation in order to gain periodontal healing
4. Symptoms clinically and radiographically simulate pulpal and peri-apical disease but in fact have periodontal origin.

GROSSMAN (1988) FOLLOWED THE OLDEST CLASSIFICATION BY OLIET AND POLLOCK (1968) AND CLASSIFIED THE ENDO-PERIO LESIONS ACCORDING TO TREATMENT NEED, AS FOLLOWS

Teeth requiring endodontic therapy only – it includes

- a. Necrotic pulp and peri-apical lesion with/without sinus tract
- b. Chronic peri-apical abscess with sinus tract passing through a/a.
- c. Root fracture
- d. Root resorption
- e. Replantation
- f. Intentional endodontic therapy
- g. Radisectomy
- h. Incomplete closure of apex.

Teeth requiring periodontal therapy only – it includes

- a. Occlusal trauma causing reversible pulpitis
- b. Occlusal trauma plus inflammation of gingiva resulting in pocket

- c. Overzealous periodontal therapy causing pulpal sensitivity
- d. Deep and extensive infra-bony pocket, extending beyond apex, sometimes coupled with root desorption, yet with a vital pulp.

Teeth requiring both endodontic-periodontal procedures – it includes

- a. Any type 1 lesion causing irreversible reaction to a/a, and hence require periodontal therapy
- b. Any type 2 lesion causing irreversible reaction to pulp, and hence require endodontic therapy

WORLD WORKSHOP FOR CLASSIFICATION OF PERIODONTAL DISEASES (1999)^[12] HAS PRESENTED A NEW CLASSIFICATION DEPENDING ON ORIGIN OF DISEASE AS FOLLOWS

- a. Endodontic-periodontal lesion
- b. Periodontal-endodontic lesion
- c. Combined lesion.

PRIMARY ENDODONTIC LESION

Pathogenesis

- It arises as sequel of pulpitis from dental caries, wear defects, trauma, and fracture
- A primary endodontic lesion presents a necrotic pulp and a chronic peri-apical abscess with a sinus tract draining through periodontal ligament space or gingival sulcus.

Clinical features

- The lesion presents “isolated” periodontal problem in relation to the affected tooth only, without a generalized periodontal disease
- H/O pulpitis
- A sinus tract, originating from apex, is often present in sulcus
- Negative pulp vitality test.

Treatment

- Endodontic therapy – must be performed in multiple appointment, to reevaluate healing process between the beginning and completion of treatment
- Periodontal therapy is not required usually.

Prognosis

- They exhibit good prognosis. Radiographic and clinical healing occurs rapidly
- A sinus tract heals soon after canal debridement. Healing completes within 3–6 months.

Pathogenesis

- It arises when periodontal problem develops on teeth with PEL
- If the primary endodontic lesion with a sinus tract is not detected and hence, treated early; plaque and calculus

are often deposited in draining sinus tract; creating a secondary periodontal problem.

Clinical features

- Negative pulp vitality test
- Presence of plaque and calculus, in the way of sinus tract.

Treatment

- Endodontic therapy
- Periodontal therapy – should not be employed until complete debridement of canal is achieved.

Prognosis

- Prognosis of endodontic therapy is usually predictable
- Regeneration of periodontal tissue depends on the extent of tissue destruction.

PRIMARY PERIODONTAL LESION

Pathogenesis

- The lesion develops as sequelae of progressing periodontal problem extending to the apex
- Plaque represents the prime etiologic factor.

Clinical features

- Patient presents with generalized chronic periodontitis, sometimes having a sinus tract, with periodontal probing even extending to apex of the affected tooth, showing no pulpal exposure through caries/trauma/fracture. Patient can experience minimal or no pain.
- Positive pulp vitality test.

Treatment

- Surgical/non-surgical periodontal therapy
- Re-evaluation must be done periodically to check for retro-infection of pulp.

PRIMARY PERIODONTAL LESION WITH SECONDARY ENDODONTIC INVOLVEMENT^[13,14]

Pathogenesis

- It arises as retro-infection of pulp, when periodontal lesion extends to apex
- It may also follow the path through a lateral canal. Cervical abrasion and SRP also can add to such problem.

Clinical features

- Negative/altered pulp vitality test (as pulp can be necrotic/partially vital, especially in multi-rooted teeth).

Treatment

- Surgical/non-surgical periodontal therapy
- Endodontic therapy

Prognosis

- The prognosis depends on periodontal therapy and hence, extent of periodontal damage
- Healing of peri-apical lesion is not predictable due to periodontal communication.

TRUE COMBINED LESION

Pathogenesis

- Here pulpal and periodontal lesions develop and unite independently
- It develops when an endodontic lesion progressing coronally joins with a pre-existing periodontal defect progressing apically.

Clinical features

- Features are similar to that of primary periodontal lesion. In addition, there must be some caries, trauma, fracture, wear defects, deep restoration, or history of endodontic therapy. So patient often has severe pain
- Negative pulp vitality test.

Treatment

- Endodontic therapy and periodontal therapy
- Root resection can be in need with regenerative therapy.

Prognosis

- Prognosis of lesion is related to extent of periodontal damage
- Although response of endodontic therapy is predictable, the tooth shows hopeless prognosis, if majority of osseous support is lost from periodontal lesion.

Diagnosis

The correct diagnosis of the periodontal-endodontic lesions is fundamental to set the treatment plan and assess the prognosis. Diagnosis of primary endodontic disease and primary periodontal disease usually presents no clinical difficulty. In primary periodontal lesion, the pulp is vital and responds to pulp vitality test. In primary endodontic lesion, the pulp is infected and non-vital and does not respond.

However, primary endodontic disease with secondary periodontal involvement, primary periodontal disease with secondary endodontic involvement, or true combined diseases are clinically and radio graphically very similar.^[7] Accurate diagnosis can be achieved by detailed history taking

According to the studies of Goldman and Schildert,^[15] cases of caries, traumas, defective restorations, and wear defects, which can develop a pulp necrosis, indicate the endodontic origin of the lesion. Absence of these and presence of calculus, plaque, inflammation of marginal tissue and generalized periodontitis, indicate periodontal lesion.

TREATMENT SEQUENCE

If primary endodontic lesions persist, despite extensive endodontic therapy, then it may also have secondary periodontal involvement or it can be a true combined lesion. Hiatt and Amen suggested that persistent periodontal disease resolves only after definitive periodontal therapy is accompanied by successful endodontic therapy.^[16,17]

In case of secondary periodontal involvement, root canal treatment is employed immediately and the cleaned and

shaped canal is filled with calcium hydroxide paste, which has anti-microbial, anti-inflammatory and proteolytic property, inhibiting resorption, and favoring repair. It also prevents periodontal contamination of instrumented canals through patent channels connecting the pulp and periodontium, before periodontal treatment removes the contaminants.^[18] Treatment results should be evaluated after 2–3 months and only then should periodontal treatment be considered.^[19,20]

Primary periodontal lesions should be treated first by non-surgical periodontal therapy. Periodontal surgery, in the form of pocket surgery and resective and regenerative procedure, is required for deeper pockets and angular bone defects.^[21] Periodontal lesions with early secondary endodontic involvement presents with reversible pulpal hypersensitivity, which can be treated purely by periodontal therapy. Periodontal procedure removes noxious stimuli, and subsequent secondary mineralization of dentinal tubules allows the resolution of hypersensitivity. If pulpitis is irreversible, root canal treatment is carried out, followed by periodontal treatment. Decision of periodontal surgery depends on destruction of periodontal structure. True combined lesions are treated initially as for primary endodontic lesions with secondary periodontal involvement. Root resection or hemi-section often yields good prognosis following palliative periodontal therapy and root canal treatment to root to be saved.^[22] Iatrogenic lesions like perforation during root canal treatment^[18,23] or preparation of the canal for post and core, require a surgical approach or sealing with a ZOE, GIC, or MTA immediately. The prognosis can also be improved by enhancing bony support, achieved by regenerative procedure like GTR.^[24] These advanced treatment options are based on responses to basic periodontal and endodontic therapy over a long time period.

CONCLUSION

Endo-perio lesions can be a challenge to doctors as interdisciplinary collaboration is needed in order to obtain a favorable 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.

REFERENCES

1. Johnson HB, Orban BJ. Interradicular pathology as related to accessory root canals. *J Endod* 1948;3:21-5.
2. Simring M, Goldberg M. The pulpal pocket approach: Retrograde periodontitis. *J Periodontol* 1964;35:22.
3. Armitage GC. Development of a classification system for periodontal diseases and conditions. *Ann Periodontol* 1999;4:1-6.
4. Czarnecki RT, Schilder H. A histological evaluation of the human pulp in teeth with varying degrees of periodontal disease. *J Endod* 1979;5:242-53.
5. Milano F, Melsen B. Guided tissue regeneration using bioresorbable membranes: What is the limit in the treatment of combined periapical and marginal lesions? *Int J Period Restorat Dent* 1997;17:416-25.
6. Seltzer S, Bender IB, Nazimov H, Sinai IP. Ulipitis-induced interradericular periodontal changes in experimental animals. *J Periodontol* 1967;38:124-9.
7. Turner JH, Drew AH. Experimental injury into bacteriology of pyorrhea. *Proc R Soc Med* 1919;12:104.
8. Simon JH, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions. *J Periodontol* 1972;43:202-8.
9. Stock JJ, Messing CJ. The Endo-Perio Lesions: In *A color Atlas of Endodontics*. Singapore: Wolf Medical Publication Ltd; 1988.
10. Al-Fouzan Khalid S. A new classification of endodontic-periodontal lesions. *Int J Dent* 2014;2014:919173.
11. Weine FS. Endodontic periodontal problem in endodontic therapy, 3rd ed. sl: CV. Mosby Co; Toronto, 1982.
12. Mastromihalis N, Goldstein S, Greenberg M. Applications for guided bone regeneration in endodontic surgery. *N Y State Dent J* 1999;65:30-2.
13. Clarke NG. Periodontal defects of pulpal origin: Evidence in early man. *Am J Phys Anthropol* 2005;82:371-6.
14. Clarke NG, Hirsch RS. Two critical confounding factors in periodontal epidemiology. *Community Dent Health* 1992;9:133-41.
15. Goldman HM, Schilder H. Regeneration of attachment apparatus lost due to disease of endodontic origin. sl: *J Periodontol*, 1988, 609-10.
16. Tal H, Kafee I, Littner MM, Tamse A. Combined periodontic-endodontic lesions: A diagnostic challenge. *Quintessence Int* 1984;12:1257-65.
17. Schmitz MS. Influence of cervical preflaring on determination of apical file size in mandibular molars: SEM analysis. *Braz Dent J* 2008;19:245-51.
18. Harrington GW, Steiner DR, Ammons WF Jr. Controvérsias em periodontia-endodontia. *J Periodontol* 2000 2002;30:123-30.
19. Langeland K, Rodrigues H, Dowden W. Periodontal disease, *Bacteria and pulp histopatolgy*. *Oral Surg Oral Med Oral Pathol* 1974;34:357.
20. Fagundes CF, Storrer CM, de Sousa AM, Deliberador TM, Lopes TR. Lesões endoperiodontais-considerações clínicas e microbiológicas. *RSBO* 2007;4:54-60.
21. Kobayashi T, *et al.* The microbial from root canals and periodontal pockets of non-vital teeth associated with advanced periodontitis. sl: *Int Endod J* 1990; 23:100-6.
22. Nagaveni NB, Kumari KN, Poornima P, Reddy V. Management of an endo-perio lesion in an immature tooth using autologous platelet-rich fibrin: A case report. *J Indian Soc Pedod Prev Dent* 2015;33:69-73.
23. Hiatt W, Amen C. Periodontal pocket elimination by combined therapy. *Dent Clin North Am* 1964;28:133-44.
24. Kim E, Song JS, Jung IY, Lee SJ, Kim S. Prospective clinical study evaluating endodontic microsurgery outcomes for cases with lesions of endodontic origin compared with cases with lesions of combined periodontal-endodontic origin. *J Endod* 2008;5:546-51.