



## Endodontic Periodontal Lesion Diagnosis and Treatment Decision Analysis

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### ABSTRACT

The relationship between periodontal and endodontic disease has been a controversial aspect for more than a century. Differentiating between these periodontal and endodontic disease is very difficult due their developmental, embryonic, anatomic and functional similarities. Nature pain is often considered as the first clue which should be supported by the radiographic and clinical evaluation for the correct diagnosis of the condition. The aim of this review was to develop a decision tree for easier and accurate diagnosis of periodontal and endodontic disease. A brief pubmed search was performed on endodontic and periodontal lesion using "MESH" terms "endo-perio lesion", "diagnosis of endo perio lesion", "decision making of endo-perio lesion". In addition some websites and local guidelines were screened. By following the correct and appropriate diagnostics methods, accurate diagnosis of Endodontic-Periodontal disease can be done and the treatment for the particular condition could be achieved. With a decision tree, the diagnosis and pharmacological management of the pulpal and periapical diseases becomes easier for the dentist in regular clinical practice. A decision tree and a flow chart for daily practice which should be started up as soon as the patient presents with pain or swelling due to pulpal or periodontal periapical pathology. In this aspect active management of the infection can be done with sound knowledge on the endodontic periodontal lesions.

**Key words:** Endoperio lesion, Periodontal, Pulpal, Diagnosis, Treatment plan

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### INTRODUCTION

Skin and soft tissue infections (SSTIs) have variable etiology and clinical presentation and is commonly seen in both in ambulatory and hospital. The interrelation between the pulp and the periodontium are very difficult to understand and also have been a controversial topic over years which could be owed to their developmental, embryonic, anatomic and functional similarities [1,2]. It was first described by Simring et al. [3]. Differentiating the disease being a pulpal or periodontal origin presents various challenges due to the complexity in the communicating pathways between the pulp and the periodontium [3,4]. The endodontic and periodontal lesion is closely interrelated presenting both the signs of pulpal and periodontal involvement which makes their

diagnosis quite complex. The disease can be a result of one or other or even can be from two different unrelated processes which gets related with the advancement of disease. Diagnosing the disease is the most challenging aspect of this disease which requires deeper knowledge and insight into subject [5].

We have numerous highly cited publications on well-designed clinical trials and lab studies [6-21]. This has provided the right platforms for us to pursue the current study. Thus the aim of this review was to develop a decision tree for easier and accurate diagnosis of periodontal and endodontic diseases.

### CLASSIFICATION

Based on the primary cause of the disease, Simon et al. has given classification of endodontic-periodontal lesion as [2,5,22,23]

- (i) Primary endodontic lesions,
- (ii) Primary endodontic lesions with secondary periodontal involvement,

- (iii) Primary periodontal lesions,
- (iv) Primary periodontal lesions with secondary endodontic involvement,
- (v) True combined lesions.

In 1999, the world workshop for classification of periodontal diseases gave classification of periodontitis associated with endodontic disease as

- (i) Endodontic-periodontal lesion,
- (ii) Periodontal-endodontic lesion,
- (iii) Combined lesion.

**Pathways of communications**

Three main pathways which were considered as prime route for endodontic-periodontal lesions are [3-5,22,24],

- Apical foramen.
- Dentinal tubules.
- Lateral and accessory canals.

**Etiopathogenesis of endo-perio lesions**

**Etiological factors** [3,24,25]

- ✓ Live pathogens-bacteria, fungi, viruses.
- ✓ Nonliving etiological agents -foreign bodies,

cholesterol crystals, Russell bodies, Rushton hyaline bodies.

**Contributing factors** [3,24,25]

- ✓ Poor endodontic treatment.
- ✓ Coronal leakage.
- ✓ Root resorption.
- ✓ Perforations.
- ✓ Trauma.
- ✓ Developmental malformations [26].
- ✓ Cracked tooth syndrome.

**Characteristics of diseases**

The characteristics of diseases are mentioned in Table 1 [3,5,24,25].

**Diagnosis** [5,22,24,27]

Table 2 describes the diagnostic features of endo perio lesion.

Table 3 describes the findings of endo perio lesion [3,24]

Figure 1 shows the decision analysis for diagnosis of endodontic-periodontal lesion.

Figure 2 Shows decision analysis for diagnosis of endodontic-periodontal lesion [22].

**Table 1: Characteristics of diseases.**

	Pathogenesis	Clinical Features	Treatment	Prognosis
Primary Endodontic Lesion	It arises as a sequel of pulpitis from dental caries, wear defects, trauma and fracture. A primary endodontic lesion presents a necrotic pulp and a chronic periapical abscess with a sinus tract draining through periodontal ligament space or gingival sulcus.	The lesion presents an '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 present in sulcus. Negative pulp vitality test.	Endodontic therapy must be performed in multiple appointment, to reevaluate healing process between the beginning and completion of treatment. Periodontal therapy isn't required usually.	They exhibit good prognosis. Radiographic and clinical healing occurs rapidly. A sinus tract heals soon after canal debridement -within 3-6 months.
Primary Periodontal Lesion	The lesion develops as sequelae of progressing periodontal problem extending to the apex. Plaque represents the prime etiologic factor.	Patients present with generalized chronic periodontitis. Minimal or no pain. Positive pulp vitality test.	Surgical/ non-surgical periodontal therapy. Re-evaluation must be done periodically to check for retro-infection of pulp	The prognosis is entirely dependent on periodontal therapy and hence, extent of periodontal damage.
Primary Endodontic Lesion with Secondary Periodontal Involvement	It arises when periodontal problem develops on teeth with PEL. Plaque and calculus is often deposited in draining sinus tract; creating a secondary periodontal problem	Negative pulp vitality test. Presence of plaque and calculus, in the way of sinus tract.	Endodontic therapy. Periodontal therapy – should not be employed until complete debridement of canal is achieved	Prognosis of endodontic therapy is predictable. Regeneration of periodontal tissue depends upon the extent of tissue destruction
Primary Periodontal Lesion with Secondary Endodontic Involvement	It arises as retro-infection of pulp, when periodontal lesion extends to apex. It may also follow the path through a lateral canal.	Negative/ altered pulp vitality test (as pulp can be necrotic/ partially vital, especially in multi-rooted teeth)	Surgical/ non-surgical periodontal therapyEndodontic therapy	The prognosis depends upon periodontal therapy and hence, extent of periodontal damage.
True Combined Lesion	Here pulpal and periodontal lesions develop and unite independently.	Features are similar to primary periodontal lesions. In addition, there must be some caries, trauma, fracture, wear defects, deep restoration or history of endodontic therapy. Negative pulp vitality test.	Endodontic therapy and periodontal therapy. Root resection can be in need with regenerative therapy.	Prognosis of lesion is related to extent of periodontal damage.

Table 2: Diagnosis.

Clinical	Pulpal	Periodontal
Vitality	Non vital	Vital
Restorative	Deep or extensive	Not related
Plaque/calculus	Not related	Primary cause
Inflammation	acute	chronic
Pockets	Single, narrow	Multiple, wide coronally
pH value	Often acid	Usually alkaline
Trauma	Primary or secondary	Contributing factor
Microbial	few	complex
Radiographic		
Pattern	localized	generalised
Bone Loss	Wider apically	Wider coronally
Periapical	radiolucent	Not often related
Vertical bone loss	no	yes
Histopathological		
Junctional epithelium	No apical migration	Apical migration
Granulation tissue	apical	coronal
Gingival	normal	recession
Treatment	Root canal therapy	Periodontal treatment

Table 3: Findings of endo perio lesion.

Examination/ tests	Primary Endodontic lesion	Primary periodontal lesion	Primary endodontic secondary periodontal	Primary periodontal secondary endodontic	True combined lesion or concomitant lesions
Visual	Presence of sinus opening. Presence of decay/large restoration or tooth/erosions/ abrasions/cracks/ discolorations/ poor RCT	Inflamed gingiva/ gingival recession, Accumulation of plaque and subgingival calculus around multiple teeth. Intact teeth Presence of periodontal abscess	Plaque forms at the gingival margin of the sinus tract and leads to inflammation of marginal gingiva exudate Root perforation / fracture/ displaced post	Presence of plaque, subgingival calculus and swelling around multiple teeth Presence of pus, Exudate. Presence of localized/ generalized gingival recession and exposure of root	Plaque, calculus and periodontitis will be present in varying degrees. Swelling around single or multiple teeth Presence of pus, exudate
Pain	Sharp	Usually dull ache Sharp only in acute condition	Usually sharp shooting. Dull ache in chronic conditions	Usually sharp shooting. Dull ache in chronic conditions	Dull ache usually Only in acute conditions it is severe
Palpation	It does not indicate the origin	Pain on palpation	Pain on palpation	Pain on palpation	Pain on palpation
Percussion	Tender on percussion	Tender on percussion	Tender on percussion	Tender on percussion	Tender on percussion
Mobility	Fractured roots and recently traumatized teeth often present high mobility	Localized to generalized mobility of teeth	Localized mobility	Generalized mobility	Generalized mobility with higher grade of mobility related to the involved tooth
Pulp vitality using cold test, electric pulp test	A lingering response-irreversible pulpitis. No response in necrotic pulp	The pulp is vital and responsive to testing	Pulp vitality tests negative	Pulp vitality may be positive in multirooted teeth	Usually negative. Positive response in multirooted teeth
Pocket probing	None unless sinus tract	Moderate	Evident or sinus tract	Severe	Severe, connects with periapex
Sinus tracing	A radiograph with gutta percha points to apex or furcation area in molars	Sinus tract mainly at the lateral aspect of the root	Sinus tract mainly at the apex or furcation area	Sinus tract mainly at the lateral aspect of the root	Difficult to trace out the origin of the lesion
Radiographs	Possible periapical radiolucency	Decreased crestal bone height	Radiolucency from apex to sulcus, decreased crestal bone height	Bone loss approaching apex	Bone loss extending to apex
Cracked tooth	Painful response to chewing	No symptoms	Painful response to chewing	No symptoms	Painful response to chewing

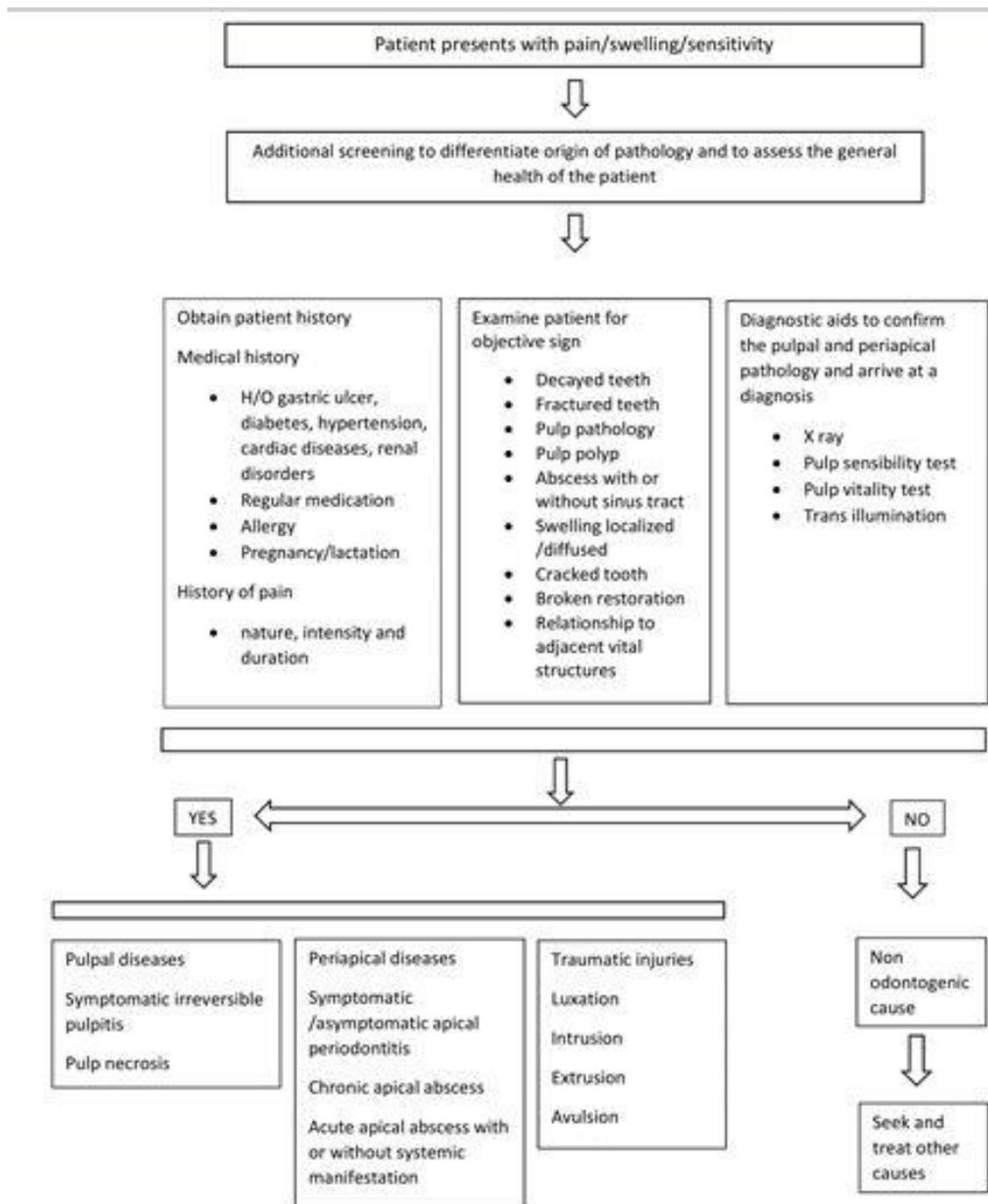


Figure 1: Decision analysis for diagnosis of endodontic-periodontal lesion.

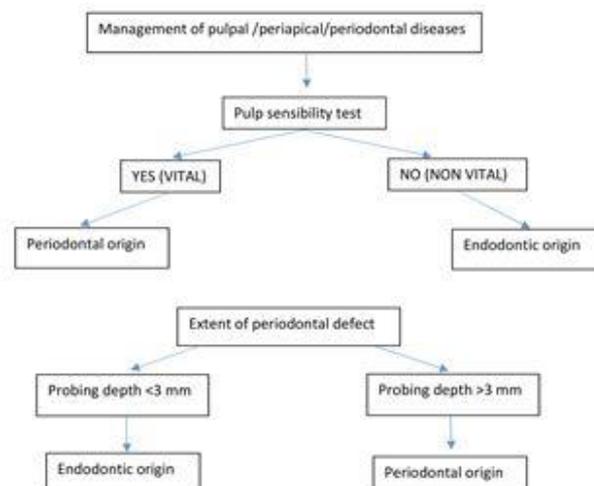


Figure 2: Decision analysis for diagnosis of endodontic-periodontal lesion.

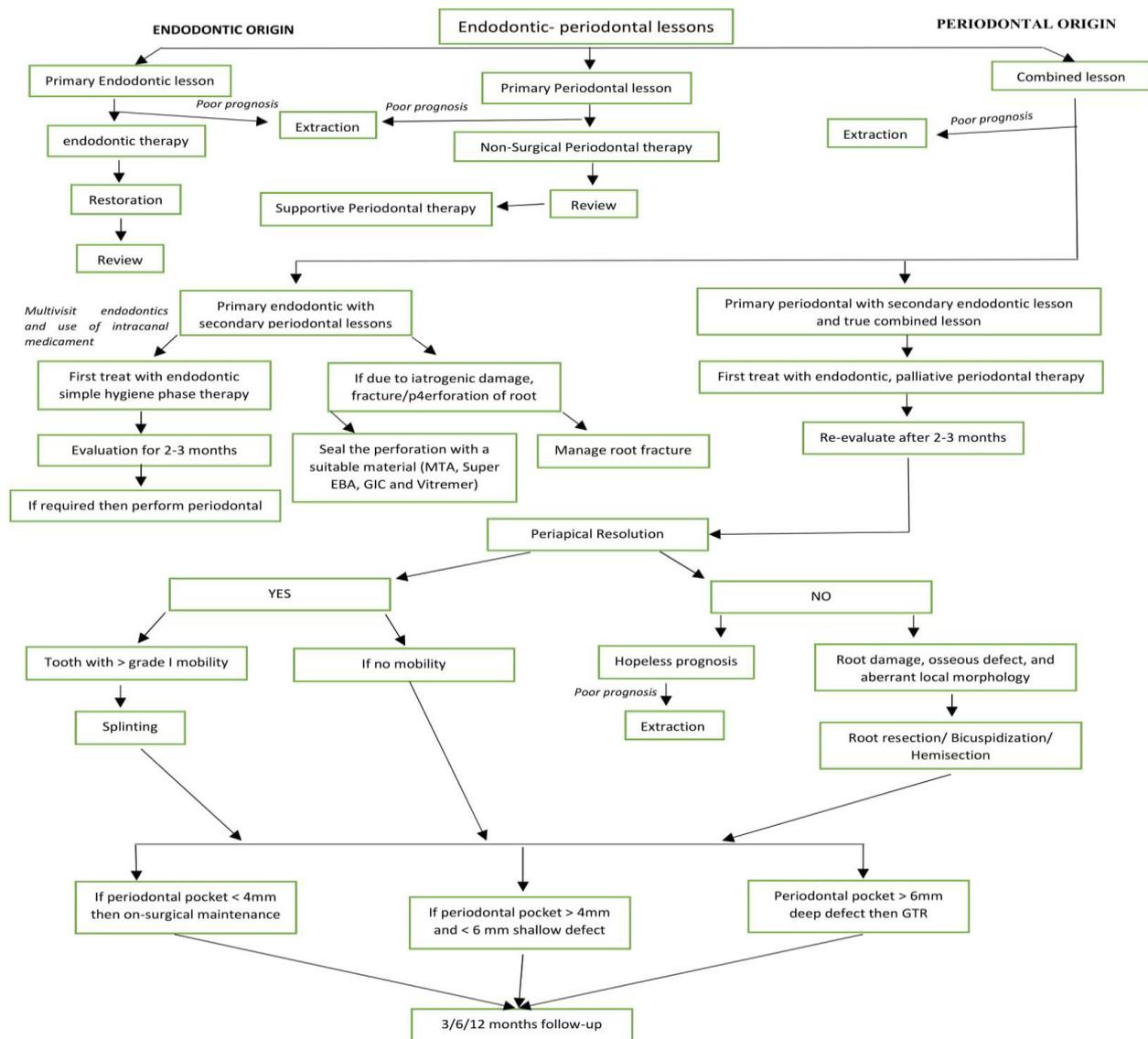


Figure 3: Decision analysis for the treatment of endodontic and periodontal lesion.

Decision analysis for the treatment of endodontic and periodontal lesion (Figure 3) [24,28-31].

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**CONFLICT OF INTEREST**

There is no conflict of interest.

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