Periodontic – Endodontic Relationship
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DEFINITION

Periodontic – Endodontic Relationship

It's the spread of inflammation and infection from one component to the other.

Embryonic, anatomic, functional
Pulpal and Periodontal problems are responsible for more than 50% of tooth mortality.


Bender IB. Factors influencing radiographic appearance of bony lesions. J Endod 8; 161-170, 1982
Perio-Endo Relationship

Dentinal Tubules

Apical Foramen

Lateral & Accessory canals
Etiologic Factors

1. Instrumentation
   (peri, resto, prosth...)

2. Progression of dental Caries
   (Bacteria or Biochemical Toxins...)

3. Direct Local Trauma
   (tooth fracture...)

Pulpal disease
**Pulpal disease** : the major causes of pulpal inflammation are:

1. Instrumentation during periodontal, Restorative, or Prosthetic dentistry.
2. Progression of dental caries.
3. Direct trauma such as tooth fracture.


Bender IB. Factors influencing radiographic appearance of bony lesions. *J Endod* 8; 161-170, 1982
Dental caries is the most common cause of pulpal disease. Due to the ability of micro-organisms and their products to penetrate through the dentinal tubules to the pulp and causing pulpal inflammation.


Bender IB. Factors influencing radiographic appearance of bony lesions. J Endod 8;161-170, 1982
The dynamics of the pulpal reaction is dictated by the following:

- Bacteria, Virulence
- Host Response
- Effectiveness Of Pulpal Circulation
- Vascular & Lymphatic Drainage
Pathogenesis

Pulpal inflammation and necrosis are initiated by:
Dental caries, Restorative procedures, Trauma, Chemical irritation and Severe thermal stimulation.

These inflammatory lesions cause localized edema and a resulting increase in intra-pulpal pressure and cell death.
Periodontal lesions are initiated by deposits of plaque and calculus:

The toxins produced by these bacteria can irritate the gum tissues and cause the body’s immune system to “turn on” (chronic inflammation) – this inflammation can break down and destroy the tissues and bone supporting the tooth. The gum tissues separate from the tooth, forming pockets. As the disease progresses, the pockets deepen, destroying more supporting tissues.
Bacteria Associated with Pulpitis

- Eubacterium
- Peptostreptococcus
- Fusobacterium
- Porphyromonas
- Prevotella
- Streptococcus
- Lactobacillus
- Wolinell
- Actinomyces
# Bacteria Associated with Periodontitis

<table>
<thead>
<tr>
<th>Very Strong</th>
<th>Strong</th>
<th>Moderate</th>
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<tbody>
<tr>
<td><em>A. actinomycetemcomitans</em></td>
<td><em>P. intermedia</em></td>
<td><em>S. intermedius</em></td>
</tr>
<tr>
<td><em>P. gingivalis</em></td>
<td><em>C. rectus</em></td>
<td><em>P. micros</em></td>
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<tr>
<td><em>B. forsythus</em></td>
<td><em>E. nodatum</em></td>
<td><em>F. nucleatum</em></td>
</tr>
<tr>
<td>Treponema sp</td>
<td>Eubacterium sp</td>
<td>E. corrodens</td>
</tr>
</tbody>
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**Note:** The table lists bacteria associated with periodontitis, sorted by their level of association with the disease, from very strong to moderate.
Classification of Pulpal Disease

- Reversible pulpitis
- Irreversible pulpitis
- Pulpal Necrosis
Classification of pulpal disease:

1- **Reversible pulpitis**: minor injury such as periodontal root planing or the conservative preparation of a tooth for a restoration may lead to pulpal damage. A transient hypersensitivity to thermal stimuli is the most common symptom noted. The response rapidly disappears after removal of the stimulus. The reversibility of inflammation and symptoms, without permanent pulpal damage, has led to classification of this condition as **reversible pulpitis**.


*Bender IB. Factors influencing radiographic appearance of bony lesions. J Endod 8:161-170, 1982*
Classification of pulpal disease:

2- **Irreversible pulpitis**: If the pulp is affected to the point that the inflammatory lesion cannot be resolved, even though the source of trauma is eliminated, a progressive degeneration of the pulp results. This progression has been described as **Irreversible pulpitis**.

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Bender IB. Factors influencing radiographic appearance of bony lesions. *J Endod* 8; 161-170, 1982
Classification of pulpal disease:

3- **pulpal necrosis**: irreversible pulpitis finally leads to loss of pulpal vitality (necrosis). Necrosis usually results from the same factors that induced the irreversible pulpitis and may lead to an alteration in the patient's symptoms.


Bender IB. Factors influencing radiographic appearance of bony lesions. *J Endod* 8;161-170, 1982
AAP Classification of Periodontal Diseases and Conditions (1999)

• **Gingival Diseases**
  – Dental plaque-induced gingival diseases
  – Non-plaque induced gingival lesions

• **Chronic Periodontitis** (Slight: 1-2mm CAL; moderate: 3-4mm CAL; severe: >5mm CAL)
  – Localized
  – Generalized (>30% of sites are involved)

• **Aggressive Periodontitis** (Slight: 1-2mm CAL; moderate: 3-4mm CAL; severe: >5mm CAL)
  – Localized
  – Generalized
AAP Classification of Periodontal Diseases and Conditions (1999)

• Periodontitis as a Manifestation of Systemic Diseases
  - Associated with hematological disorders
  - Associated with genetic disorders
  - Not otherwise specified

• Necrotizing Periodontal Diseases
  - Necrotizing ulcerative gingivitis
  - Necrotizing ulcerative periodontitis

• Abscesses of the Periodontium
  - Gingival abscess
  - Periodontal abscess
  - Pericoronal abscess
AAP Classification of Periodontal Diseases and Conditions (1999)

• Periodontitis Associated with Endodontic Lesions
  – Combined periodontic-endodontic lesions

• Developmental or Acquired Deformities and Conditions
  – Localized tooth-related factors that modify or predispose to plaque-induced gingival diseases periodontitis
  – Mucogingival deformities and conditions around teeth
  – Mucogingival deformities and conditions on edentulous ridges
  – Occlusal trauma
As long as the pulp remains vital, it is unlikely that significant changes will occur in the periodontium. Necrosis, can result in bone resorption and radiolucency at the apex, in the furcation, or at points along the root.

**Effect on the periodontium**

*Pulpal tissue inflamed may be little or no effect on the periodontium.*
Effect on the periodontium

Dental radiographs usually document the presence of apical or lateral lesion. The resulting lesion may be an acute apical lesion, or abscess, a more chronic periradicular lesion (cyst or granuloma), or lesion associated with a lateral or accessory canals. The lesion may remain small or it can expand to destroy the attachment of the tooth and communicate with a lesion of periodontitis.
Effect of the periodontitis on the dental pulp

The ability of inflammatory periodontal disease to affect the pulp is much less certain.
Effect of the periodontitis on the dental pulp

It has been suggested that the presence of an intact layer of cementum may protect the pulp from damage produced by microbiota. Sever breakdown of the pulp does not occur until periodontitis has reached a terminal state, when bacteria plaque has involved the main apical foramen. The pulp has a good capacity for defence as long as the blood supply through the apical foramen is intact. Therefore, retrograde periodontitis, if it occurs, is rare.
Effect of the periodontitis on the dental pulp

The effects of pulpal disease on the periodontium are well documented, a clear-cut relationship between periodontitis and pulpal involvement is less evident. One may consider that bacteria and the inflammatory products of periodontitis could gain access to the pulp through accessory canals, apical foramen, or dentinal tubules. This process, the reverse of the effects of a necrotic pulp on the periodontium, has been referred to as retrograde pulpitis.
Differences between periodontal and pulpal lesion

Signs and symptoms of periodontitis: teeth with chronic periodontal lesions are typically free of acute symptoms, the patient may be unaware of the condition, except for bleeding on brushing and flossing, or bad breath. Increased tooth mobility may occur if sufficient attachment has been lost. Dental radiographs usually disclose the extent of attachment loss, which should correlate with clinical probing data.
Differences between periodontal and pulpal lesion

Signs and symptoms of pulpal disease:
the teeth with pulpal inflammation respond normally to percussion and palpation.
Thermal stimuli or percussion applied to teeth with irreversible pulpitis can provoke severe pain.
This pain may be intense and is often described as bright or throbbing.
Differences between periodontal and pulpal lesion

If the inflammatory process extends to involve the periodontal ligament, the affected tooth can become tender to pressure, biting, or light tapping with an instrument. Dental radiographs usually document the presence of apical or lateral lesions. The clinician should remember that some inflamed and necrotic pulps are asymptomatic and that the patient is unaware of their existence.
These photos are from the patient shown in the previous slide. The lateral incisor tested vital and the abscess was a periodontal abscess that was initiated with pockets starting in a cingulum groove of the palatal surface.
The path of the sinus tract can be determined by carefully placing a fine gutta percha point into the fistula and then making a radiograph. The point stops within the periodontal pocket. Careful probing confirms the presence of the pocket, and dilation of the sulcus usually results in drainage.
This fistula on the labial surface looks like an endodontic abscess. Diagnosis of any abscess must include periodontal probing, periapical radiographs, vitality tests and a patient history.
Vertical root fracture
This case shows a combination of periodontitis and endodontic inflammation causing bone loss at the crest and at the apex.
**Based on the primary source of infection.**

Chronic apical lesion on a tooth with a necrotic pulp may drain coronally through the periodontal ligament into the gingival sulcus. Usually heal following well root canal treatment.

Pulpal infection may cause a tissue-destructive process that proceeds from the apical region of a tooth toward the gingival margin. **“retrograde periodontitis”**
Classification

Based on the primary source of infection.

Endodontic lesions are most frequently initiated and sustained by the apical foramen, followed by accessory and lateral canals, and most infrequently by dentinal tubules.

The prognosis of periodontal lesions is poorer than endodontic lesions and is dependant on the apical extension of the lesion.
Based on the primary source of infection.

It's untreated primary endodontic lesion involved with secondary periodontal breakdown. This cases may also occurs as a result of root perforation during root canal treatment, or where pins and posts may have been misplaced during restoration of the crown. Root fractures may also be present.
classification

Based on the primary source of infection.

In this process chronic periodontitis progresses apically along the root surface. In this cases pulpal test indicate a clinically normal pulp reaction. There is frequently an accumulation of plaque and the presence of deep pockets may be detected.
classification

Based on the primary source of infection.

The apical progression of a periodontal pocket continue until the apical tissues are involved. The pulp may become necrotic as a result of infection entering through lateral canals or apical foramen. Pulpal changes resulting from periodontal disease are more likely to occur when the apical foramen is involved. In molars not all roots may infected.

PRIMARY PERIODONTIC LESION WITH SECONDARY ENDODONTIC INVOLVEMENT.
classification

Based on the primary source of infection.

Two independent lesions, periapical and marginal, can coexist and eventually fuse with each other.

Combined endodontic-periodontic lesions
TREATEMENT
TREATEMENT

PRIMARY ENDODONTIC LESION

CONVENTIONAL ENDODONTIC THERAPY

Are sufficient to result in healing of the lesion. Periodontal treatment is not required in the absence of any periodontal involvement.
TREATMENT

Appropriate treatment varies with the presence, nature, and extent of involvement of the disease.
TREATEMENT

PRIMARY PERIODONTAL LESION
1-PERIODONTAL THERAPY
2-GUIDED TISSUE REGENERATION
3-ROOT AMPUTATION & HEMISECTION
4-PULP THERAPY
TREATMENT

PRIMARY PERIODONTAL LESION
WITH SECONDARY ENDO LESION

1-PULP THERAPY
2-PERIODONTAL THERAPY
3-ROOT AMPUTATION
4-GTR
INDEPENDENT ENDODONTIC AND PERIODONTAL LESION

ENDO - PERIO THERAPY

THE PROMPT MANAGEMENT OF THE PULPAL LESION IS THE PRIMARY CONCERN. THERAPY FOR PERIODONTITIS MAY BE DELAYED UNTIL THE ACUTE SYMPTOMS OF PULPAL DISEASE ARE ALLEVIATED.
Treatment

Independent Endodontic and Periodontal Lesion

The involvement of the apical periodontium by a pulpal lesion may obscure the symptoms of periodontitis. In most cases the lesions are independent. The patient's history and probing allow determination of the extent of each problem and the independence of the two defects. Endodontic and periodontic therapy is required for a successful result.
classification

Based on the primary source of infection.

Occurs less frequently than other, s. It is formed when an endodontic lesion progressing coronally joins an infected periodontal pocket progressing apically.

In molar teeth, root resection can be an alternative treatment.

The prognosis of a true-combined perio-endo lesion is often poor or even hopeless, especially when periodontal lesions are chronic with extensive loss of attachment.

TRUE COMBINED LESION.S
Endodontic-Periodontic lesions

Such lesion, may present with the characteristics of both diseases, which may:
**Periodontic _ Endodontic Relationship**

1. Complicate the Diagnosis

2. Complicate the Treatment Plan

3. Affect the Sequence of Care
In combined endodontic-periodontic lesions, it is generally wise to treat the Endodontic component first, because in many cases this will lead to complete resolution of the problem.
If the periodontitis progresses to involve a lateral canal or apical tissues, a secondary pulpal infection may be induced, referred to as *retrograde pulpitis*. If it exists, it is rare.
The pain from the loss of pulpal vitality is the most common complaint of patients with combined lesions.
History and careful clinical and radiographic examinations are required to identify lesion and contribution of each lesion, and to produce an optimal treatment result.
The most important factor in the treatment of perio-endo lesions is the correct diagnosis.
Removal of caries
Endodontic therapy

Furcal bone loss resolved after endodontic treatment carried out before any periodontal care.
The location, extent, severity of inflammation and the degree of tissue involvement helps the dentist to select the proper treatment.
The residual periodontal pocket that remains can be best treated. Thus, periodontal treatment may include scaling and root planing, as well as various surgical treatment. If the endodontic lesion requires apical surgery. The surgical treatment of both lesion performed at the same time.
The periodontal portion of the defect has plaque, calculus, or root roughness. This contaminated root and the associated osseous defect constitute the major complication to treatment of combined lesion. Once the decision to retain the tooth is made, endodontic therapy should precede attempts at periodontal pocket elimination. After successful endodontic treatment.
Prognosis of combined lesion:

The prognosis of periodontal lesions is poorer than endodontic lesions, and is dependant on the apical extension of the lesion.

The prognosis of a true-combined perio-endolesion is often poor or even hopeless, especially when periodontal lesions are chronic with extensive loss of attachment.
DIAGNOSIS

• PAIN
• SWELLING
• MOBILITY
• SUPPURATION
• PERIODONTAL PROBING
• PRESENCE OF LOCAL DEPOSITS
• PRESENCE OF CARIES AND RESTORATION
• PALPATION
• PULP VITALITY TEST
• RADIOGRAPHIC INTERPRETATION
DIAGNOSIS

Diagnosis of primary endodontic or periodontic disease usually easy clinically. The pulp is vital and responsive to testing in periodontic disease, while it’s infected and nonvital in primary endodontic disease.
### Clinical Findings in Endodontic and Periodontic Lesions

<table>
<thead>
<tr>
<th>Clinical Findings</th>
<th>Endo Lesion</th>
<th>Perio Lesion</th>
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<tbody>
<tr>
<td>Pulpal Response</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Bone Deformity</td>
<td>Tubular ‘U’</td>
<td>Triangular ‘V’</td>
</tr>
<tr>
<td>Plaque &amp; Calculus</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Caries/ Restoration</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Mobility</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Gen Periodontitis</td>
<td>Absent</td>
<td>Present</td>
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<tr>
<td>CLINICAL FINDINGS</td>
<td>ENDO LESION</td>
<td>COMBINED LESION</td>
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<tr>
<td>PULPAL STATUS</td>
<td>NECROTIC</td>
<td>NECROTIC</td>
</tr>
<tr>
<td>PERIO STATUS</td>
<td>NORMAL</td>
<td>GEN PERIODONTITIS</td>
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<tr>
<td>PROBING</td>
<td>NARROW POCKET</td>
<td>WIDE POCKET</td>
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<tr>
<td>PLAQUE &amp; CALCULUS</td>
<td>ABSENT</td>
<td>PRESENT</td>
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<td>TREATMENT</td>
<td>ENDODONTIC</td>
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</tr>
<tr>
<td>PROGNOSIS</td>
<td>GOOD</td>
<td>DEPENDS ON PERIO</td>
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</tbody>
</table>
There is no shame in making a mistake. It would be a shame not to learn from your mistakes.