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ENDO-PERIO LESION: A COMPREHENSIVE REVIEW OF LITERATURE

Dental Science

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ABSTRACT

Endodontic-periodontal lesions are complex disease entities that are common in daily dentistry practise but challenging to diagnose and treat. Eliminating both disease processes is necessary for the successful care of a combined periodontal and endodontic lesion. When there is a combined endo-perio lesion, endodontic therapy heals the endodontic component, but the long-term health of the tooth ultimately depends on the healing of the periodontal lesion. The present review of literature aims to discuss various aspects of endo-perio lesion in detail.

KEYWORDS

Endo-Perio Lesion, Pulp and Peridontium

INTRODUCTION:

The destructive lesion caused by inflammatory substances present in both the periodontium and the pulpal tissues has been referred to as a "endo-perio" lesion.[1,2] Due to the close ties between the endodontium and periodontium, diseases of one tissue may involve the other. Simring and Goldberg published the first description of the true connection between pulpal and periodontal disease in 1964. Since then, lesions brought on by inflammatory substances that are to varied degrees present in both the periodontium and the pulpal tissues have been referred to as "perio-endo" lesions. There are functional, anatomical, and developmental connections between the pulp and periodontium. Diagnosis and treatment planning may become more challenging if pulpal issues and inflammatory periodontal disease coexist. The present review of literature aims to discuss various aspects of endo-perio lesion in detail.

Pathway of Endo-Perio Relationship:

Periodontal structure and dental pulp are related embryologically, anatomically, and functionally. Both of them have ectomesenchymal origins. In endodontic and periodontal illnesses, the lesion's dominant flora differs. However, some were observed shredding the surroundings.[5,6] The majority of the flora in the tooth with periodontal pockets were rods and Rods and cocci made up the majority of the mobile organisms and those in the root canals. In teeth with endodontic disease, bacteria like Actinobacillus actinomycetemcomitans, Bacterioides frosythus, Ekinella corrodens, Fusobacterium nucleatum, Porphyromonas gingivalis, Prevotella intermedia, and Treponema denticola are found both apical and persistent adult periodontitis. Both endodontic infections and subgingival patients with adult periodontitis contained fungi such as Candida albicans. Periodontal and endodontic disease may be caused by cytomegalovirus, Epstein-Barr virus, and herpes virus, which can range from an increase in periodontal bacteria in periodontal pockets to participation in disorders of the pulp and periapex.[1,7]

Pathways of developmental origin (anatomical pathways):

- Apical foramen, accessory canals/lateral canals
- Congenital absence of cementum exposing dentinal tubules
- Developmental grooves

Pathways of pathological origin:

- Empty spaces on root created by Sharpey's fibers
- Root fracture following trauma
- Idiopathic root resorption - internal and external
- Loss of cementum due to external irritants.

Pathways of iatrogenic origin:

- Exposure of dentinal tubules following root planning
- Accidental lateral root perforation during endodontic procedures
- Root fractures during endodontic procedures.

Living pathogens (bacteria, fungi, and viruses) and non living pathogens are the primary etiological contributors for endoperio lesions. In addition to these, a number of additional contributory factors, including trauma, root resorptions, perforations, and dental abnormalities, are crucial in the growth and evolution of such lesions.[8,9]

(Table no.1) The pulp's state has a significant impact on how susceptible it is to microbial invasion. Microbial invasion is exceedingly difficult to succeed in a critical pulp. Oral microbes have a difficult time penetrating the surface of a healthy pulp, and they may even be completely blocked. In contrast, bacteria quickly penetrate and colonise a necrotic pulp. Inflammatory by-products of pulpal origin may leak out through these pathways when the pulp becomes necrotic and cause the adjacent alveolar bone and cementum to resorb as well as start/trigger an inflammatory vascular response in the periodontium, destroy periodontal tissue fibres, and initiate/trigger an inflammatory vascular response in the pulp. The aggressiveness of the microorganisms, the length of the illness, and the host defence mechanism all have a role in the nature and scope of periodontal damage.[10]

Classification of Endo-Perio Lesion:

The most commonly used classification was given by Simon, Glick and Frank in 1972. According to this classification, Endo-Perio lesions can be classified into:[11]

1. Primary endodontic lesion
2. Primary periodontal lesion
3. Primary endodontic lesion with secondary periodontal involvement
4. Primary periodontal lesion with secondary endodontic involvement
5. True combined lesion

Primary Endodontic Lesion:

On a tooth with a necrotic pulp, an acute exacerbation of a chronic apical lesion may leak coronally through the periodontal ligament and into the gingival sulcus. Clinically, this condition could resemble the presence of a periodontal abscess. The sinus tract that enters into the periodontal ligament would actually come from the pulp in actuality. The majority of primary endodontic lesions recover after receiving root canal therapy. If the necrotic pulp has been removed and the root canals are thoroughly sealed, the sinus tract that extends into the gingival sulcus or furcation area vanishes at an early stage.

Primary Periodontal Lesion:

Periodontal infections are the main culprits behind these lesions. Chronic periodontitis advances apically along the root surface throughout this procedure. Pulpal testing typically show a clinically normal pulpal reply. Plaque and calculus frequently build up, and the existence of deep pockets may be found.[12]

Primary Endodontic Lesion with Secondary Periodontal Involvement:

These lesions are caused primarily by periodontal pathogens. In this process, chronic periodontitis progresses apically along the root surface. In most cases, pulpal tests indicate a clinically normal pulpal reaction. There is frequently an accumulation of plaque and calculus and the presence of deep pockets may be detected.[12]

Primary Periodontal Disease with Secondary Endodontic Involvement:

Until the apical tissues are affected, the apical evolution of a periodontal pocket may persist. In this situation, an infection that enters by the apical foramen or lateral canals may cause the pulp to become necrotic. The prognosis for single-rooted teeth is typically not good. The prognosis for molar teeth may be better. Root excision might be thought of as an alternative form of treatment because not all roots may lose their supporting tissue at the same rate.[11,12]

True Combined Lesion:

Comparatively to other endodontic-periodontal issues, true combination illness is less common. It develops when an infected periodontal pocket that is growing apically combines an endodontic lesion that is growing coronally.[14] In this kind of injury, the degree of attachment loss is almost always severe, and the prognosis is uncertain. This is especially true for teeth with a single root. Root resection is an alternate procedure for molar teeth. Combination endodontic and periodontal disease may have a similar radiographic look to a tooth that has fragmented vertically. To ascertain the cause of the lesion, it could be necessary to raise a flap if a sinus tract is present.[12,13]

Diagnosis of Endo-Perio Lesion

Visual Assessment:

The lips, cheeks, oral mucosa, tongue, palate, and muscles should all be thoroughly visually inspected. Inflammation, ulcerations, and sinus tracts are looked for in the alveolar mucosa and the attached gingiva. Frequently, a necrotic pulp is connected to the presence of a sinus tract.[14]

Palpation:

Applying firm digital pressure to the mucosa covering the roots and apices is known as palpation. The mucosa is rubbed on the underlying cortical bone with the index finger. This will reveal the presence of periradicular anomalies or "hot" zones that hurt when digital pressure is applied.[15]

Tooth Mobility:

The integrity of the attachment system or the level of periodontal ligament inflammation directly relates to how mobile a tooth is. Hypermobility is quite typical when primary endodontic involvement is present, however it should not be confused with genuine mobility brought on by periodontal disease. The mobility disappears within a week of beginning endodontic therapy in patients of primary endodontic disease.[12]

Pulp Vitality Examination:

When exposed to cold, teeth containing essential pulps will experience an acute, transient pain reaction, which typically lasts no longer than a few seconds. An extended period of severe pain frequently signals irreversible pulpitis and pulpal alterations. Pulp necrosis may be indicated by a lack of reaction.[13]

Pocket Probing:

A vertical root fracture or an endodontic lesion may be present if there is a deep isolated pocket in the absence of periodontal disease. The ability to distinguish between endodontic and periodontal disease is facilitated by periodontal probing. Inflammatory periapical lesions that extend cervically into the periodontal ligament space can also cause sinuses, which can be detected with this method. Numerous defects can be seen all around the mouth in periodontal diseases, and subgingival calculus can be found.[13]

Radiograph:

Different level of bone losses may be seen in endodontic lesions. The radiographic appearance of combined endo-perio disease maybe similar to vertical root fracture.[16]

Management of Endo-Perio Lesion:

The coexistence of endodontic infection, periodontal damage, and other lesions is what makes up an endo-perio lesion. The tooth should be extracted as a possible alternative before beginning any type of extensive restorative work to cure a perio-endo lesion. Radiographs can assist in revealing therapeutic guidelines.[18,19]

Endodontic Lesion:

Calcium hydroxide can be utilised as an intracanal medication when the aetiology is solely endodontic. It inhibits resorption and promotes healing due to its antibacterial, anti-inflammatory, and proteolytic effects. Because of its transient obturating activity, which would prevent periodontal contamination of the instrumented canals via patent routes of communication, it is particularly useful in endodontic diseases with significant periapical pathology and pseudo pockets.[20]

Endodontic lesion with secondary periodontal involvement:

Periodontal involvement should first be treated with endodontic therapy. Treatment results should be evaluated in 2-3.[1]

Periodontal Lesion:

Initial therapy for primary periodontal lesions involves the hygiene phase. If necessary, periodontal surgery is carried out following the end of the hygiene phase of treatment. Only periodontal therapy may be used to treat early stage periodontal diseases with secondary endodontic involvement and limited reversible pulpal hypersensitivity. A proper diagnosis is the most crucial element in the course of treatment. The history should specifically look for signs of past illness, trauma, and pain. This will show a better plan for the following action.[21]

True Lesion:

This lesion develops when an infected periodontal pocket that is developing apically and coronally due to endodontic disease combine. Anatomical redesigning techniques including root amputation, tooth excision, and bicuspidization are alternatives for the management of endo-perio lesion. If not all roots are severely damaged, in-molar teeth root excision can be beneficial.[22-24]

Table no. 2: Management of Endo-Perio Lesion17

	Treatment	Prognosis
Primary Endodontic Lesion	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	Surgical/ non-surgical periodontal therapy. Reevaluation must be done periodically to check for retroinfection of pulp	The prognosis is entirely dependent on periodontal therapy and hence, extent of periodontal damage.
Primary Endodontic Lesion with Secondary Periodontal Involvement	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	Surgical/ non-surgical periodontal therapyEndodontic therapy	The prognosis depends upon periodontal therapy and hence, extent of periodontal damage.
True Combined Lesion	Endodontic therapy and periodontal therapy. Root resection can be in need with regenerative therapy.	Prognosis of lesion is related to extent of periodontal damage.

CONCLUSION:

Endo perio lesions make it difficult for clinicians to make an accurate diagnosis, choose the best course of action, and predict the prognosis of the affected teeth. They have a wide variety of pathophysiology, from pretty simple to fairly complex. For a good diagnosis and treatment plan to be developed, understanding these disorders is crucial.

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