



COMBINED PERIODONTAL-ENDODONTIC LESION



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Differential diagnosis

For differential diagnostic purposed the “endo-perio lesions” are best classified as *endodontic, periodontal or combined diseases*. They can also be classified by treatment depending on whether endodontic, periodontal or combined treatment modalities are necessary. They include: primary endodontic disease, primary periodontal disease and combined diseases. The combined diseases include: primary endodontic disease with secondary periodontal involvement, primary periodontal disease with secondary endodontic involvement, and true combined diseases.

Primary endodontic disease

An acute exacerbation of a chronic apical lesion on a tooth with a necrotic pulp may drain coronally through the periodontal ligament into the gingival sulcus. This condition may mimic clinically the presence of a periodontal abscess. In reality, it is a sinus tract from pulpal origin that opens through the periodontal ligament area. For diagnosis purposes, it is imperative for the clinician to insert a gutta-percha cone into the sinus tract and to take one or more radiographs to determine the origin of the lesion. When the pocket is probed, it is narrow and lacks width. A similar situation occurs where drainage from the apex of a molar tooth extends coronally into the furcation area. This may also occur in the presence of lateral canals extending from a necrotic pulp into the furcation area.

Primary endodontic diseases usually heal following root canal treatment. The sinus tract extending into the gingival sulcus or furcation area disappears at an early stage once the necrotic pulp has been removed and the root canals are well sealed. It is important to recognize that failure of any periodontal treatment will occur when the presence of a necrotic pulp has not been diagnosed, and endodontic treatment has not followed.

Primary periodontal disease

These lesions are caused primarily by periodontal pathogens. In this process, chronic periodontitis progresses apically along the root surface. In most cases, pulp tests indicate a clinically normal pulpal reaction. There is frequently an accumulation of plaque and calculus and the pockets are wider. The prognosis depends upon the stage of periodontal disease and the efficacy of periodontal treatment. The clinician must also be aware of the radiographic appearance of periodontal disease associated with developmental radicular anomalies.

Combined diseases

Primary endodontic disease with secondary periodontal involvement

If after a period of time a suppurating primary endodontic disease remains untreated, it may become secondarily involved with periodontal breakdown. Plaque forms at the gingival margin of the sinus tract and leads to plaque-induced periodontitis in the area. When plaque or calculus is detected, the treatment and prognosis of the tooth are different that 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 plaque-induced periodontitis 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 space can be anticipated.



fig 1. Primary endodontic disease in a mandibular first molar with a necrotic pulp. (A) Preoperative radiograph showing periapical and interradicular radiolucencies. (B) Radiograph taken upon completion of root canal treatment. (C) One year follow up radiograph showing evidence of bony healing.

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 restoration. Symptoms may be acute, with periodontal abscess formation associated with pain, swelling, pus or exudates, pocket formation, and tooth mobility. A more chronic response may sometimes occur with out pain, and involves the sudden appearance of a pocket with bleeding on probing or exudation of pus. When the root perforation is situated close to the alveolar crest, it may be possible to raise a flap and repair the defect with an appropriate filling material. In deeper perforations, or in the roof of the furcation, immediate repair of the perforation has a better prognosis than management of an infected one. Use of mineral trioxide aggregate has resulted in cemental healing following immediate repair.



Fig 2 Primary endodontic disease in a mandibular first molar with a necrotic pulp. (A) Preoperative radiograph showing large periradicular radiolucency associated with the distal root and furcal lucency. (B) Clinically, a deep narrow buccal periodontal defect can be probed. (C) One year following root canal treatment. (D) Clinically, the buccal defect healed and probing is normal.

Root fractures may also present as primary endodontic lesions with secondary periodontal involvement. These typically occur on root-treated teeth, often with post and crowns. The signs may range from a local deepening of a periodontal pocket to more acute periodontal abscess formation. Root fractures have also become an increasing problem with molar teeth that have been treated by root resection.

Primary periodontal disease with secondary endodontic involvement

The apical progression of a periodontal pocket may continue until the apical tissues are involved. In this case the pulp may become necrotic as a result of infection entering via lateral canals or the apical foramen. In molar teeth the prognosis may be better. Since not all the roots may suffer the same loss of supporting tissues, root resection can be considered as a treatment alternative.

The effect of the progression of chronic periodontitis on the vitality of the pulp is controversial. If the blood supply circulating through the apex is intact, the pulp has good prospects for survival. It has been reported that pulpal changes resulting from periodontal disease are more likely to occur when the apical foramen is involved. In these cases, bacteria originating from the periodontal pocket are the most likely source of the root canal infection. A strong correlation between the presence of microorganisms in root canals and their presence in periodontal pockets of advanced periodontitis has been demonstrated. Support for this concept has come from research in which cultured samples obtained from the pulp tissue and radicular dentin of periodontal involved human teeth showed bacterial growth in 87% of the teeth.

The treatment of periodontal disease can also lead to secondary endodontic involvement. Lateral canals and dentinal tubules may be opened to the oral environment by scaling and root planning or surgical flap procedures. It is possible for a blood vessel within a lateral canal to be served by a curette and for microorganisms to be pushed into the area during treatment, resulting in pulp inflammation and necrosis.



Fig 3 True combined endodontic-periodontal diseases in a mandibular first molar. (A) Preoperative radiograph showing periradicular radiolucencies. Pulp sensitivity tests were negative. (B) Immediate postoperative radiograph of nonsurgicle endodontic treatment. (C) Six-month follow-up radiograph showing no healing. Gutta-percha cone is inserted in the buccal gingival sulcus. (D) Clinical photograph showing treatment of the root surfaces and removal of the periradicular lesion. (E) One-year follow-up radiograph demonstrating healing.

True combined disease

True combined endodontic-periodontal disease occurs less frequently than other endodontic-periodontal problems. It is formed when an endodontic disease progressing coronally joins with an infected periodontal pocket progressing apically. The degree of attachment loss in this type of lesion is invariably large and the prognosis 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 required. In most cases periodical 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.

The radiographic appearance of combined endodontic-periodontal disease may be similar to that of a vertically fractured tooth. A fracture that has invaded the pulp space, with resultant necrosis, may also be labeled a true combined lesion and yet not be amenable to successful treatment. If a sinus tract is present, it may be necessary to raise a flap to determine the etiology of the lesion.

Treatment decision-making and prognosis

Treatment decision making and prognosis depend primarily on the diagnosis of the specific endodontic and / or periodontal disease. The main factors to consider are pulp vitality and type and extent of the periodontal defect. Diagnosis of primary endodontic disease and primary periodontal disease usually present no clinical difficulty. In primary endodontic disease the pulp is infected and nonvital. In primary periodontal disease the pulp is vital and responsive to testing. However, primary endodontic disease with secondary periodontal involvement, primary periodontal disease with secondary endodontic involvement, or true combined diseases are clinically and radiographically very similar. If a lesion is diagnosed and treated as primarily endodontic disease due to lack of evidence of plaque induced periodontitis, and there is soft-tissue healing on clinical probing and bony healing on a recall radiograph, a valid retro-spective diagnosis can then be made. The degree of healing that has taken place following root canal treatment will determine the retrospective classification. In the absence of adequate healing, further periodontal treatment is indicated.

The prognosis and treatment of each endodontic periodontal disease type varies. Primary endodontic disease should only be treated by endodontic therapy and has a good prognosis. Primary Periodontal disease should only be treated by periodontal therapy. In the case, the prognosis depends on severity of the periodontal disease and patient response. Primary endodontic disease with secondary periodontal involvement should first be treated with endodontic therapy. Treatment results should be evaluated in 2-3 months and only then should periodontal treatment be considered. This sequence of treatment allows sufficient time for initial tissue healing and better assessment of the periodontal condition. It also reduces the potential risk of introducing bacteria and their byproducts during the initial healing phase. In this regard, it was suggested that the periodontal healing was adversely affected by aggressive removal of the periodontal ligament and underlying cementum during interim endodontic therapy). Areas of the roots that were not aggressively treated showed unremarkable healing. Prognosis of primary endodontic disease with secondary periodontal involvement depends primarily on the severity of periodontal involvement, periodontal treatment and patient response.

Primary periodontal disease with secondary endodontic involvement and true combined endodontic periodontal diseases require both endodontic and periodontal therapies. It has been demonstrated that intrapulpal infection tends to promote epithelial downgrowth along a denuded dentin surface. Additionally, experimentally induced periodontal defects around infected teeth were associated with 20 % more epithelium than non infected teeth .Non infected teeth showed 10 % more connective tissue coverage than infected teeth. The prognosis of primary periodontal disease with secondary endodontic involvement and true combined diseases depends primarily upon the severity of the periodontal disease and the response to periodontal treatment. Cases of true combined disease usually have a more guarded prognosis than the other types of endodontic periodontal problems.

In general, assuming the endodontic therapy is adequate, what is of endodontic origin will heal. Thus the prognosis of combined diseases rests with the efficacy of periodontal therapy.