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CLINICAL CLASSIFICATION OF PULPAL AND PERIAPICAL DISEASES

Clinical classifications of pulpal and periapical disease have been developed in order to formulate treatment plan options.

Pulpal Disease

1- Normal Pulp

2- Pulpitis

- ***A. Reversible Pulpitis***
- ***B. Irreversible Pulpitis***
  - **B.1. Symptomatic Irreversible Pulpitis**
  - **B.2.Asymptomatic Irreversible Pulpitis**

3- Pulp Necrosis

Pulpal Disease

1. Normal Pulp

Clinically: the pulp is symptom-free and normally responsive to pulp testing. Teeth with normal pulp do not usually exhibit any spontaneous symptoms. The symptoms produced from pulp tests are mild, do not cause the patient distress, and result in a transient sensation that resolves in seconds.

Radiographically: there may be varying degrees of pulpal calcification but no evidence of resorption, caries, or mechanical pulp exposure.

Treatment: No endodontic treatment is indicated for these teeth.

2. Pulpitis: mean inflammation of the dental pulp, clinically described as reversible or irreversible and histologically described as acute, chronic, or hyperplastic.

A. Reversible Pulpitis:

Clinically: When the pulp within the tooth is irritated so that the stimulation is uncomfortable to the patient, but reverses quickly after irritation, it is classified as reversible pulpitis.

Causative factors:

- Caries.
- Exposed dentin.
- Recent dental treatment.
- Defective restorations.

Treatment: Conservative removal of the irritant will resolve the symptoms.

Confusion can occur when there is exposed dentin, without evidence of pulp pathosis, which can sometimes respond with sharp, quickly reversible pain when subjected to thermal, evaporative, tactile, mechanical, osmotic, or chemical stimuli. This is known as dentin (or dentinal) sensitivity (or hypersensitivity).

Exposed dentin in the cervical area of the tooth accounts for most of the cases diagnosed as dentin sensitivity.

Detailed questioning about recent dental treatment and a thorough clinical and radiographic examination will help to separate dentin sensitivity from other pulpal pathosis, as the treatment modalities for each are completely different.

B. Irreversible Pulpitis

As the disease state of the pulp progresses, the inflammatory condition of the pulp can change to irreversible pulpitis. At this stage, treatment to remove the diseased pulp will be necessary. This condition can be divided into the subcategories of symptomatic and asymptomatic irreversible pulpitis.

B.1. Symptomatic Irreversible Pulpitis

This is a clinical diagnosis based on subjective and objective findings indicating that the vital inflamed pulp is incapable of healing. **Clinically:** Teeth with symptomatic irreversible pulpitis exhibit intermittent or spontaneous pain. Rapid exposure to dramatic temperature changes (especially to cold stimuli) will elicit heightened and prolonged episodes of pain even after the thermal stimulus has been removed.

The pain in these cases may be sharp or dull, localized, diffuse, or referred.

Radiographically: there are minimal or no changes in the radiographic appearance of the periradicular bone. With advanced irreversible pulpitis, a thickening of the periodontal ligament may become apparent on the radiograph, and there may be some evidence of pulpal irritation by virtue of extensive pulp chamber or root canal space calcification. Deep restorations, caries, pulp exposure, or any other direct or indirect insult to the pulp, recently or historically, may be present.

Typically, when symptomatic irreversible pulpitis remains untreated, the pulp will eventually become necrotic.

B.2. Asymptomatic Irreversible Pulpitis

Clinically: The patient, however, does not complain of any symptoms. On occasion, deep caries will not produce any symptoms, even though clinically or radiographically the caries may extend well into the pulp. Left untreated, the tooth may become symptomatic or the pulp will become necrotic.

Treatment: In cases of asymptomatic irreversible pulpitis, endodontic treatment should be performed as soon as possible so that symptomatic irreversible pulpitis or necrosis does not develop and cause the patient severe pain and distress.

A. Pulp Necrosis

This is a clinical diagnostic category indicating death of the dental pulp.

Clinically: The pulp is usually nonresponsive to pulp testing. When pulpal necrosis (or nonvital pulp) occurs, the pulpal blood supply is non existent and the pulpal nerves are non-functional. It is the only clinical classification that directly attempts to describe the histologic status of the pulp. After the pulp becomes completely necrotic, the tooth will typically become asymptomatic until such time when there is an extension of the disease process into the periradicular tissues. With pulp necrosis, the tooth will usually not respond to electric pulp tests or to cold stimulation.

However, if heat is applied for an extended period of time, the tooth may respond to this stimulus. This response could possibly be related to remnants of fluid or gases in the pulp canal space expanding and extending into the periapical tissues.

Pulpal necrosis may be partial or complete and it may not involve all of the canals in a multirooted tooth. For this reason, the tooth may present with confusing symptoms. Pulp testing over one root may give no response, whereas over another root it may give a positive response. The tooth may also exhibit symptoms of symptomatic irreversible pulpitis. Pulp necrosis, in the absence of restorations, caries, or luxation injuries, is likely caused by a longitudinal fracture extending from the occlusal surface and into the pulp.

After the pulp becomes necrotic, bacterial growth can be sustained within the canal. When this infection (or its bacterial by products) extends into the periodontal ligament space, the tooth may become symptomatic to percussion or exhibit spontaneous pain.

Radiographically: changes may occur, ranging from a thickening of the periodontal ligament space to the appearance of a periapical radiolucent lesion.

The tooth may become hypersensitive to heat, even to the warmth of the oral cavity, and is often relieved by applications of cold. As previously discussed, this may be helpful in attempting to localize a necrotic tooth (i.e., by the application of cold one tooth at a time) when the pain is referred or not well localized.

Apical (Periapical) Disease

1. Normal Apical Tissues

This classification is the standard against which all of the other apical disease processes are compared.

Clinically: the patient is asymptomatic and the tooth responds normally to percussion and palpation testing.

Radiographically: reveals an intact lamina dura and periodontal ligament space around all the root apices.

2. Periodontitis

This refers to an inflammation of the periodontium. When located in the periapical tissues it is referred to as apical periodontitis. Apical periodontitis can be sub-classified to symptomatic apical periodontitis and asymptomatic apical periodontitis.

A. Symptomatic Apical Periodontitis

This condition is defined as an inflammation, usually of the apical periodontium,

Clinically: painful response to biting or percussion or palpation. This tooth may or may not respond to pulp vitality tests,

Radiographically: image of the tooth will typically exhibit at least a widened periodontal ligament space and may or may not show an apical radiolucency associated with one or all of the roots.

B. Asymptomatic Apical Periodontitis

This condition is defined as inflammation and destruction of apical periodontium that is of pulpal origin, appears as an apical radiolucent area, and does not produce clinical symptoms.

Clinically: This tooth does not usually respond to pulp vitality tests. The tooth is generally not sensitive to biting pressure but may “feel different”

to the patient on percussion. Manifestation of persistent apical periodontitis may vary among patients.

Radiogrphically: image of the tooth will exhibit an apical radiolucency.

3. Acute Apical Abscess

This condition is defined as an inflammatory reaction to pulpal infection and necrosis, characterized by rapid onset, spontaneous pain, tenderness of the tooth to pressure, pus formation, and swelling of associated tissues.

Clinically: A tooth with an acute apical abscess will be acutely painful to biting pressure, percussion, and palpation. This tooth will not respond to any pulp vitality tests and will exhibit varying degrees of mobility. Swelling will be present intraorally and the facial tissues adjacent to the tooth will almost always present with some degree of swelling. The patient will frequently be febrile, and the cervical and submandibular lymph nodes may exhibit tenderness to palpation.

Radiographically: the image can exhibit anything from a widened periodontal ligament space to an apical radiolucency.

Chronic Apical Abscess

This condition is defined as an inflammatory reaction to pulpal infection and necrosis characterized by gradual onset, little or no discomfort, and the intermittent discharge of pus through an associated sinus tract.

Clinically: In general, a tooth with a *chronic apical abscess* will not present with clinical symptoms. The tooth will not respond to pulp vitality tests. Usually the tooth is not sensitive to biting pressure but can "feel different" to the patient on percussion. This entity is distinguished from asymptomatic apical periodontitis because it will exhibit intermittent drainage through an associated sinus tract.

radiographically: the image will exhibit an apical radiolucency.

Apical (Periapical) Disease

1. **Normal Apical Tissues**
2. **Periodontitis**
   - **A. Symptomatic Apical Periodontitis**
   - **B. Asymptomatic Apical Periodontitis**
3. **Acute Apical Abscess**
4. **Chronic Apical Abscess**