Systematic Endodontic Diagnosis

Published as an insert to the Fall/Winter 1996 edition of ENDODONTICS: Colleagues for Excellence

The following outline provides a quick review of the steps taken in endodontic diagnosis:

I. **Chief Complaint**—Record symptoms or problems expressed by the patient in his or her own words.

II. **Health History**
- A. Medical history
  - 1. Take a complete medical history for each new patient.
  - 2. Update the medical history of each patient of record.
- B. Dental history
  - 1. Summarize present and past dental treatment
  - 2. May provide subtle clinical findings or identify source of patient's complaint
  - 3. Attitudes toward dental health and treatment may affect treatment planning.
- C. Present signs and symptoms

III. **Diagnostic Evaluations**
- A. Subjective Examination—obtain information by question and answer regarding history of the present illness and symptoms.
  1. Location—In some cases the patient may be able to identify
  2. Intensity—The more the pain disrupts the patient's lifestyle, the more likely it is caused by irreversible pathosis.
  3. Duration—Does pain linger after the stimulus is removed?
  4. Stimulus—Pulp tests should be chosen based upon what provokes the patient's chief complaint.
  5. Relief—Medications or actions (such as sipping ice water) taken to relieve pain.
  6. Spontaneity—Pain occurring without stimulus.

Tentative Diagnosis
After taking histories and identifying signs and symptoms, the practitioner may reach a tentative diagnosis. The objective examination will gather the information necessary to confirm this diagnosis.

- B. Objective Examination
  1. Extraoral Examination
     - a. Check general appearance, skin tone, and facial asymmetry.
     - b. Note any swelling, redness, sinus tracts, tender or enlarged lymph nodes, or tenderness or discomfort upon palpation or movement of the TMJ.
  2. Soft Tissue—Examine the mucosa and gingiva visually and digitally for discoloration, inflammation, ulceration, swelling, and sinus tract formation.
  3. Dentition—Examine teeth for discoloration, fracture, abrasion, erosion, caries, large restorations, discoloration or other abnormalities.
  4. Clinical Tests—Most tests have inherent limitations. They require care on application and interpretation. The objective is to discover which tooth is different from the patient's other teeth. Always test healthy control teeth first.
     - a. Periradicular Tests
       - (1) Percussion—a painful response is an indicator of periradicular inflammation.
       - (2) Palpation—same as above
     - b. Pulp Vitality Tests—These determine response to stimuli and may identify the offending tooth with an abnormal response. Always include stimuli similar to those that provoke the patient's chief complaint.
       - (1) Cold Test
         - (a) Intense, prolonged pain indicates an irreversible pulpitis.
         - (b) Necrotic pulps do not respond.
         - (c) A false-negative response may occur with constricted canals.
       - (2) Heat Test—same as for cold test

Electric Pulp Testing
Contrary to popular opinion and persistent notion, different response levels in electric pulp testing do not indicate different stages of pulp degeneration. Electric pulp testers do not measure the degree of health or disease of a pulp. A "yes or no" response is merely a rough indicator of the presence or absence of vital nerve tissue in the root canal system.

       - (3) Electric Pulp Testing
         - (a) Before testing, clean, dry, and isolate the teeth, then place a small amount of toothpaste or other conductor on the electrode. Be sure to follow your manufacturer's instructions for establishing an electrical circuit and to ensure accurate measurement with your instrument.
         - (b) Sensation may be described as tingling, stinging, or a feeling of heat, "fullness," or pressure.
       - (4) Test cavity—may be helpful, especially for a tooth with a porcelain-fused-to-metal crown (PFM). Sudden, sharp sensation when the bur cuts dentin indicates that the pulp contains vital tissue.
     - c. Periodontal Examination—periodontal probing cannot be overemphasized, since pulpal and periodontal pathosis sometimes mimic each other and must be differentiated.

C. Radiographic Examination
   1. Limitations
      a. Pathologic vital pulps are not visible on radiographs.
      b. Necrotic pulps may not produce radiographic changes in early stages.
      c. To be visible, the inflammatory process must spread to cortical bone.
   2. Periradicular
      a. Periradicular lesions of pulpal origin tend to have three characteristics:
         (1) Loss of lamina dura apically
         (2) Radiolucency remaining at the apex regardless of cone angle
         (3) Radiolucency resembling a "hanging-drop"
      b. If a radiolucency is in the periradicular region of a tooth with a vital pulp, it cannot be of pulpal origin and will be either a normal structure or another type of pathosis.
      c. Follow up or biopsy may be required with radiolucencies not of pulpal origin.
   3. Pulpal
      a. Radiographically visible pulpal pathoses are only rarely related to irreversible pulpitis.
      b. Internal resorption or extensive diffuse calcification in the chamber may indicate long-term, low-grade irritation.
      c. "Obliteration" of canals (usually with history of trauma) does not, in itself, indicate need for treatment.

D. Special Tests—if special circumstances prevent making a definitive diagnosis, additional tests may be indicated.
   1. Caries Removal—in an asymptomatic vital case, caries is removed as a final test. Penetration into the pulp indicates an irreversible pulpitis requiring root canal treatment.
   2. Selective Anesthesia—useful in painful teeth, particularly when the patient cannot isolate the offender to a specific arch.
   3. Transillumination—for identification of vertical crown fractures, since fractured segments do not transmit the light similarly. Dark and light shadows appear at the fracture site.

IV. **Analyze the data you have obtained**—Findings may not always be consistent, and the process of arriving at a final diagnosis depends heavily on the practitioner's critical evaluation of the findings.

V. **Formulate an appropriate diagnosis and treatment plan**—In addition to diagnosing pathoses and their indicated treatments, the practitioner must take into account the patient's overall needs, know the indications and contraindications for root canal therapy, and recognize those conditions that make treatment difficult.

The American Association of Endodontists cannot guarantee success in every case. Practitioners must always use their best professional judgment in individual situations. The AAE neither expressly nor implicitly warrants any positive results nor expressly nor implicitly warrants against any negative results associated with the application of this information.

If you would like more information on endodontic diagnostic considerations, call your local endodontist or write to the American Association of Endodontists, 211 E. Chicago Ave., Ste. 1100, Chicago, IL 60611-2691,312/266-7255, fax 312/266-9867. References are available upon request.